Operating manual

Multitron Standard

Incubation Shaker

CE

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Engineering and production in Switzerland

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1 General Information

1.1 About this Manual

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

This manual is a component part of the equipment. It must be kept near to the equipment and must be accessible to the operators at all times. The operators must read thoroughly and fully understand this manual before commencement of any work.

Adhering to all the points, advice and instructions concerning safety and operation in this operating manual is a pre-condition for safe working.

Furthermore, local rules for accident prevention and general safety regulations relevant to the equipment's field of application may be in force.

This manual contains pictures which aid general understanding and can differ from the actual equipment as supplied.

NOTICE!

Application notes are available for several issues.

They are provided as PDF-Downloads on the website of the manufacturer.

1.2 Symbols

Safety Instructions

Safety instructions are labeled using symbols. All safety instructions begin with a word that signifies the degree of hazard.

Strictly follow all safety points and act with due caution to avoid accidents, damage to equipment, personal injuries and loss of property.

DANGER!

… points out an immediate, dangerous situation that leads to death or severe injuries unless avoided.

WARNING!

… points out a potentially dangerous situation that may lead to death or severe injuries unless avoided.

CAUTION!

… points out a possibly dangerous situation that leads to slight or minor injuries unless avoided.

CAUTION!

… points out a possibly dangerous situation that leads to damage to property unless avoided.

Hints and Recommendations

NOTICE!

… highlights useful hints and recommendations as well as information for safe and efficient use of the equipment.

Specific Safety Instructions

The following safety instructions are used to call attention to particular hazards.

DANGER!
Danger of fatal electric shock!

…signifies danger by electric current. Non-observance of safety instructions may lead to a severe or fatal physical injury.

WARNING!
Danger of infectious substances!

… signifies danger by infectious substances (e.g. liquids which contain bacteria or viruses). Non-observance of safety instructions may lead to serious or fatal infections.

1.3 Limitation of Liability

All information and instructions in this manual comply with current standards and regulations, as well as the current state of technology & the manufacturer's knowledge and experience.

The manufacturer will not be held responsible for losses arising from:

- Non-observance of the points listed in the operating manual
- Incorrect and inappropriate use of the equipment
- Unqualified personnel using the equipment
- Arbitrary modifications
- Unauthorised technical changes
- Arbitrary repair
- Utilisation of unauthorised spare parts

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

Obligations stated in the delivery contract, general conditions of contract, the manufacturer's delivery conditions and the current legal regulations at the time of conclusion of the contract will apply.

1.4 Copyright Protection

This operating manual is protected by copyright and exclusively intended to be used for in-house purposes.

To pass this manual on to a third party, to copy or duplicate it – in part or as a whole – and to exploit or communicate its content by transmission outside the workplace is not allowed unless authorised in written form by the manufacturer.

Contravention will lead to liability for damages. All rights are reserved.

1.5 Spare parts

WARNING!
Safety risk due to incorrect spare parts!

Inappropriate or faulty spare parts may impair safety and/or may lead to damage, malfunction or complete breakdown

Therefore:

– Use only original spare parts from the manufacturer.

Spare parts may be purchased from an authorised dealer or direct from the manufacturer. See address on page 2

1.6 Terms of Guarantee

The terms of the guarantee are included in the manufacturer's general conditions of business contract to supply.

1.7 Customer Service

Our customer service is at your disposal for technical advice. See contact details on page 2.

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

1.8 Declaration of Conformity

The incubation shaker Multitron Standard complies in terms of Directive 2006 / 42 EC on machinery with the following relevant regulations:

- Directive on machinery 2006 / 42 / EC
- EMC Directive 2004 / 108 / EC.

2 Safety

This section outlines all important safety aspects for optimal personnel protection and for the safe and error-free operation of the equipment.

Non-observance of the operational descriptions and safety instructions listed in the operating manual may lead to serious hazards.

2.1 Responsibility of the operator

The equipment is used in industrial domains, institutes and academic workplaces. Therefore an operator is individually liable with regard to statutory duties relating to operational safety.

All regulations concerning health & safety, accident prevention and environmental protection of the workplace must be complied with alongside all safety instructions in this manual. In particular:

- The operator must be informed about the current industrial safety regulations. He must carry out a risk assessment to identify additional hazards due to special working conditions related to the equipment's area of application. They must declare these hazards in the form of directives for the equipment's operation.
- The operator must ensure that these directives comply with current legal regulations and adapt them as necessary.
- The operator must clearly regulate and define responsibility for installation, operation, maintenance and cleaning.
- The operator must ensure that all employees using the equipment have read and understood the operating manual. Beyond that, he must provide training and inform personnel at regular intervals regarding potential dangers.
- The operator must provide the employees with the necessary protective equipment.

Furthermore, the operator is responsible for the equipment's maintenance in correct operational condition. Therefore, the following applies:

- The operator must ensure that the maintenance frequency, as stated in the operating manual, is adhered to.
- The operator must ensure that all safety devices are checked regularly for efficiency and integrity.

2.2 Requirements for qualified personnel

WARNING!
Risk of injury when used by anyone inadequately qualified!

Inappropriate use of the equipment may lead to serious physical injury and material damage.

Therefore:

– All operations must be executed by qualified personnel only.

The following qualifications for different operations are listed in the operating manual:

- **Qualified electrician**
  is capable of carrying out work on electrical systems, identifying and avoiding possible hazards independently due to their professional standing, experience, skills and knowledge of relevant standards and regulations.
  The qualified electrician is familiar with the site on which they are operating and knows the relevant standards and regulations.
- **Qualified personnel**
  are capable of carrying out the assigned work, identifying and avoiding possible hazards independently due to their professional standing, experience, skills and knowledge of relevant standards and regulations.
- **Qualified personnel in biology, biotechnology or chemical engineering**
  are capable of carrying out work in the field of biology, biotechnology or chemical engineering alongside the chemical or biological process chain due to their professional standing, experience, skills and knowledge of relevant standards and regulations.
  This includes regulations concerning health and environmental protection, safety at work, plant safety and taking quality management into account at work. They are capable of identifying and avoiding possible hazards independently. The qualified personnel in biology, biotechnology or chemical engineering are familiar with the site on which they are operating and know the relevant standards and regulations.

2.2.1 Unauthorised persons

WARNING!
Danger for unauthorised persons!

Unauthorised persons are those who do not fulfill the criteria described here and so may not appreciate any of the dangers related to operation.

Therefore:

– Keep unauthorised people away from the area of operation.
– Challenge and remove any such persons from the area of operation, if in doubt.
– Halt operation as long as unauthorised personnel remain in the area of operation

2.3 Conventional use of the equipment

The equipment is designed and constructed only for conventional uses as described here.

The equipment is conventionally used only as an incubation shaker for (depending on the equipment version and selected options) microorganisms, cell culture and photo sensitive cells.

Conventional use of the equipment also includes following all instructions in this operating manual.

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

WARNING!
Danger by misuse!

Misuse of the equipment may lead to dangerous situations.

In particular, desist from using the equipment in any of the following ways:

– Producing explosive gases e.g. methane, hydrogen etc.
– Producing overpressure in the cultivation vessel(s) caused by biologic activity.
– Uncontrolled cultivation of toxic or pathogenic organisms.

The following containers for cultivation are allowed:

- Erlenmeyer flasks up to 5000 mL made of borosilicate glass, e.g. Schott Duran® glass, or made of synthetics, e.g. polycarbonate such as e.g. Corning® etc.
- Fernbach flasks up to 3000 mL made of borosilicate glass, e.g. Schott Duran® glass, or made of synthetics, e.g. polycarbonate such as e.g. Corning® etc.
- Other possibilities are:
  - Test tubes
  - Centrifuge tubes
  - Microtitre plates
  - Deep-well plates

NOTICE!

The cultivation vessel(s) must be fixed to the tray with the appropriate holding devices (clamps, adhesive matting, test tube rack etc.) corresponding to the shaking speed of the equipment.

CAUTION!
Risk of loss of property caused by increased abrasion due to incorrect loading of the tray!

Drive and mechanical parts of the shaking table may be damaged if other type of flasks as permitted or larger working volumes as permitted are used.

Therefore:

– Working volume must not be more than 1/3 of the total volume of the flask.
– Do not use flow diffusing inserts in the flasks.
– Reduce the loading or the shaking speed until the equipment runs smoothly, if loud noises or strong vibrations occur!

2.4 Personal protective equipment

It is essential to wear personal protective equipment to minimise health hazards

- Always wear the personal protective equipment which the particular activity requires.
- Always follow instructions available in the workplace, regarding the use of personal protective equipment

Strictly to be worn

Strictly to be worn for all activities:

Protective clothes

To protect against contamination and carryover of viable organisms. Must be tight-fitting and only slightly tear proof work clothes with tight sleeves and no loose material.

Protective cap

To protect against contamination and carryover of viable organisms.

Protective gloves (chemical resistant)

To protect hands from aggressive substances.
Check gloves are impermeable before use. Clean gloves before taking them off and store in a well-ventilated location after use.

Safety goggles

To protect the eyes against liquid splashes

Safety shoes

To protect against loose materials falling and slipping on substances coating the floor.

Wearing for a particular activity

Personal protective equipment is required when executing particular activities. This is indicated within the individual chapters of this manual. The personal protective equipment is explained as follows:

2.5 Particular hazards

The following section contains additional risks which were identified on the basis of a risk assessment.

- Observe all safety instructions and warning notices in this and the following sections, in order to reduce health hazards and to avoid dangerous situations.

Electric current

DANGER!
Danger of fatal electric shock!

There may be fatal danger by touching components connected to a mains power supply (single or 3-phase). Damage to insulation or components may have fatal consequences!

Therefore:

– Immediately turn off the electrical supply when the insulation is damaged and initiate a repair.
– Qualified electricians only must be used to make these repairs on the electrical system.
– Disconnect electrical components from the mains supply and check whether it is electrically isolated before making any repairs.
– Turn off the electrical supply and lock off any isolation switch before commencing maintenance, cleaning or repairing.
– Do not bypass fuses or take them out of operation. Adhere to the correct rates (in Amps) when replacing fuses.
– Keep components which are electrically powered away from humidity, as excessive moisture may lead to short circuit.
– Do not expose equipment to inappropriate environmental temperatures outside the stated operating range.
– Never open the housing covers of the basic unit and control panel when the electrical supply is turned on.

Safety

Biohazard

WARNING!
Biohazard!

Noncompliance with biological safety regulations increases the health risk of the operator and the risk of lower equipment functionality.

Therefore:

– Strictly follow all biological safety regulations
– Decontaminate and clean every part that comes in contact with any infectious biochemical substances.

Dangerous gases

WARNING!
Risk of explosion, risk of asphyxiation and high risk of danger to the health due to dangerous gases!

Non-compliance with safety regulations regarding the use of dangerous gases such as e.g. O_2, N_2, CO_2 or inappropriate handling contains a risk of explosion or asphyxiation and a high health risk for the user depending on the type of gases used.

Therefore:

– Strictly adhere to safety regulations regarding the use and handling of dangerous gases.
– Strictly follow the instructions in this operating manual regarding gas supply and handling of gases and exhaust gas.

Moving parts

WARNING!
Risk of injury due to moving parts.

Parts that are rotating or moving linearly can cause serious injuries.

Therefore:

– Do not reach into moving parts nor work on or near moving parts.
– Do not open covers while the equipment is operating.
– Pay attention to the stopping time:
Make sure that all parts have stopped moving before opening any covers.
– Wear close-fitting protective work clothing in the danger zone.

Dirt and materials lying about

CAUTION!
Risk of slipping due to dirt and materials lying about!

Dirt and materials lying about may lead to slipping and present a health hazard e.g. possible infection.

Therefore:

– Always keep the work place clean and tidy.
– Remove all materials not required immediately.

2.6 Step to take in the event of hazardous situations and at accidents

Preventive measures

- Always be prepared for accidents and fire!
- Have first aid facilities readily at hand (first aid box, blankets etc.) and fire extinguisher
- Familiarize personnel with accident notification, first aid and rescue facilities.
- Keep access routes clear for ambulance.

Steps to take in case of an accident

- Immediately switch off the equipment and unplug the mains cable.

NOTICE!

Instructions given by in-house safety protocols are to be followed if additional isolation switches for the power supply have been installed locally.

- Initiate first aid measures
- Remove people away from the danger zones (care with handling!).
- Inform responsible personnel on site
- Alert emergency medical services, if appropriate.
- Clear access routes for ambulance

2.7 Environmental protection

CAUTION!
Danger for the environment caused by mishandling!

Mishandling environmentally hazardous substances, especially incorrect disposing, may cause severe damage to the environment.

Therefore:

– Always observe the points stated below.
– Immediately take appropriate action should environmentally hazardous substances be released into the environment accidentally. Inform the responsible local authority, if in doubt.

The following environmentally hazardous substances are used:

Genetically modified organisms and genetically modified materials

Organisms and genetically modified materials must not gain access to the environment. They must be disposed of in accordance with local regulations.

2.8 Adhesive labels / signs / symbols

The following symbols and information labels are located in the working area. They refer to the local surrounding the area where they are applied.

WARNING!
Risk of injury by illegible symbols!

Stickers and labels can get dirty and unrecognizable by other means over the course of time.

Therefore:

– Keep all safety, warning and operating instructions in a clearly legible state.
– Replace damaged labels and stickers immediately.

Biohazards

Warns against infectious biochemical substances (e.g. liquids which contain bacteria or viruses) present in the working area.

Some procedures must be executed on objects or in rooms which contain bacteria, yeasts or other parasites. These substances may become perilous not only to medical and laboratory personnel, but also to cleaners when handled incorrectly.

Non-authorised persons must not have access to work areas in which bio hazardous or infectious materials are handled.

Immediately call a doctor if suspicion of infection arises.

Hot surfaces

Hot surfaces such as heated parts of any equipment, flasks or material and hot liquids are not always clear to see. Do not touch without protective gloves.

3 Technical data

3.1 Dimensions

Drawing with side and top cooling

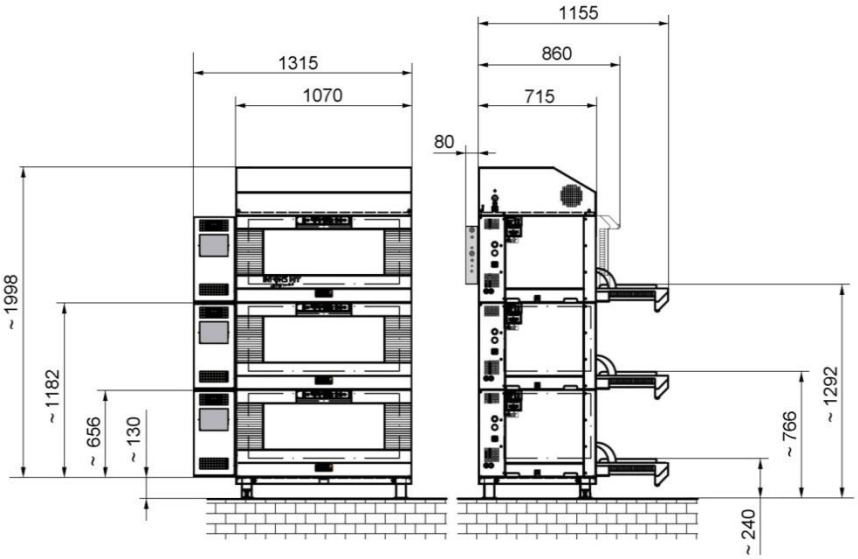


Fig. 1 Dimensions in Millimeters

Base unit

Description	Value	Unit
Width	1070	mm
Single unit height	520	mm
2-unit staple height	1040	mm
3-unit staple height	1560	mm
Base unit (with door handle) depth	860	mm
Base unit (with open door) depth	1155	mm
Base depth	715	mm

Technical data

Base frame

Description	Value	Unit
Rubber feet	30	mm
Trolley	90	mm
Frame low	130	mm
Frame high	310	mm

Cooling units

Description	Value	Unit
Side cooling width	245	mm
Top cooling width	1070	mm
Top cooling heigth	290	mm

3.2 Weights

Base unit

Description	Value	Unit
Single unit 25mm throw	90	kg
Additional weight 50 mm throw	8	kg
1 units stacked 25mm throw	93	kg
2 units stacked 25mm throw	197	kg
3 units stacked 25mm throw	300	Kg

Approved load 25 throw (incl. tray)

Description	Value	Unit
Standard unit with 25 mm throw:		
■ up to 350 rpm	9 to 19	kg
■ over 350 rpm	12 to 16	kg

Approved load 50 throw (incl. tray)

Description	Value	Unit
■ up to 250 rpm	9 to 19	kg
■ over 250 rpm	12 to 16	kg

Cooling units

Description	Value	Unit
Bottom / top cooling (per unit)	65	kg
Side cooling (per unit)	37	kg
External cooling	2.5	kg

3.3 Connection values

Electrical (single unit)

Type 230V 50/60 Hz

Description	Value	Unit
Voltage	230	V
Power consumption max.	880	W
Power consumption stand-by	6	W
Current max.	3.8	A
Individual fusing	16	A
Frequency	50/60	Hz
2 unit fuses 5 x 20 mm, time-lag	10	A

Type 115V 60 Hz

Description	Value	Unit
Voltage	115	V
Power consumption max.	880	W
Power consumption stand-by	6	W
Current max.	7.7	A
Individual fusing	16	A
Frequency	60	Hz
2 unit fuses 5 x 20 mm, time-lag	16	A

Technical data

Electrical Side cooling 380 Watts

Type 230 V 50 Hz

Description	Value	Unit
Voltage	230	V
Power consumption max.	220	W
Current max.	1.2	A
Fuses	None	
Frequency	50	Hz
2 unit fuses 5 x 20 mm, time-lag	10	A

Type 230 V / 60 Hz

Description	Value	Unit
Voltage	230	V
Power consumption max.	220	W
Current max.	1.2	A
Fuses	None	
Frequency	60	Hz
2 unit fuses 5 x 20 mm, time-lag	10	A

Type 115 V / 60 Hz

Description	Value	Unit
Voltage	115	V
Power consumption max.	200	W
Current max.	2.6	A
Fuses	None	
Frequency	60	Hz
2 unit fuses 5 x 20 mm, time-lag	16	A

Electrical Top cooling 900 Watts

Type 230 V 50 Hz

Description	Value	Unit
Voltage	230	V
Power consumption max.	540	W
Current max.	4.2	A
Individual fuses	16	A
Frequency	50	Hz
2 unit fuses 5 x 20 mm, time-lag	10	A

Type 230 V / 60 Hz

Description	Value	Unit
Voltage	230	V
Power consumption max.	690	W
Current max.	4.6	A
Individual fuses	16	A
Frequency	60	Hz
2 unit fuses 5 x 20 mm, time-lag	10	A

Type 115 V / 60 Hz

Description	Value	Unit
Voltage	115	V
Power consumption max.	570	W
Current max.	7.5	A
Individual fuses	16	A
Frequency	60	Hz
2 unit fuses 5 x 20 mm, time-lag	16	A

Technical data

Electrical Top cooling 1200 Watts

Type 230 V 50 Hz

Description	Value	Unit
Voltage	230	V
Power consumption max.	650	W
Current max.	2.8	A
Individual fuses	16	A
Frequency	50	Hz
2 unit fuses 5 x 20 mm, time-lag	10	A

Type 230 V / 60 Hz

Description	Value	Unit
Voltage	230	V
Power consumption max.	800	W
Current max.	3.5	A
Individual fuses	16	A
Frequency	60	Hz
2 unit fuses 5 x 20 mm, time-lag	10	A

Type 115 V / 60 Hz

Description	Value	Unit
Voltage	115	V
Power consumption max.	800	W
Current max.	6.9	A
Individual fuses	16	A
Frequency	60	Hz
2 unit fuses 5 x 20 mm, time-lag	16	A

3.4 Specifications

General information

Description	Value
Material housing	PU
Material chamber	Stainless steal
Material table	Aluminum, anodized
Mounting table	4 x M5x16, hexagon socket
Light chamber	2 x halogen lamp pin socket G4 10 Watts 12 Volts Length 33 mm
Fuses	2 x 20 mm 10 Amperes time-lag
Hose nozzle	
Ø inner diameter nozzle	8 mm
Ø inner diameter hose	10 mm

Temperature

Description	Value
2 cross flow blowers with heating Power consumption	750 W
Air circulation	360 m^3/h
Control	Electronic PID-controller
Sensor	Pt100
Temperature range	4 °C over ambient temperature up to 65 °C
Control accuracy	± 0,2 °C
Measuring accuracy	± 0,15 °C

Technical data

Control accuracy capillary thermostat	± 2,5 °C
Capillary thermostat	Adjustable, standard setting ex works 70 °C
Heating bi-metal control	Approx. at 80 °C
Overheat protection	84 °C, fuse

Temperature range

No cooling	
	6 °C over ambient temperature up to 65 °C

With cooling	
Side cooling	15 °C under ambient temperature up to 65 °C
Top cooling	12 °C under ambient temperature up to 65 °C
External cooling	Depending on temperature of cooling liquid and ambient temperature

Shaking

Description	Value
Drive	External rotor motor
Power consumption	75 W
Current 230V 50 / 60 Hz	0.63 A
Current 115V 60 Hz	1.15 A
Motion	orbital
Control accuracy	1% at maximum speed
Rotation direction	Clockwise
Range	20 – 400 RPM

Throw 25 mm speeds

Description	Value
Single unit	400 rpm
Base 13 cm	
2 units stacked	■ bottom: up to 400 rpm ■ top: up to 350 rpm
3 units stacked	■ bottom: up to 400 rpm ■ middle: up to 350 rpm ■ top: up to 350 rpm
Base 31 cm	
2 units stacked	■ bottom: up to 400 rpm ■ top: up to 250 rpm

Technical data

Throw 50 mm speeds

Description	Value
Single unit	■ 50 mm throw: 400 rpm
2 units stacked	■ bottom: up to 350 rpm ■ top: up to 250 rpm
3 units stacked	■ bottom: up to 350 rpm ■ middle: up to 250 rpm ■ top: up to 250 rpm
Base 31 cm	
2 units stacked	■ bottom: up to 350 rpm ■ top: up to 250 rpm

NOTICE!
For higher speeds contact the supplier!

Side cooling 380 W

Power supply Voltage/Frequency	Power Consumption	Rating
230 V / 50 Hz	1.2 A	220 W
230 V / 60 Hz	1.2 A	220 W
115 V / 60 Hz	2.6 A	200 W

Top and bottom cooling 900 W

Power supply Voltage/Frequency	Power Consumption	Rating
230 V / 50 Hz	2.3 A	540 W
230 V / 60 Hz	3 A	690 W
115 V / 60 Hz	5 A	570 W

Cooling liquid volume

Description	Value
1 unit stacked	9 L
2 units stacked	10 L
3 units stacked	11 L

Top and bottom cooling 1200 W

Power supply Voltage/Frequency	Power Consumption	Rating
230 V / 50 Hz	2.8 A	650 W
230 V / 60 Hz	3.5 A	800 W
115 V / 60 Hz	5 A	800 W

Cooling liquid volume

Description	Value
1 unit stacked	9 L
2 units stacked	10 L
3 units stacked	11 L

External cooling

Description	Value
Pressure inlet	2 - 4 bars
Outer diameter Ø hose nozzle	10 mm

3.5 Operating conditions

Description	Value
Ambient temperature max.	With / without cooling 30 °C
Ambient temperature max.	■ without cooling: 8 °C below required minimum incubation temperature ■ with cooling: side cooling: 15 °C top cooling: 12 °C upon required minimum incubation temperature
Relative humidity max.	With / without cooling: 85% rH

3.6 Emissions

Description	Value	Unit
Noise emission	<70	dB(A)

3.7 Utilities

CAUTION!
Risk of loss of property due using of inappropriate utilities!

Using wrong utilities may cause loss of property.

Therefore:

– Only use manufacturer prescribed utilities, listed in the following table.

Description	Valid substances
Cooling liquid Secondary circuit Top cooling External cooling	Permitted for food and pharmaceutical fields Freezing < -40 °C Corrosion copper: < -0.6 g/m^2 Temperature range: -40 °C up to 150 °C
Cleaning agents generally	Mild cleaning agents

Disinfectants generally	Ethanol 70% Standard disinfectants
Disinfectants door pane polycarbonate	Disinfectants without aldehydes, phenols or amines
Cleaning agents adhesive matting	Mild cleaning agents
Disinfectants adhesive matting	Ethanol 70%

3.8 Identification plate

Fig. 2

The identification plate is placed in the middle of the front side underneath the front door.

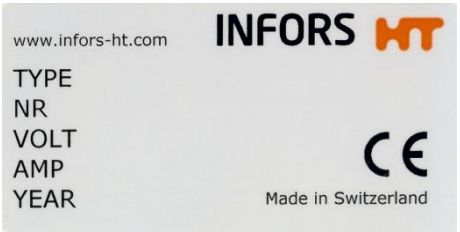


Fig. 3

It contains the following information:

- Name and internet address of the manufacturer
- TYPE = Model Type
- NR = Serial number
- VOLT = Nominal voltage
- AMP = Current consumption
- YEAR = Year of manufacture
- CE-marking

3.9 Interface communication protocol

For communication with other equipment a serial interface is available.

The communication protocol can be ordered via info@infors-ht.com.

4 Setup and function

4.1 Base unit

Housing

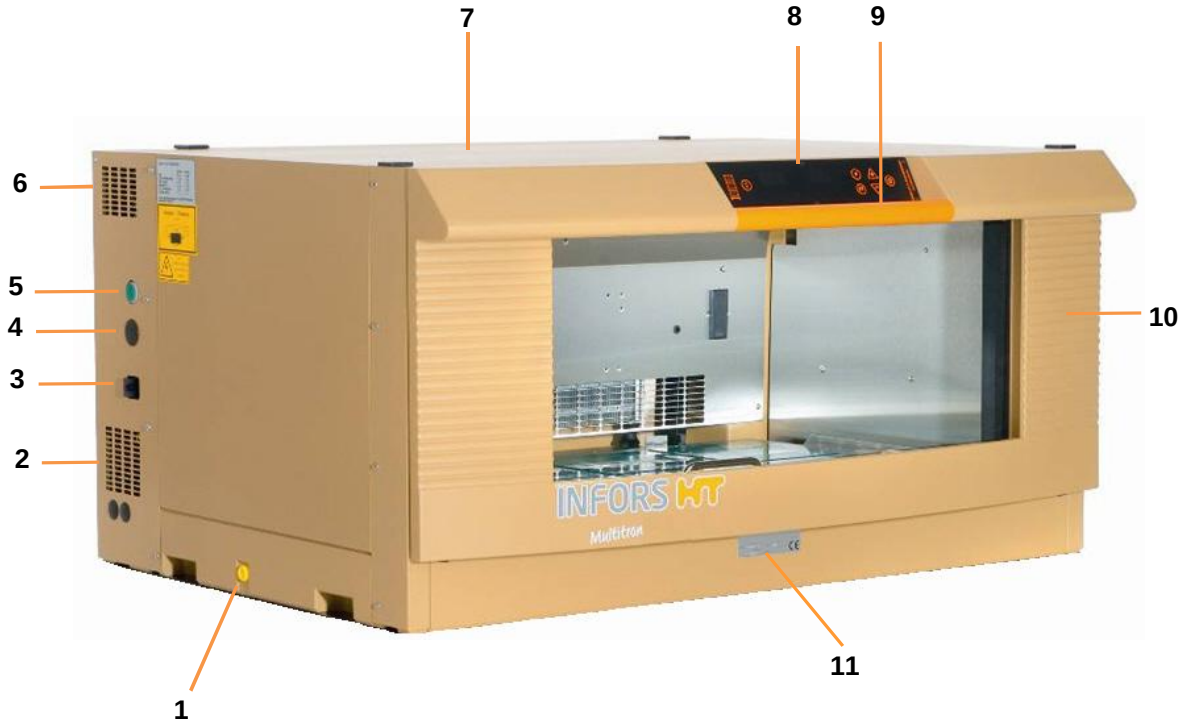


Fig. 4

1	Drain hole	7	Housing
2	Ventilation holes	8	Operating panel
3	Mains connector with fuses	9	Door handle
4	Blind opening (for switch of optional door heater)	10	Door
5	Main switch	11	Identification plate
6	Ventilation holes		

The incubator shaker is constructed as an insulated plastic housing with a sealed floor pan and a door.

The following elements are located on the housing:

- Main switch
- ON/OFF control lamp
- Blind opening (for optional door heater)
- Drain hole (the drain nozzle is supplied unmounted)
- Serial interface
- Power connector (with fuses) for an angle plug
- Door
- Ventilation holes

Door

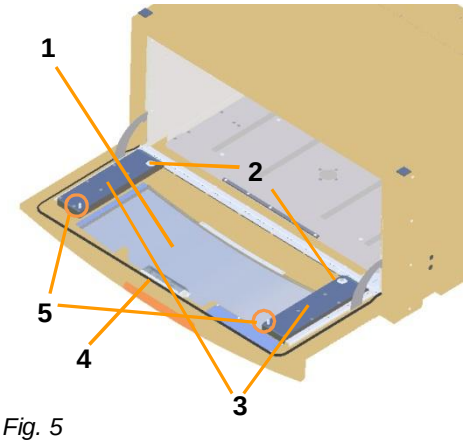


Fig. 5

The following elements are located on the door:

1 Window
2 Roller bearings
3 Glide rails
4 Lamp for the incubation chamber
5 Cylindrical pins (stops)

Incubation chamber

The walls of the incubation chamber are made of stainless steel.

The following elements are located inside the incubation chamber:

1 Capillary thermostat with temperature controller
2 Ventilation outlets (2 cross-flow fans with heating)
Pt100 sensor (behind the INOX rear wall) to measure the temperature.

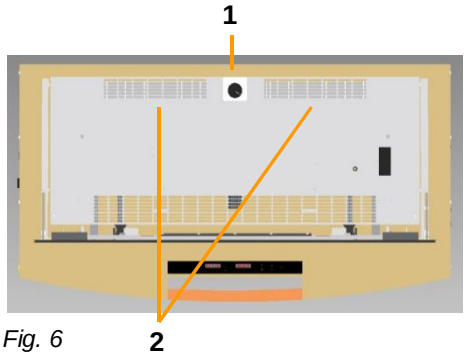


Fig. 6

Setup and function

There is a safety fuse located between the cross-flow fans behind the rear wall. It protects against overheating.

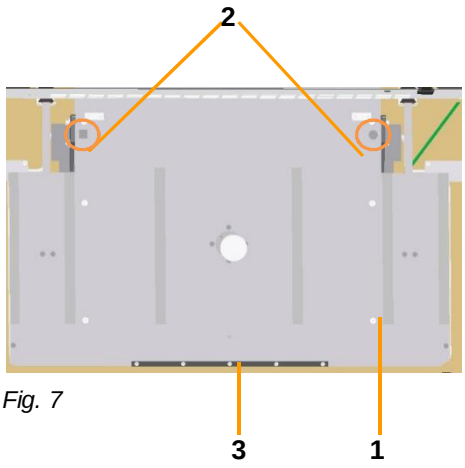


Fig. 7

1 Table
2 Cones (to lock the tray)
3 Stop bar

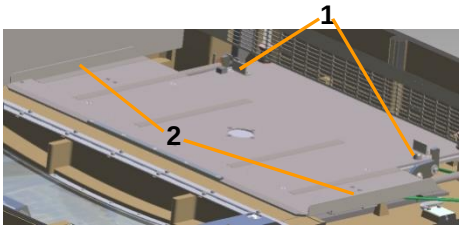


Fig. 8

1 Rear stops
2 Guide rails

Fig. 9

Locking hooks

The following elements are located underneath the table:

1 Tray ejector
2 Drive belt
3 Counterweight

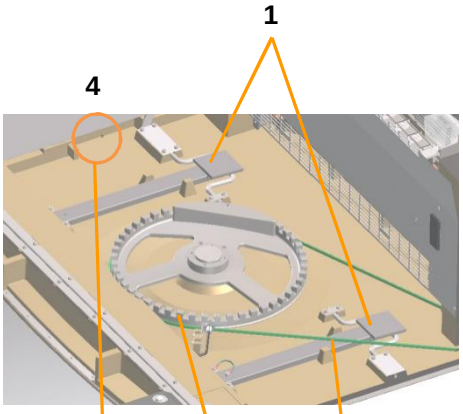


Fig. 10

4 Drain hole

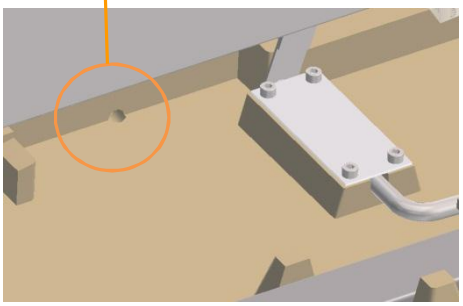


Fig. 11

Transport lock

The table and the counterweight are secured with a star knob screw during transport to stop them moving uncontrollably.

This lock is located in the front section of the table.

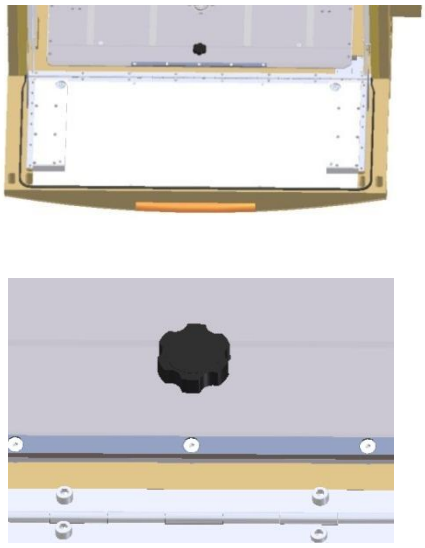


Fig. 12

NOTICE!

Please keep the star knob screw in a safe place for future use.
Do not relocate the unit without engaging the transport lock first.

4.2 Basic Functions

Shaking

The table rotates with a speed of 20 to 400 RPM. The counterbalancing weight is located underneath the table. Depending on the model (fixed throw or variable throw), the orbital throw is 12.5 mm, 25 mm or 50 mm.

The loading weights must lie within the specified range. Loading weights above or below this range prevent the table moving smoothly and thus increase wear of the bearings and joints.

The loading weights depend on the position of the deck in the stack, the throw and the rotation speed.

NOTICE!

The loading weights and maximum speeds are given in the chapter "Technical Data".

Temperature control

The temperature is controlled via two cross-flow fans, which are each equipped with a downstream heating element. The temperature is measured and controlled with a Pt100 temperature sensor. The two cross-flow fans are each equipped with a thermostat to prevent overheating. It switches off the heating at 80 °C.

The incubator shaker is doubly protected against overheating:

- Capillary thermostat with rotary knob
  (standard setting from 65 °C)
- Melting fuse (84 °C)

NOTICE!

Please contact the manufacturer's service center if the melting fuse has blown.
The heating is out of order and can only be reinstated by replacing the melting fuse.

Control system

The incubator shaker is equipped with a microprocessor control system. It is used to control, monitor and program the unit.

Each deck of a stack can be operated from each operating panel.

An integrated timer function allows programming of time cycles. Various displays and alarm functions are integrated into the control system.

Operation

The operating panel in the door of the incubator shaker is used to activate the parameters and set the target values.

The incubator shaker is equipped with a tray lock that secures the tray to the table. When the door is fully open, the locking hooks on the table release the tray. The tray ejectors underneath the table lift the tray out of the locking cones on the table.

The tray is pulled out of the incubation chamber over glide rails and the embedded roller bearings located on the interior side of the door. 2 Cylindrical pins (stops) in the glide rails limit the end position of the extended tray. The fully extended tray rests partly on the door and partly on the table.

The table is stopped as soon as the door is opened by more than 30°. The door can only be opened completely after the table has stopped moving. The table restarts automatically as soon as the door is closed by more than 45°.

All activated parameters are stopped as soon as the door is opened by more than 30°. They are re-activated as soon as the door is closed by more than 45°.

4.3 Messages

An alarm system is integrated into the unit to monitor its functions.

The incubator shaker differentiates between:

- Alarm:
  Setpoint value not reached (usually due to an operating error)
  Display: Hi, Lo, P.F AIL

and

- Error message:
  Fault due to a defect component or blocked table
  Display: Err, Er1, Er2

Setup and function

NOTICE!

For evaluation and troubleshooting of interferences: please refer to Chapter 9 Interferences.

An alarm is triggered when a parameter does not reach the setpoint value within a defined time.

The alarm is automatically cancelled when the parameter reaches the setpoint value.

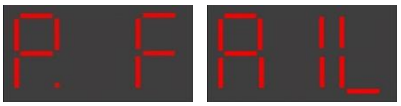
There are three ways of issuing an alarm:

- visually
- acoustically
- analog signal

Visual alarm

Value below setpoint: Lo (low)

Value above setpoint: Hi (high)



Power failure

Acoustic alarm

BEEP – BEEP – PAUSE – BEEP – BEEP

An error message is triggered when the incubator shaker has a fault.

This is the case when a component is defect.

Visual error message (example)

The displays show various error messages. Please refer to the chapter "Faults"

Acoustic error message

BEEP – PAUSE - BEEP

4.4 Serial interface

The unit is equipped with an RS 232 serial interface.

RS 232, 9-PIN

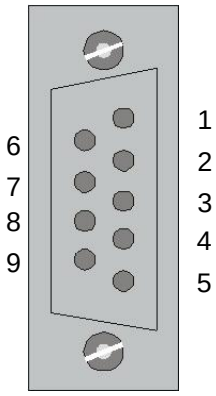


Fig. 13

PIN assignments			
1 + 6	NORMAL STATE	2	RX (RECEIVE)
1 + 7	ALARM and POWER FAILURE	3	TX (TRANSMIT)
8	RESERVE	4	RESERVE
9	RESERVE	5	GND

Alarm contacts

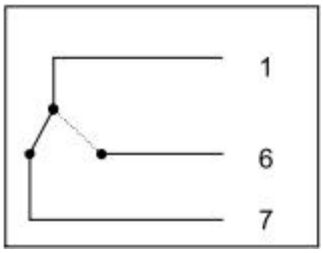


Fig. 14

4.5 Option bases

The incubator shaker can be equipped with the following bases:

Fig. 15

- Rubber feet, 3 cm (bench-top model, standard)

Fig. 16

- Trolley, base frame 13 cm plus castors (optional)

Fig. 17

- Base frame, 13 cm (optional)

Fig. 18

- Base frame, 31 cm (optional)

4.6 Operating panel

The incubator shaker is operated using the operating panel integrated into the door.

The operating panel comprises the following elements:

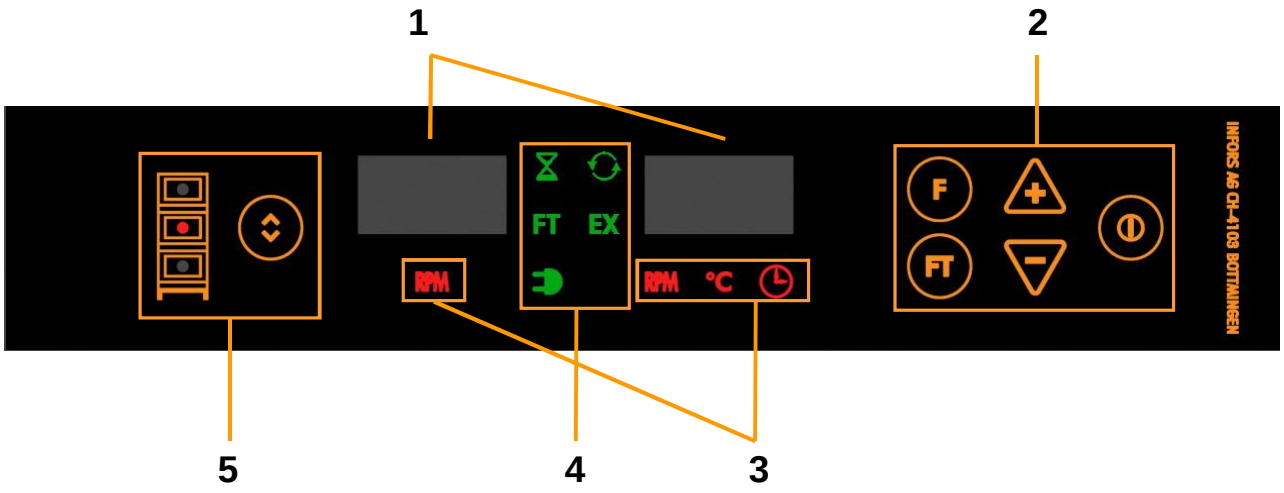


Fig. 19

1 2 Displays for the actual value, the setpoint value, alarm messages and error messages.
2 Function keys to enter parameter values (orange)
3 Parameter symbols (red)
4 Function symbols (green)
5 Deck selector – display and key

The operating panel has 2 displays, keys, parameter symbols and function symbols.

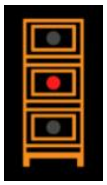
The displays show values, error messages, alarm messages and functions.

The function symbols light up green when activated.

The parameter symbols light up red when activated.

4.6.1 Operating panel displays

Unit selector functional display



The unit selector shows which unit of a stack is currently configurable with the respective operating panel.

e.g. middle unit is selected – lights up red.

FT display field – left-hand display

This display shows e.g. RPM values (setpoint or actual), values of the follow-up phase, alarm or error messages, operating time, etc.

F display field – right-hand display

This display shows e.g. values of the main phase, alarm or error messages, operating time, etc.

4.6.2 Operating panel symbols

Speed symbol

Indicates that the shaking speed RPM (rotations per minute) can be set.

Temperature symbol

Indicates that the temperature can be set.

External symbol

Indicates that the unit is being set externally.

Timer symbol

Indicates that the timer function (duration) can be set.

Cycle symbol

Indicates that the cycle function (continuous switching between basic function F and follow-up phase FT) can be set.

Follow-up phase symbol

Indicates that the parameters for the follow-up phase (FT) can be set.

Time symbol

Indicates that a function (F or FT) has been assigned a time factor.

Power symbol

Indicates that the unit is switched on.

4.6.3 Operating panel keys

ON / OFF key

Switches the unit from the stand-by mode into the active mode, activates selected parameters and acknowledges preset values.

F function key

Switches between the programmed parameters during the main phase.

FT function key

Switches between the programmed parameters during the follow-up phase.

PLUS function key

Increases the value of a parameter.

MINUS function key

Decreases the value of a parameter.

UP / DOWN function key

Switches between the control systems of the individual units in stacked systems.

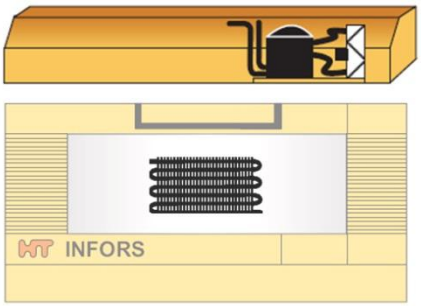
4.7 Option cooling system

The incubator shaker is equipped with a cooling system so that cultivation can be carried out in a defined climate.

The heat exchanger of all cooling systems is located behind the rear wall of the incubation chamber.

The following cooling systems are available:

Top-mounted cooling system, 900 watts / 1200 watts



The cooling unit is located in a housing mounted on top of the incubator shaker.

It can cool up to three incubators.

The cooling unit has a separate power supply.

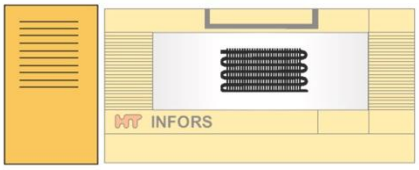
The mains switch is located on the left-hand side of the mounted housing.

The cooling unit has a twin-circuit system with a coolant tank.

The coolant tank is located in the mounted housing.

Fig. 20

Side-mounted cooling system, 380 watts



The cooling unit is located in a housing mounted on the side of the incubator shaker.

It can cool only one incubator.

The incubator shaker supplies power to the cooling unit.

The cooling unit is a closed single-circuit system.

Fig. 21

Setup and function

External cooling system

CAUTION!
Risk of material damage to the circulating pump of the external cooling unit.

The circulating pump of the external coolant system may be damaged if it is not connected correctly.

Therefore:

– The cooling register must be connected to the external coolant system with a bypass.

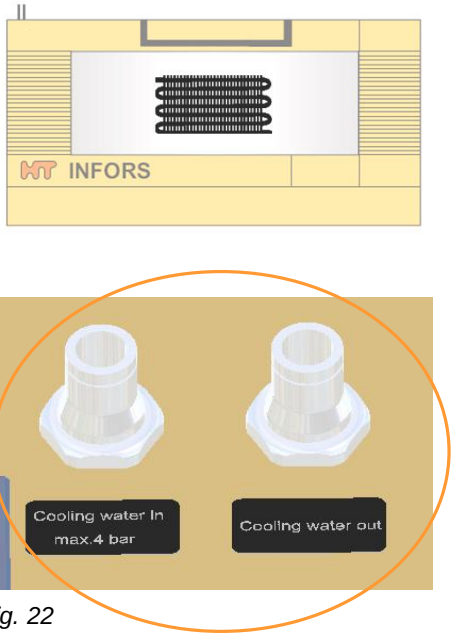


Fig. 22

The cooling unit is supplied with cooling liquid from the in-house cooling system.

A control valve opens when necessary to allow coolant to flow through the cooling register.

The inlet and outlet of the coolant circuit are each equipped with a male hose nozzle with an outside diameter of 10 mm.

They are located on the upper left-hand side of the top of the incubator shaker.

The cooling unit does not require a power supply.

4.8 Option «Sticky Stuff» adhesive matting

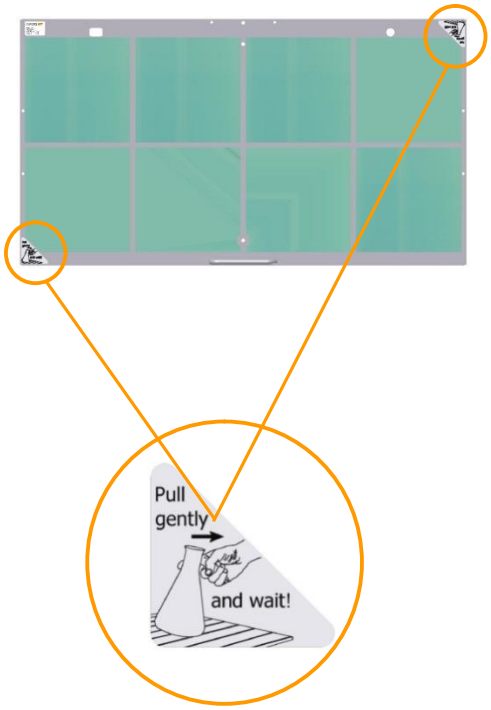


Fig. 23

The «Sticky Stuff» adhesive matting is a very sticky mat that lines the tray. It can be detached from the tray and replaced.

The adhesive matting can also be used on perforated trays.

The adhesive matting provides secure purchase for cultivation flasks with a large base.

The tray is labeled on two diagonally opposed corners with an information sticker on how to remove the cultivation flasks.

These stickers must not be removed under any circumstances.

5 Transport, packaging and storage

5.1 Safety instructions for transport

Inappropriate transportation

CAUTION!
Damage due to inappropriate transportation!

Inappropriate transportation may cause considerable loss of property.

Therefore:

– Handle packed items with care and caution when unloading on delivery, as well as during in-house transportation.

– Remove packaging finally only when the equipment is ready to be brought into use.

5.2 Transport inspection

Immediately verify delivery on receipt for completeness and freedom from any transit damage.

Proceed as follows when transit damage is physically identifiable:

- Do not accept delivery or under reserve only.
- Note extent of loss on transport documentation or delivery note.
- Initiate complaint.

NOTICE!

Complain regarding a defect as soon as it is identified. Claims for damages can only be made within the effective terms for presenting complaints according to the manufacturer's general conditions of contract

5.3 Packaging

CAUTION!
Risk of material damage – particularly the window – due to scratches caused by using sharp-edged or pointed tools when opening the packaging.

Therefore:

– Do not use pointed tools to open the packaging.

Packaging

Only environmental friendly packaging materials are used.

The unit and its accessories are packed in a crate (wood and/or corrugated cardboard) on a EURO pallet.

The packaging is intended to protect the individual components against damage during transport, etc. Therefore, do not destroy the packaging and remove it just before starting initial operation.

5.4 Transport

NOTICE!

The following descriptions refer to the transport of new, unused equipment.

CAUTION!
Risk of damage due to extreme localized loads.

An extreme localized load may cause the feet to shear off or leave dents in the base plate.

Therefore:

– Never push the unit.

Owing to its weight, the incubator shaker must never be transported or moved by one person alone.

If the unit has to be relocated over a long distance within the building, it is essential to use a stacker truck or a trolley.

When transporting with a stacker truck, the unit must be set down very carefully in a vertical position on the floor.

Transport on a trolley must be carried out with extreme care.

Never transport the unit without fitting the transport lock first; see "Installation and commissioning – Fitting the transport lock".

Transport of palettes with fork lift.

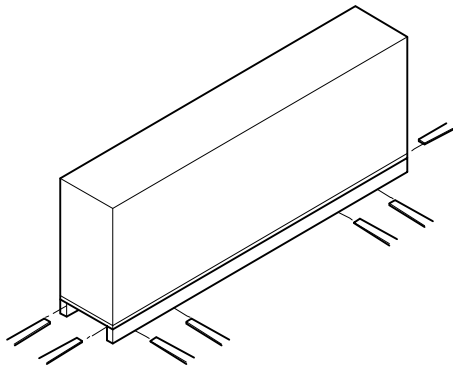


Fig. 24

Packing pieces which are mounted on palettes can be moved by a fork lift in the following circumstances:

- The fork lift must be of appropriate design for the weight of the unit to be transported.
- The driver must be qualified for driving the fork lift.

To hook on:

1. Drive the fork lift with its forks between or under the palette's bars.
2. Move the forks so that they stand out on the opposite side.
3. Ensure that the palette cannot tilt because of an eccentric balance point.
4. Lift the packed item and start to transport it.

5.5 Storage of the incubator shaker

The unit must be stored as follows:

- Do not store outdoors.
- Do not expose to aggressive substances.
- Do not expose to sunlight.
- Avoid mechanical vibrations and shocks.
- If stored for more than 3 months, make regular checks of the general condition of the unit and its packaging. If necessary, refresh or renew the conservation.
- Always decontaminate and clean the unit before putting it into storage (see chapter "Maintenance").
- Store the unit in a clean and dry place that is protected against dust, dirt and all kinds of liquids
- Store the unit in a cool place, not exposed to frost, and with a low humidity.
    - Storage temperature: 15 to 35 °C
    - Relative humidity: max. 60% rH

6 Installation and initial operation

Faulty installation or incorrect initial operation

WARNING!
Danger due to faulty installation or incorrect initial operation!

Installation and initial operation requires qualified and experienced personnel. Faulty installation may lead to perilous situations or severe loss of property.

Therefore:

– Installation and initial operation are to be carried out by the manufacturer's associates only.
– Call the manufacturer when any subsequent translocation is foreseen.
– Prevent arbitrary installation and translocation

6.1 Safety

Personnel

- Installation and initial operation may only be carried out by qualified personnel.

Electrical system

DANGER!
Danger of fatal electric shock!

Contact with electrically powered components is perilous. Energized electrical components may perform uncontrolled movements which can lead to severe injuries.

Therefore:

– Turn off the electrical supply and check whether it is electrically isolated before starting any work.

Inappropriate installation and initial operation

WARNING!
Risk of injury due to inappropriate installation and initial operation!

Inappropriate installation and initial operation may lead to severe damage to persons or loss of property.

Therefore:

– Make sure that enough space is provided for the installation before starting.
– Take care regarding sharp-edged components
– Keep the installation site tidy and clean! Discarded components and tools may be a source of accidents.
– Component parts must be installed professionally.
– Secure component parts so that they cannot fall off or tumble.

6.2 Installation location

6.2.1 General information

The following requirements must be met for the installation of the unit:

- The equipment must be installed and operated inside a building.
- The unit must not be exposed to direct sunlight.

NOTICE!

The incubator shaker must be protected against hot exhaust air of other equipment with cooling systems.

- Ambient temperature must lie within the following range:
  - Minimum: 1 °C
  - Maximum: 30 °C
  - Without cooling: not more than 5 °C below the minimum incubation temperature
  - With cooling: not more than 20 °C above the minimum incubation temperature
- Protect the unit against mechanical damage (trolleys, being kicked, etc.).
- The installation site must be level, sufficiently stable and able to bear loads.

- There must not be any sources of electrical interference near the unit.
- All interfaces and switches on the unit must be readily accessible.

NOTICE!

The main switch of the incubator shaker must be completely unobstructed and readily accessible.

- Ensure that the workplace is sufficiently illuminated.
- Protect the operating panel against splashed water.
- Protect the outside of the unit against extreme levels of dust and dirt.

NOTICE!

Any other type of installation must first be checked with the manufacturer and requires the written permission of the manufacturer

6.2.2 Minimum distances

The incubator shaker must be set up as follows for operation, handling and repair work:

NOTICE!

Main switch and cable for power supply must be easily and freely accessible.

To provide a good circulation of air following distances are necessary:

- Right side: Minimum 8 cm
- Backside: Minimum 8 cm
- Top: Minimum 10 cm

The dimensions of the different models are given in the chapter "Technical Data".

6.3 Removing the transport lock

Before the unit can be put into operation, the transport lock must be released and removed:

Procedure

1. Release and remove the star knob screw.

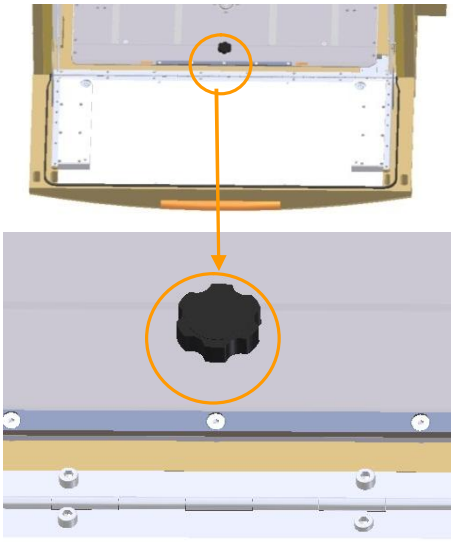


Fig. 25

2. Store the screw and the supplied tools together for future transports.

6.4 Mounting the drain nozzle

Before commissioning, the supplied hose nozzle must be screwed into the drain hole:

Procedure

1. Unscrew the blanking plug from the drain hole.

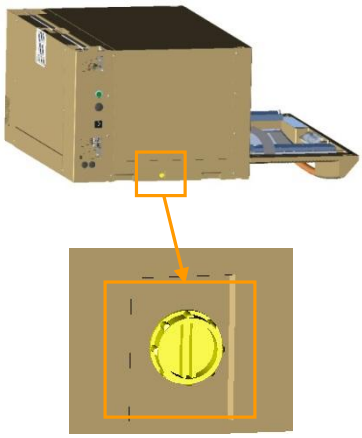


Fig. 26

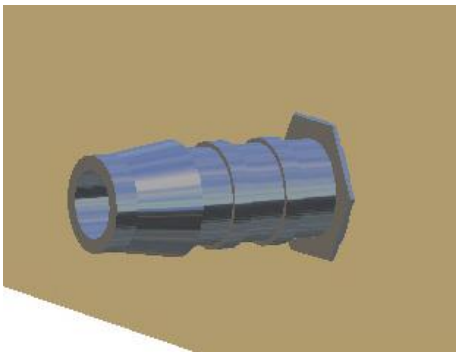


Fig. 27

2. Screw in the hose nozzle.

NOTICE!

To drain condensate or rinsing fluids, mount one end of a hose onto the nozzle and place the other end in a suitable container.

6.5 Installing the incubator shaker

CAUTION!
Risk of material damage due to uncontrolled movement of the unit.

The unit may start moving around uncontrollably if it is placed on a slippery surface.

Therefore:

– Place a non-slip mat under each foot.

CAUTION!
Risk of material damage due to uncontrolled movement

If the unit has not been leveled properly it may move around uncontrollably if it starts to vibrate.

Therefore:

– If the unit shows any signs of vibration or unusual movements, level it again.

Installation and initial operation

Rubber feet

The bench model cannot be leveled out. It must stand on a firm, flat surface.

Trolley

NOTICE!

The trolley cannot be leveled out. Remove both front castors out of the frame before starting initial operation.

Procedure

1. Lift the incubator shaker with a stacker truck.
2. Pull the front castors out of the frame.

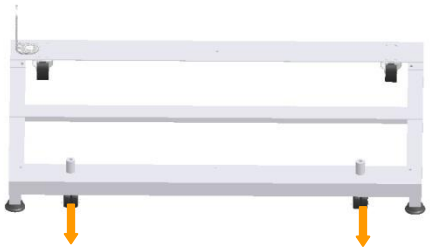


Fig. 28

3. Set the unit down again carefully.

Base frame

Units with a base frame must be leveled using the adjustable feet.

The unit must be leveled on initial installation or if it is relocated.

NOTICE!

If the incubator shaker is resting on a slippery surface, place a non-slip mat under each foot.

Procedure

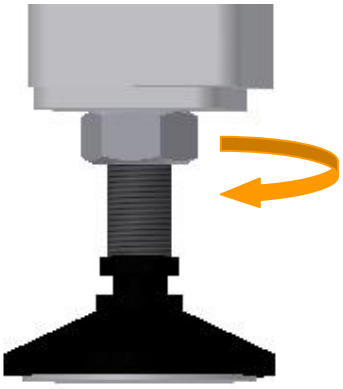


Fig. 29

1. Release the locknut of the leveling foot.
2. Set the shaking speed of all units in the stack to 50 rpm.
3. Start the shakers.
4. Check the stacked units for vibrations or uneven operation.
5. In the event of vibrations or uneven operation, adjust the leveling foot upwards or downwards with an open-end wrench (19 mm) until the stacked units operate smoothly.
6. Check the smooth running of the units in increments of 50 rpm.
7. Adjust the leveling foot if the unit vibrates or does not operate smoothly.
8. Release the locknut of the leveling foot.

6.6 Switching on the unit

Connect the unit to the power supply with the power plug.

NOTICE!

It is essential that each unit is connected via an electrical socket that has its own 16 ampere fuse.

Fig. 30

The main switch of the unit is located to the rear of the left-hand side wall. It is an ON/OFF push-button switch that must be switched on for all operating modes.

- Unit OFF = switch is not illuminated
- Unit ON = switch is illuminated

Fig. 31

Switched OFF – power supply symbol is not illuminated.

CAUTION!
Risk of material damage if the door is forced downwards when the unit is switched off.

The door mechanism may sustain damage if it is forced completely open when the incubator shaker is switched off.

Therefore:

– Do not force the door completely open when the incubator shaker is switched off.

Fig. 32

Switched ON – power supply symbol is illuminated.

The unit is ready for operation.

NOTICE!

Frequent ON/OFF switching of the unit may damage the electronic components.

The unit only needs to be switched off if it will not be used for a while (> 1 day).

The setpoint values of the parameters remain stored for approx. 1 month.

The power consumption in the standby mode is approx. 6 watt per hour.

6.7 Setting the capillary thermostat

The capillary thermostat of the incubation chamber has a default setting of 70 °C. This is 5 °C above the maximum operating temperature of the unit, i.e. 65 °C.

The absolute tolerance of the thermostat is 2.5 °C.

Procedure

1. Set the thermostat to 70 °C.

2. Shut the door of the unit.

3. Switch the unit on.

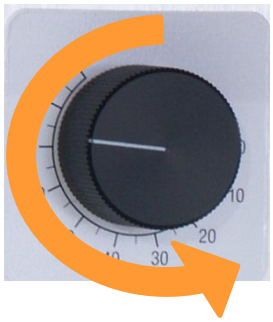
4. Press the F key repeatedly until the temperature parameter has been selected.

The temperature symbol lights up.

5. Press the PLUS key until the maximum operating temperature (e.g. 50 °C) is set.

6. Press the ON/OFF key to switch on the temperature control system.

7. Wait until the right-hand display has reached the setpoint value (e.g. 50 °C).



8. Open the door.
9. Turn the thermostat down slowly until there is an audible click at the actuation point of the thermostat.
10. Set the thermostat 5 °C higher.

NOTICE!

The thermostat must be set a few °C higher than the maximum operating temperature to allow continuous control.

The thermostat is now set. The maximum operating temperature now corresponds to the specified setpoint shown on the display.

6.8 Switching on the cooling system

NOTICE!

The nominal cooling capacity can only be reached if the ambient temperature at the cooling aggregate is below 30 °C.

Ensure sufficient air circulation.

See chapter "Installation".

- Side-mounted cooling system
  The side-mounted cooling system can be put into operation without any previous preparatory work.
- External cooling system
  The cooling register must be connected to the external cooling system via a feed hose and a return hose.
- Top-mounted cooling system
  The top-mounted cooling system must be filled with cooling liquid before it is put into service.

The supplied cooling liquid is diluted. The mixture has a mixing ratio of 9:2 (distilled water : coolant).

CAUTION!
Risk of material damage due to the use of an unsuitable cooling liquid.

The copper piping of the cooling system can be damaged by corrosion if an unsuitable cooling liquid is used.

Therefore:

– Use only copper-compatible cooling liquids suitable for use in the food and pharmaceutical sectors
– Pay attention to the level of cooling liquid in the tank

6.9 Filling with cooling liquid

CAUTION!
Risk of material damage due to dry-running of the pump and insufficient cooling.

If cooling systems with a coolant circuit (top-mounted or base cooling systems) are not filled with the supplied coolant before initial operation, this will have a negative effect on the cooling efficiency and will damage the pump if it runs dry.

Therefore:

– Before initial operation, fill the coolant system with the separately supplied coolant (Antifrogen L, copper-compatible and approved for use in the food and pharmaceutical industries; based on propylene glycol / 1,2-propandiol) (See also the warning sticker on the unit)

NOTICE!

The cooling liquid is not physiologically harmful. Nevertheless, avoid contact with skin and eyes. If swallowed, drink plenty of fresh water and seek medical advice, if necessary.

6.9.1 Top-mounted cooling system

The top-mounted cooling system must be filled with the supplied cooling liquid before it is put into operation.

Auxiliary tool

- Funnel

Procedure

1. Remove the cap from the filler port of the coolant tank.

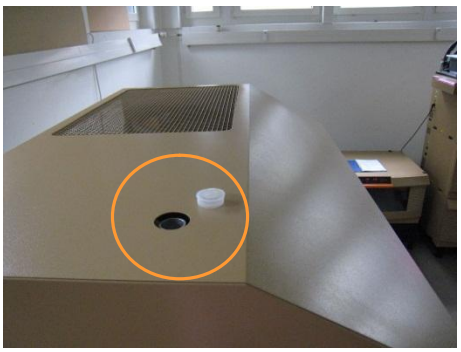


Fig. 33

2. Take the cooling liquid canister out of the incubator.
3. Place the funnel in the filler port.
4. Pour in the cooling liquid.

Fig. 34

5. Replace the cap of the filler port.

6.10 Connecting the external cooling system

NOTICE!

If it is certain that the feed temperature does not drop below +4 °C, it is not necessary to use an antifreeze.

The male nozzles for the inlet and outlet of the external coolant system are labeled.

The labels are located on the top panel or on the rear wall of the incubator shaker.

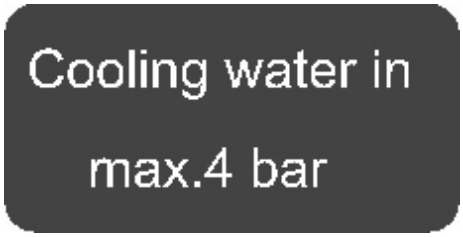


Fig. 35

Label of cooling liquid inlet

Fig. 36

Label of cooling liquid outlet

Connect the in-house cooling system as follows:

Procedure

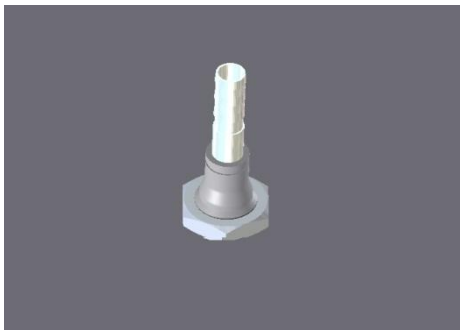


Fig. 37

1. Push the cooling feed hose onto the male inlet nozzle.

2. Secure the cooling feed hose with a hose clamp.

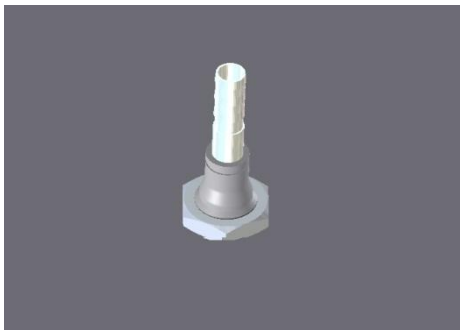


Fig. 38

3. Push the cooling return hose onto the male outlet nozzle.

4. Secure the cooling return hose with a hose clamp.

7 Operation

7.1 Safety

Personnel

- The incubator shaker may only be operated by qualified chemistry, biology or bio-technology technicians or by personnel who have been appropriately instructed by qualified chemistry, biology or bio-technology technicians.
- All work associated with preparations for cultivation and the cultivation process must be carried out by qualified chemistry, biology or bio-technology technicians or by personnel who have been appropriately instructed by qualified chemistry, biology or bio-technology technicians.

Inappropriate operation

WARNING!
Risk of injury due to inappropriate operation!

Inappropriate operation may lead to severe physical injury or loss of property.

Therefore:

– Strictly follow the instructions stated in this operating manual.

CAUTION!
Risk of burns on touching hot surfaces.

There is a risk of burns from hot surfaces if the table and/or cultivation flasks are touched when the unit is operating at temperatures above 50 °C.

Therefore:

– Always wear safety gloves.

CAUTION!
Risk of injury due to broken glass or shards from glass cultivation flasks.

Broken or splintered cultivation flasks can injure hands and eyes.

Therefore:

– Always wear safety glasses.
– Always wear suitable safety gloves.
– Always use undamaged cultivation flasks.

7.2 Switching on the unit

The unit is switched on with the green button located on the side.

- ON = button is illuminated.
- OFF = button is not illuminated.

The initialisation phase of the unit is shown on the right-hand display. The unit is not ready for operation until this phase is complete.
The initialisation display disappears automatically when initialisation is complete.

The power symbol lights up green.

The unit is ready for operation.

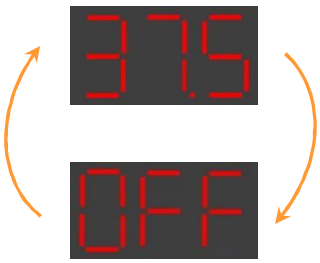
The symbols of the installed parameters light up in alternation.

The right-hand display alternates between the respective setpoint value and the mode (ON or OFF).

The alternating display changes every 16 seconds.

Example:

Static: The temperature symbol lights up.



Alternating: right-hand display

setpoint = 37.5 °C / OFF

The left-hand display alternates between the setpoint and the status (ON or OFF) of the speed RPM.

Example:

Alternating: left-hand display

setpoint: 250 RPM / ON

NOTICE!

If the incubator shaker is left unattended or is not being used for long periods, it must be disconnected from the power supply.
Pull out the plug!

7.3 General operation

The unit is operated either directly using the operating panel on the unit or externally.

If the unit is operated externally, the EX symbol lights up briefly.

The unit can be operated externally using any of the operating panels on the stack of units or with a PC connected to the RS232 interface using the hardware converter ShakerWeb (see chapter "Design and function – ShakerWeb Software").

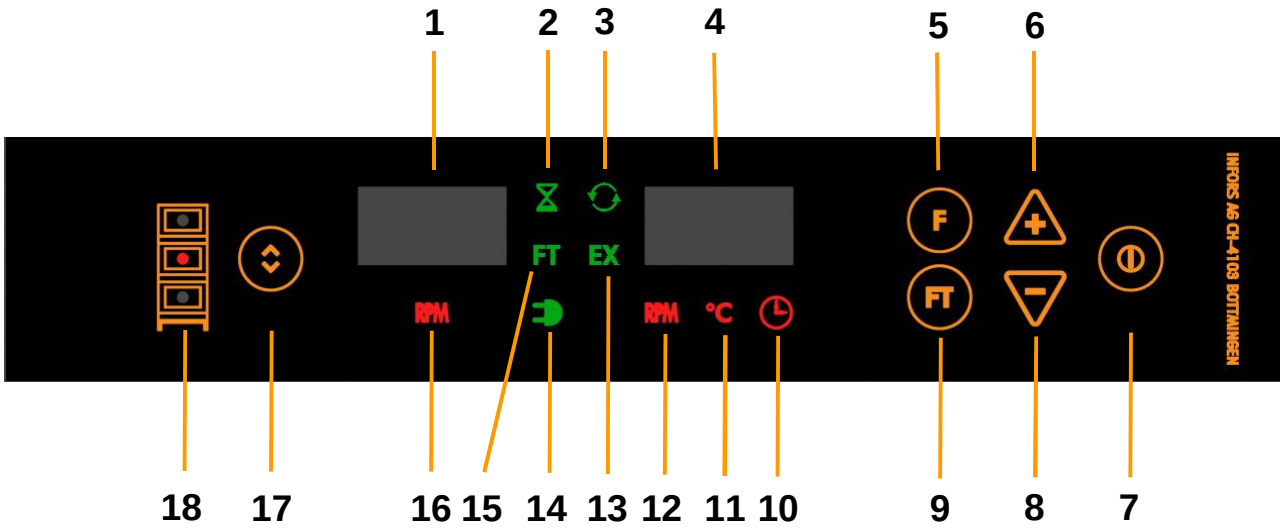


Abb. 39

1 FT symbol (functions after a specific time / follow-up phase)
2 Function symbol for timer
3 Function symbol for cycle (alternates between two operating states)
4 F symbol (function)
5 F function key (changes the parameters)
6 PLUS key (increases values)
7 ON / OFF key
8 MINUS key (reduces values)
9 FT follow-on function key (functions after a specific time)
10 Function symbol for duration
11 Parameter symbol for temperature
12 Parameter symbol for speed (F)
13 Function symbol EX (external access)
14 Function symbol for power supply ON/OFF
15 FT symbol (timed function is activated)
16 Parameter symbol for speed (FT)
17 Deck selection key UP / DOWN
18 Function display for deck selection

Operation

The operating panel is used to operate the following functions:

Switching on the interior light

The interior light is switched on by pressing any key once. It turns off automatically after 1 minute.

Activating parameters

The installed parameters are selected by repeatedly pressing the F key.

If the parameter is deactivated, the right-hand display alternates between the setpoint value of the parameter and OFF.

NOTICE!

Parameters that are not installed cannot be displayed.

The ON/OFF key is used to activate or deactivate the selected parameter.

If the parameter is activated, the right-hand display alternates between the actual value of the parameter and ON.

Setting parameter values

Pressing the PLUS or MINUS key incrementally increases or respectively decreases the value by the smallest unit of the selected parameter.

Holding down the PLUS or MINUS key initially increases or respectively decreases the parameter value in small increments and subsequently with the next biggest increment.

- Increments:
  - RPM: 1 RPM – 10 RPM
  - Temperature: 0.1 °C – 1 °C
  - Timer: 1 min – 1 h – 1 d

NOTICE!

The setpoint values of the parameters do not have to be confirmed. They are accepted after entry without confirmation.

Setting up the follow-up phase

Pressing the FT key activates the set-up mode of the follow-up phase. The FT symbol lights up green.

The parameters and parameter values are set up in the same way as for the main phase.

NOTICE!

The parameter settings of the follow-up phase are only activated when the timer is switched on.

7.4 Selecting a unit in a stack

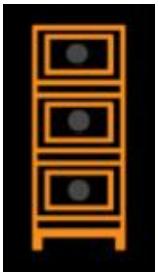
In the standard operating mode, the currently selected unit is that to which the operating panel belongs. For example, the lowest unit in a stack of 3 is always the "bottom unit".

For stacked units, any of the operating panels in the stack can be used to control each unit individually or all units.

NOTICE!

The units in a stack are assigned from bottom to top.

Symbol for selecting a unit



The symbol on the operating panel for selecting units shows a triple stack.

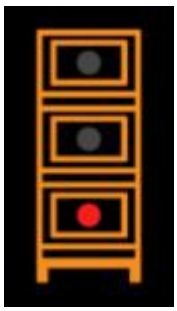
External operation of a unit

All units must be switched on using the main switch so that they can be selected via the control system.

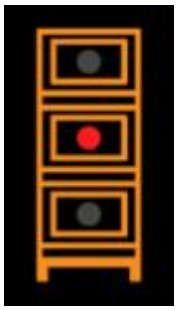
Operation

Procedure

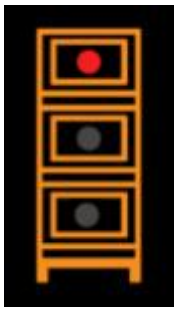
1. Select the appropriate unit with the UP/DOWN key.



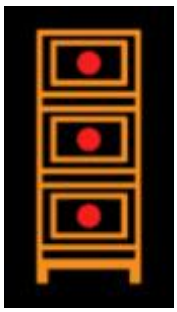
Bottom unit selected.



Middle unit selected.



Top unit selected.



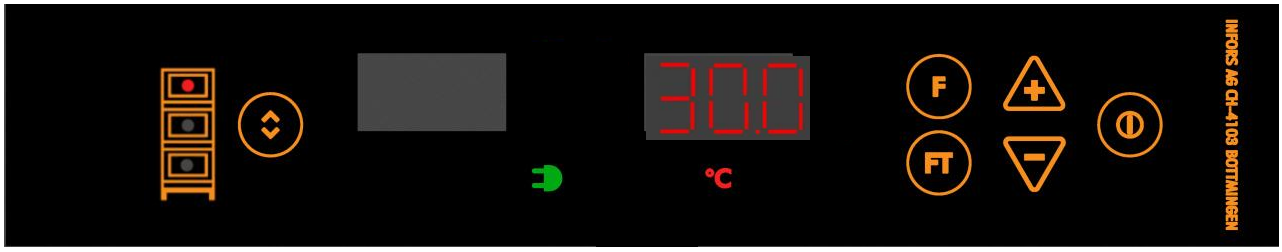
All units selected.

The EX function symbol lights up on the selected incubator shaker.

Setting the parameters of the incubator shaker. (see chapter "Operation" – "Starting a work cycle")

The displays on the externally operated incubator shaker show the values and parameters that are also shown on the unit with which it is being operated.

The left-hand display is not used when operating another unit. The right-hand display shows the setpoint value of the parameter that is being set.



2. With the UP/DOWN key, select the incubator shaker whose operating panel is being used.

The EX function symbol is not illuminated on all units.

7.5 Starting a work cycle

The parameters have to be set and then activated before a work cycle can be started.

The respectively selected parameters light up red on the operating panel.

Procedure

1. Press the F key repeatedly until the desired parameter appears.

Example: Temperature parameter is selected.

The parameter symbol °C lights up red.

The right-hand display shows the current setpoint – in this case 30.0 °C.

Operation

NOTICE!

The setpoint values of the parameter remain stored for approx. 1 month after the unit has been switched off.

2. Set the desired setpoint value with the PLUS or MINUS key.

NOTICE!

The parameter values do not have to be confirmed. They are accepted directly by the control system.

The right-hand display shows the current setpoint value.

If no keys on the operating panel are pressed within 2 seconds, the display alternates between the setpoint value and the operating status OFF.

3. Activate the parameter with the ON/OFF key.

The parameter symbol lights up.

Select the next parameter, as required.

If no key is pressed within 2 seconds:

- The right-hand display changes to the actual value of the parameter, e.g. 30.0 °C.
- If this value is above the setpoint, "Hi" (= high) is displayed.
- If this value is below the setpoint, "Lo" (= Low) is displayed.

Activating the speed parameter

When the status of the speed parameter (RPM) is changed, the following is displayed:

- "Sta" on switching on the shaker drive.

- "StP" on switching off the shaker drive.

NOTICE!

The operating panel is blocked as long as "Sta" or "StP" is displayed.

NOTICE!

When starting the shaker, check that the flasks are securely seated on the tray until the setpoint has been reached.

Deactivating the alternating display

From firmware Version 2.40 onwards, the alternating display can be stopped for validation purposes.

Stop the alternating display mode as follows:

Procedure

1. Press the F key repeatedly until the desired parameter has been selected.

2. Keeping the FT key pressed, press the F key for approx. 5 seconds.

Reactivating the alternating display

Procedure

1. Press the F key.

The alternating display is active again.

7.6 Ending a work cycle

To complete or terminate a work cycle, the corresponding parameters have to be deactivated.

Procedure

1. Press the F key and select the desired parameter.

2. Press the ON / OFF key to deactivate the parameter.

CAUTION!
Risk of material damage due to automatic start-up of the incubator shaker.

If a work cycle is incorrectly terminated by switching off the unit with the main switch, the unit can restart automatically when it is switched on again. This may damage the incubator shaker and the cultures.

Therefore:

– Never terminate a work cycle using the main switch of the unit
– Do not leave any objects in the incubation chamber when the unit is switched off.
– Always make sure that the tray is inserted correctly.

7.7 Testing the alarm function

Check the acoustic alarm and/or the correct functioning of the alarm relay as follows:

Procedure

1. Open the door.
2. Set the capillary thermostat to a low value, e.g. 30 °C.
3. Shut the door.
4. Set the value of the temperature parameter above that of the capillary thermostat, e.g. 40 °C.

5. Activate the temperature parameter.

The capillary thermostat switches off the heating on reaching 30 °C. The alarm is triggered after a certain delay:

- acoustically
- visually

7.8 Alarm messages

A message or an alarm is usually triggered by an operating error with the incubator shaker.

The message or alarm is automatically cancelled when the setpoint value is reached.

The following messages are displayed:

Alarm message	Possible causes	Trouble shooting	By
Temperature is too low Deviation > 1 °C 	Door is not fully closed.	Close the door properly.	Operator
	Fan is not operating.	Inform Infors representative.	Qualified technician
	Capillary thermostat is set too low.	Set capillary thermostat to higher temperature.	Operator
Temperature is too high Deviation > 1 °C 	Cooling is not switched on.	Switch on cooling.	Operator
	Fan is not operating	Inform Infors representative.	Qualified technician
	Setpoint is below the technically feasible value.	Increase setpoint value.	Operator
Speed is too low Deviation > 20 rpm 	Tray is too heavily loaded	Load tray properly	Operator
	Wear on drive belt	Contact Infors representative	Qualified technician
Speed is too high Deviation > 20 rpm 	Control system is defect	Contact Infors representative	Qualified technician
	Power failure	No actions required	
	Unit was switched off with activated parameters	No actions required	

7.9 Operating the timer

7.9.1 Displaying the time

Time displays

The timer interval can be displayed as follows:

- From 0 to 99 minutes

- From 1 hour 40 minutes to 9 hours 50 minutes
  The first number is the hours – h (= hours) – the second number is in 10 minute intervals

- From 10 hours to 95 hours
  Number h (=hours)

- From 1 day 00 hours to 9 days 23 hours
  Number of days – dot – number of hours

7.9.2 Continuous operation without a timer

The timer is switched off.

The timer function symbol does not light up.

The shaker operates continuously with the preset parameters.

7.9.3 Setting the timer

The timer can be used to change over between two operating phases. This can be a single changeover or continuous changeovers (cycling)

Parameters that are active in the main phase are set up in operating mode F.

Parameters that are active in the follow-up phase are set up in operating mode FT.

NOTICE!

Do not activate the timer in the FT phase. This starts the programmed cycle.

Operation

NOTICE!

The active phase of the incubator shaker is always the F phase. The FT phase is used to specify which parameters having which values are active after the timer has expired.

CAUTION!

If «Sticky Stuff» adhesive matting is used, there is a risk of material damage due to condensation caused by sudden drops in temperature.

If «Sticky Stuff» adhesive matting is used, do not program downward jumps in temperature with the timer. This may lead to condensation and thus cause the cultivation flasks to detach from the adhesive matting.

Therefore:

– Never program temperature jumps with the timer.

Setting the timer for a single changeover

The timer can be used for a single change over of the cultivation parameters after a specific time.

Procedure

1. Set the parameters for the first time interval.
See chapter "Setting parameters"

2. Activate the parameters with the ON/OFF key.

3. Press the F key to select the timer function

The timer symbols lights up red.

4. Set the timer for the first time interval with the PLUS key.

5. Activate the timer with the ON/OFF key.

The hourglass function symbol flashes green.

6. Press the FT key for the follow-up phase.

The FT function symbol lights up green.

7. Set the parameters for the second time interval:

8. Activate the parameters with the ON/OFF key.

9. Select the timer by repeatedly pressing the FT key.

10. Set the time with the PLUS key.

11. Activate the timer with the ON/OFF key.

The FT function symbol is not illuminated.

NOTICE!

For a single changeover, the timer must be deactivated in the second time interval of the FT follow-up phase.

The shaker now operates in operating mode F until the end of the preset time. It then changes over to operating mode FT. The timer function symbol does not light up. In operating mode FT, the unit keeps operating until it is switched off manually.

7.9.4 Setting the timer for multiple changeovers (cycling)

Procedure

1. Set the parameters for the first time interval (see chapter *Setting parameters*)

2. Activate the parameters with the ON/OFF key.

3. Select the timer with the F key.

The timer symbols lights up red.

4. Set the time with the PLUS key.

5. Activate the timer with the ON/OFF key.

The hourglass function symbol flashes green.

6. Select the follow-up phase with the FT key.

The FT function symbol lights up green.

7. Set the parameters for the second time interval.

8. Activate the parameters with the ON/OFF key.

9. Select the timer with the FT key.

10. Set the time with the PLUS key.

11. Activate the timer with the ON/OFF key.

The cycle symbol lights up green.

The FT function symbol is not illuminated.

7.9.5 Displaying the remaining runtime of the timer

The following timer modi can be displayed during the first timer interval (F) of the incubation process:

- Display the remaining runtime by pressing the F key.
- Display the total runtime by pressing the F key and then pressing the PLUS or MINUS key once.

NOTICE!

Repeated pressing of the PLUS or MINUS key changes the runtime of the timer. If the timer has been inadvertently changed, it can be restarted by switching it on and off with the ON/OFF key.

7.10 Using the operating time counter

The operating time is always displayed in hours.

The left-hand display shows the hours in units of a thousand – the right-hand display shows the hours from 0 to 999.

Displaying the operating time

Activate the operating time display as follows:

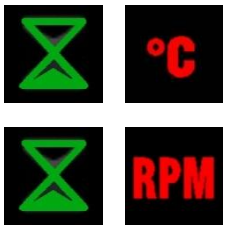
Procedure

1. Hold down the F and FT keys at the same time.

The FT function display lights up green.
The two displays show the operating time in hours.

The operating modes are displayed as followed:

- Operating time for power ON.



- Operating time of temperature control system
- Operating time of motor control system.

Display of the operating time is automatically deactivated as soon as the two function keys (F and FT) are released.

Example: Operating time RPM = 14,042 hours

Fig. 40

7.11 Operating the tray

CAUTION!
Risk of damaging the door and the door mechanism if the opened door is subjected to a surface load of 26 kg or to a large localized load.

A surface load of more than 26 kg or a large localized load on the door can damage both the door itself and the door mechanism.

Therefore:

– Do not place objects weighing more than 26 kg on the door
– Do not sit on the door
– Do not use the door as a support

Inserting the tray

Procedure

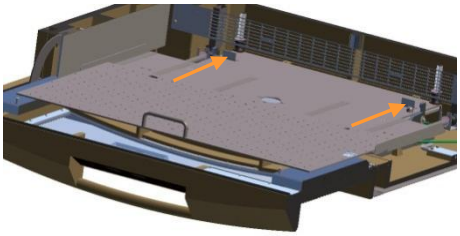


Fig. 41

1. Place the tray on the glide rails of the door.
2. Load the tray or handle the flasks.
3. Push the tray between the guide rails over the front stops until it meets the stops at the back of the incubation chamber.

The tray must click into place behind the front stop.

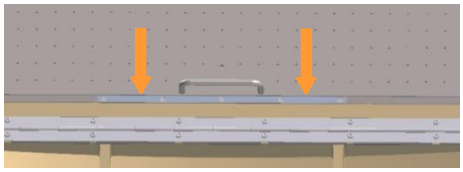


Fig. 42

4. Check whether the tray sits behind the front stop.

Closing the door lowers the tray ejectors and thus lowers the tray into the two cones. At the same time, the locking hooks move forwards to secure the tray to the table.

CAUTION!
Risk of material damage if the tray is not locked.

If the tray is not secured to the table by the locking mechanism, the tray can damage the chamber when the table is moving.

Therefore:

– Only start the unit when the tray is securely locked to the table.

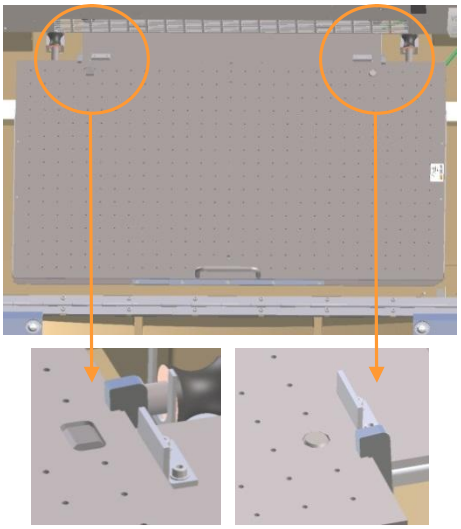


Fig. 43

6. Check whether the locking hooks are firmly securing the tray when the door is being closed

Withdrawing the tray

Procedure

1. Stop the incubator shaker.

> *NOTICE!*
>
> *The incubator shaker can be stopped either by switching off the speed rpm or by half-opening the door and waiting until the table has come to a complete stop.*

2. Open the door to its full extent.

The safety mechanism automatically disengages the hooks when the door is opened and lifts the tray out of the cones at the rear.

> *NOTICE!*
>
> *If the tray cannot be pulled out, check whether the door is completely open.*
> *Press the door down to its full extent.*

3. Lift the tray by the handle.
4. Pull the tray over the front stop.
5. Pull the tray over the glide rails on the opened door.

Unlocking the tray manually

If there is a fault (power failure or mechanical problem) and the door cannot be completely opened, the tray can also be removed manually (by two people, if possible).

Procedure

1. Unload the tray.
2. Open the door as far as possible.
3. Person 1: Press both hooks of the locking mechanism backwards.

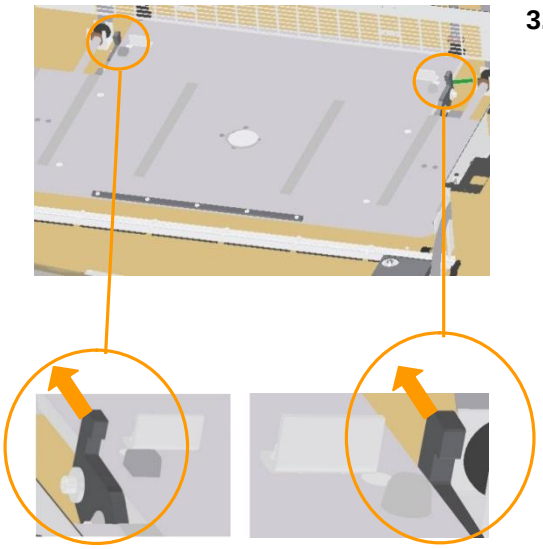


Fig. 44

4. Person 2: Lift the tray out of the locking mechanism.
5. Pull the tray over the front stop on the table.

7.12 Handling the flasks without pulling out the tray

The flasks can also be handled without having to pull out the tray.

The flasks are handled as follows:

Procedure

1. Interrupt the incubator shaker (see chapter *Interrupting operation*)

> *NOTICE!*
>
> *The flasks can be handled when the motor has stopped and the door lock has disengaged (metallic clicking noise).*

2. Open the door to a maximum of 80°.

> *NOTICE!*
>
> *The tray is disengaged when the door is opened by more than 80°.*

3. Handle the flasks.
4. Close the door.

The incubator shaker automatically starts operating again with the preset parameters.

7.13 Loading the trays

> **CAUTION!**
> **Risk of material damage due to excessive wear resulting from uneven loading of trays.**
>
> Uneven loading of trays considerably shortens the service life of the suspension mechanism and bearings of the table.
>
> Therefore:
>
> – Always place the flasks symmetrically with respect to the centre of the tray.

The unit must be switched on when loading the table so that the safety lock on door will disengage and the door can be fully opened.

CAUTION!
Risk of material damage due to collisions between the flasks and the walls of the incubation chamber.

If the flasks extend beyond the edge of the tray, they may be damaged or broken if they collide with the wall of the unit.

Therefore:

– Always position culture flasks on the tray so that they do not extend beyond the edge.

Procedure

1. Open the door of the unit.
2. Pull out the tray over the glide rails up to the stops.
3. Load the tray evenly.
4. Position any optional measuring sensors.
5. Push the tray back all the way to the stop.
6. Close the door.

NOTICE!

If the tray has a low load, it is advisable to place a few flasks filled with water on the tray. This will help the table to run more smoothly.

The incubator shaker is designed for an average load of 12 kg.

The permissible tray loads are given in the chapter "Technical Data".

NOTICE!

Over the short term, heavier or lighter loading weights will not have an acute damaging effect as a result of increased wear of the incubator shaker.

However, if heavier or lighter loads are to be used at high speeds over the long term, please contact your INFORS representative.

7.14 Using the «Sticky Stuff» adhesive matting

CAUTION!
Risk of material damage due to the detachment of cultivation flasks from the „Sticky Stuff" adhesive matting due to condensation inside the incubation chamber.

The cultivation flasks may become unstuck from the adhesive matting» if there is condensation inside the incubation chamber.

Therefore:

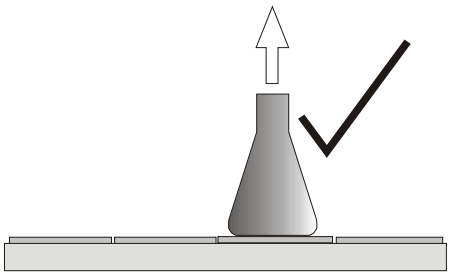
– Ensure that condensation cannot form during humidification.

Loading the «Sticky Stuff» adhesive matting

The «Sticky Stuff» adhesive matting is used underneath cultivation flasks with large, flat bottoms.

Only undamaged, unscratched cultivation flasks may be used on the adhesive matting».

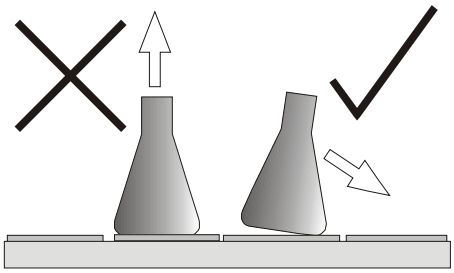
To achieve maximum adhesion to the «Sticky Stuff» adhesive matting, the flasks and matting must be completely undamaged, clean, dry and oil-free.



After placing the flasks on the matting», tilt each flask gently to check that they are adhering firmly.

Unloading the «Sticky Stuff» adhesive matting

Procedure



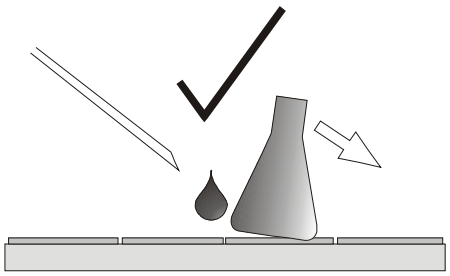
1. Tilt the neck of the cultivation flask gently to one side.
2. Wait until the flask has become detached from the matting».

NOTICE!

Large flasks may take 20 to 30 seconds to become detached.

Very firmly attached flasks can be detached as follows:

Procedure



1. Use a syringe to squirt a few drops of water onto the edge of the cultivation flask.
2. Tilt the neck of the cultivation flask gently to one side.

NOTICE!

Under certain circumstances, Fernbach flasks may be difficult to detach from the adhesive matting. To facilitate removal, part of the adhesive matting can be covered with the supplied protective film.

7.15 Switching on the interior light

The interior light switches on automatically for 1 minute when

- the unit is started.
- the door is closed after a pause.

The interior light can be switched on for visual control purposes:

Door is closed

The interior light can be switched on by pressing any key on the operating panel.

The interior light switches off automatically after 1 minute.

Door is open

The interior light can be switched on by pressing the F key on the operating panel.

The interior light switches off when the F key is released.

7.16 Interrupting operation

The unit can be stopped by opening the door. All functions and parameters remain activated.

The door can only be fully opened once the table has stopped moving.

NOTICE!

The door must be held half open while the table is slowing down.
The door lock is only disengaged once the table has stopped moving, provided that the door is not subjected to a load (e.g. by something resting on it).

To reduce operating costs, all parameters are deactivated while the door is open.

When the door is shut, the unit restarts at a closing angle of 45° with the preset parameters and with the interior light switched on for 1 minute for inspection purposes.

7.17 Operating the cooling system

Top-mounted cooling system 900 watts / 1200 watts

The cooling system has its own power supply. The cooling system is switched on with the green push-button on the left-hand side of the cooling module.
The push-button lights up when the cooling system is switched on.

Side-mounted cooling system 380 watts

The incubator shaker supplies power to this cooling system. The cooling system is ready for operation when the incubator shaker is switched on.

External cooling system

The external cooling system is supplied via a pressurised line from the in-house cooling system. The external cooling system is ready for operation when the incubator shaker is switched on.

Activating the cooling parameter

The incubation chamber can be cooled as follows:

Procedure

1. Press the F key repeatedly until the temperature parameter is selected.

The temperature symbol lights up.

2. Set the setpoint value with the PLUS or MINUS key.

3. Activate the parameters with the ON/OFF key.

The right-hand display alternates between the setpoint value (e.g. 25.3 °C) and "ON".

8 Maintenance

8.1 Safety

Personnel

- The here described maintenance work can be carried out by the user if not indicated otherwise (see “Maintenance plan”).
- Any work on the electrical system is strictly to be carried out by qualified electricians.

Protective equipment

Always wear the following protective equipment when carrying out maintenance work:

- Safety goggles
- Protective gloves
- Safety shoes

NOTICE!

Further protective equipment which is to be worn when carrying out certain work is indicated separately in this section

Maintenance work, carried out inappropriately

WARNING!
Risk of injury due to maintenance work carried out inappropriately!

Maintenance work carried out inappropriately may lead to severe physical injury or loss of property:

Therefore:

– Make sure that enough space is provided for the work before starting.
– Keep the work site tidy and clean! Discarded components and tools may be a source of accidents.
– Check correct re-assembly if component parts have been previously removed. Re-assemble all components for securing housings etc. correctly and adhere to the stated torque when tightening screws.
– Strictly follow internal safety regulations.

Electrical system

DANGER!
Danger of fatal electric shock!

Contact with electrically powered components is perilous. Energised electrical components may perform uncontrolled movements which can lead to severe injuries.

Therefore:

– Turn off the electrical supply and check whether it is electrically isolated before starting any work.

Biohazard

WARNING!
Biohazard!

Noncompliance with biological safety regulations increases the health risk of the operator and the risk of lower equipment functionality.

Therefore:

– Strictly follow all biological safety regulations

– Decontaminate and clean every part that comes in contact with any infectious biochemical substances.

WARNING!
Risk of harm to health due to contaminated component parts!

There is a risk of harm to health due to viruses and bacteria if contact is made with contaminated component parts.

Therefore:

– Precisely comply with internal instructions for cleaning and decontamination component parts.

8.2 Environmental protection

CAUTION!
Environmental danger by inappropriate handling!

Inappropriate handling of environmentally hazardous substances, especially where disposal is involved, may lead to severe environmental damage.

Therefore:

– Immediately take appropriate action if environmentally hazardous substances are accidentally released into the environment.

8.3 Maintenance plan

The required maintenance for reliable operation is described in the following chapters.

Reduce the maintenance intervals in case increased abrasion is detected during regular checks.

Contact the manufacturer for questions concerning maintenance. For contact details, see page 2.

Interval	Maintenance work	To be carried out by
Before each use	Check that the chamber lights are working, replace light bulbs if necessary.	Operator
Once a year	**Optional cooling system** Check the coolant level in the tank, top up if necessary.	Qualified technician
	Calibrate measuring devices.	Qualified technician
	Optional cooling system Exchange coolant of top-/base-mounted systems.	Qualified technician
Every 3 years	Disinfect unit.	Operator
As required	**Optional “Sticky Stuff” adhesive matting** Clean “Sticky Stuff” adhesive matting.	Operator
	Optional “Sticky Stuff” Replace the «Sticky Stuff” adhesive matting.	Operator
	Clean unit.	Operator
	Test alarm functions.	Operator
	Optional cooling system Clean heat exchanger of top-mounted cooling system.	Qualified technician
	Optional cooling system Clean heat exchanger of side-mounted cooling system.	Operator

8.4 Replacing the fuse

Replace the fuse as follows:

Procedure

1. Unlock the fuse link by pressing the snap lock.

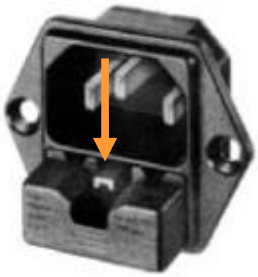


Fig. 45

2. Remove the fuse link.
3. Replace defect fuses.
4. Fit new fuse link.
5. Lock the fuse link by pressing until it clicks into place.

8.5 Replacing the chamber lamp bulbs

Replace a defect lamp bulb as follows:

Procedure:

1. Open the door.
2. Switch off the unit.
3. Disconnect the power plug.
4. Push the lamp cover to one side.

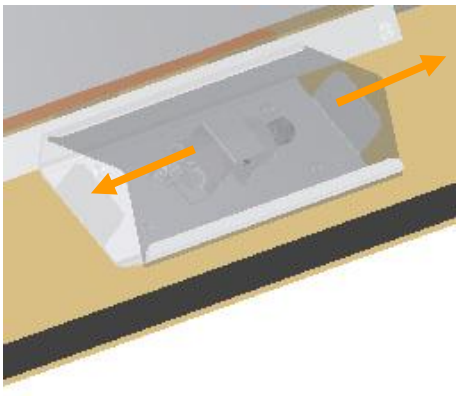


Fig. 46

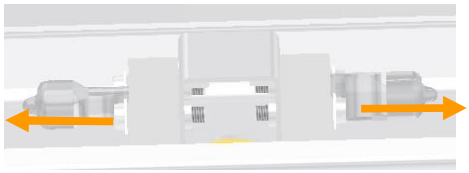


Fig. 47

5. Remove the defect bulb from its socket.
6. Fit a new bulb.
7. Push the lamp cover back into place.

8.6 Cleaning the cooling system

The cooling fins of the condenser must kept free of dust to allow optimum heat dissipation. This requires regular inspections and cleaning.

CAUTION!
Risk of damaging the heat exchanger due to the use of sharp objects.

The copper pipes of the heat exchanger may be damaged by cleaning with sharp objects, thus leading to the escape of coolant.

Therefore:

– Use only a vacuum cleaner to clean the fins and copper pipes of the heat exchanger

Side-mounted cooling system

Procedure

1. Remove the screws holding the grating.

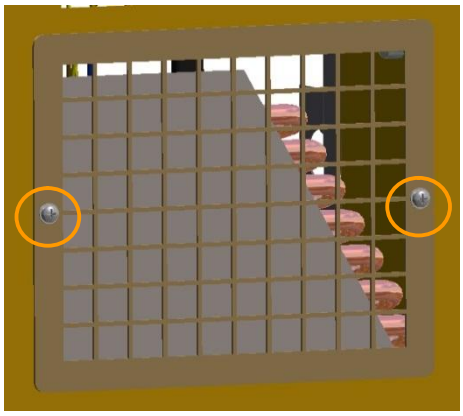


Fig. 48

2. Lift off the grating.

3. Clean the fins with a vacuum cleaner.

4. Reattach the grating with the two screws.

Top-mounted cooling system

Procedure

Fig. 49

1. Visually inspect the heat exchanger of the top-mounted cooling system for dust.

2. If there is a lot of dust, contact the manufacturer's service center.

Coolant

Maintenance of the coolant system must be carried out by the manufacturer's service center.

- Annual check of the coolant level.
- Replacement of the coolant every 3 years.

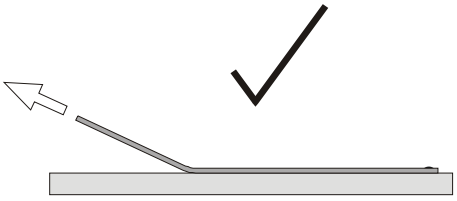
8.7 Replacing the «Sticky Stuff» adhesive matting

NOTICE!

Regular disinfection may reduce the adhesiveness of the «Sticky Stuff» matting.

Replace the adhesive matting as follows:

Procedure



1. Release the adhesive matting on one side of the tray and then pull upwards at an angle.
2. Degrease the tray with acetone.
3. Thoroughly moisten the tray with water.
4. Wet the new matting and place on the tray (see the installation instructions for «Sticky Stuff»).

8.8 Cleaning

The following areas of the incubator shaker must be cleaned regularly:

- Housing
- Chamber
- Floor pan
- Trays
- Cooling systems

CAUTION!
Risk of material damage if the incubation chamber is not cleaned sufficiently.

Moulds or other microorganisms may grow uncontrollably and thus jeopardise successful cultivation and the health of the operator.

Therefore:

– If a flask has broken or culture medium has escaped, clean the chamber thoroughly with a neutral household cleaner.
– Clean with standard disinfectants, if necessary.

CAUTION!
Risk of material damage due to the use of unsuitable cleaning agents.

Aggressive cleaning agents, solvents and scouring cleaning aids (hard sponges, brushes) may scratch and damage the surfaces and have a negative impact on the function of the unit.

Therefore:

– Use only soft cloths.
– Use only mild household cleaners.

8.8.1 Cleaning the housing

Wipe the housing regularly with a soft cloth and a mild household cleaner (e.g. washing-up liquid, neutral cleaner). If necessary, disinfect with a standard disinfectant.

8.8.2 Cleaning the chamber

Wipe the housing regularly with a soft cloth and a mild household cleaner (e.g. washing-up liquid, neutral cleaner). If necessary, disinfect with a standard disinfectant.

8.8.3 Cleaning the floor pan

When cleaning the floor pan after a glass breakage or if culture liquids have escaped, the table can be released from the counterweight and tilted upwards.

CAUTION!
Risk of material damage due to excessive mechanical loading of the table suspension when tilting the table.

The table's suspension mechanism may be damaged if the table is tilted upwards by more than 30°.

Therefore:

– Do not tilt the table upwards by more than 30°.

Clean the floor pan as follows:

Procedure

1. Open the door.
2. Switch off the unit and disconnect it from the power supply.
3. Remove the Allen screws (4) from the drive hub of the table using the supplied Allen key.

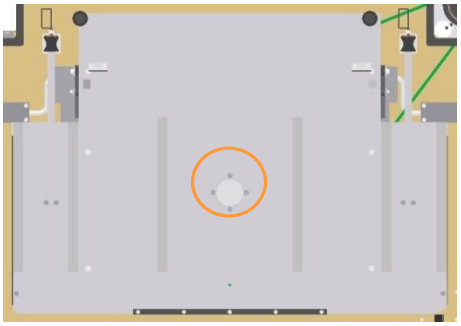


Fig. 50

4. Tilt the table upwards by no more than 30°.
5. Remove any foreign objects and debris by hand.

CAUTION!
Risk of material damage to the incubation chamber due to splashed water during cleaning.

If rinsing water is tipped into the chamber without due care, splashed water can come into contact with the electrical system and the fans, thus causing permanent damage.

Therefore:

– Always pour rinsing fluids carefully into the floor pan.
– Always use a large beaker or similar to pour rinsing fluids into the incubation chamber.
– Do not use a pressurised water hose for cleaning.

If necessary:

6. Rinse the floor pan with hot water and a mild household cleaner.

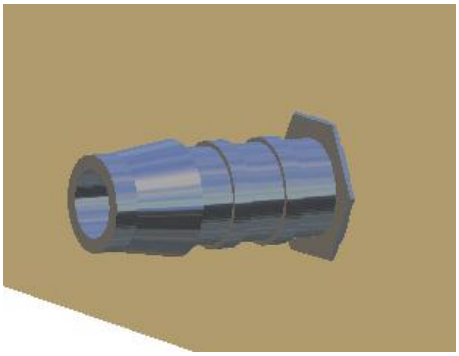


Fig. 51

Rinsing fluids must be drained away through the drain hole at the side of the unit.

NOTICE!

If the drain is not connected to the in-house wastewater system, push a hose onto the drain nozzle and let the water run into an appropriately sized container.

7. Rinse the floor pan with water.
8. Thoroughly dry the floor pan with paper towels.
9. Lower the table back onto its axle.
10. Insert the Allen screws and tighten cross-wise with an Allen key.

NOTICE!

If any of these Allen screws are lost or damaged, they must be replaced by original screws. See chapter Technical Data – General specification.

8.8.4 Cleaning the trays

Regularly wipe the trays and their mounted parts (rails, clips, adhesive matting, etc.) with a soft cloth and a mild household cleaner (e.g. washing-up liquid, neutral cleaner). If necessary, disinfect with a standard disinfectant.

8.9 Cleaning the «Sticky Stuff» adhesive matting

The adhesiveness of the mats declines over time due to dust and soiling.

Regenerate the adhesive mats as follows:

- Scrub the surfaces vigorously with a scouring pad and clean warm water or mild soapy water (washing-up liquid).
- Allow to dry overnight.
- Disinfect with 70% ethanol.

CAUTION!
Risk of material damage due to the use of solvent-based cleaning agents.

The structure and adhesive properties of the «Sticky Stuff» adhesive matting can be destroyed by solvent-based cleaners. Risk of detachment of cultivation flasks from the «Sticky Stuff» adhesive matting during operation of the shaker.

Therefore:

– Use only a mild neutral cleaning agent (e.g. washing-up liquid)
– Use only 70% ethanol for disinfection

See also the enclosed brief instructions for the «Sticky Stuff» adhesive matting.

NOTICE!

If the adhesiveness of the matting» cannot be restored by cleaning, it must be replaced. Please refer to the chapter "Maintenance – Replacing the «Sticky Stuff» adhesive matting".

8.10 Finishing maintenance work

WARNING!
Risk of injury!

If protective devices on the equipment are not brought back to their original state after maintenance work, this carries a substantial risk of injury at the next time of operation.

Therefore:

– Always restore all protective devices on the equipment back to their original state after finishing maintenance work.

9 Interferences

Possible reasons for interference or a problem and how to resolve it is described in the following section.

Reduce the service intervals if interferences/problems become increasingly common.

Contact the manufacturer in case of developing problems which cannot be resolved by following the above mentioned instructions. For service contact details, see page 2.

Action in case of interferences

The following instructions are to be followed:

1. Immediately switch off the equipment and unplug the mains plug in case of malfunctions which represent an imminent danger to persons or property.

NOTICE!

Instructions given by in-house safety protocols are to be followed if additional isolation switches for the power supply have been installed locally.

2. Investigate the cause of the malfunction.
3. Inform a responsible person about the malfunction/trouble.
4. Depending on the type of malfunction, solve the problem or engage authorised qualified personnel to do so.

NOTICE!

The following trouble shooting guide clearly indicates who is authorised to solve the problems described.

Action in case of interferences of incubation shaker

WARNING!
If people and/or equipment are in danger, switch off the incubator shaker immediately and disconnect it from the power supply.

Switch off the unit if the following irregularities occur:

- Loud noises
- Smoke
- Odor
- Strong vibrations

After switching off and disconnecting from the power supply, proceed as follows:

Procedure

1. Avert danger.
2. Remove flasks manually from the tray.

NOTICE!
If the incubator shaker is switched off, the tray cannot be removed because the door lock cannot be disengaged.

3. Remove the tray manually (see chapter "Operation – Operating the tray").

NOTICE!
If the cultivation flasks cannot be removed or if the incubator shaker needs repairing, contact your INFORS representative. (See page 2 for addresses)

9.1 Safety

Personnel

- The here described trouble shooting work may be carried out by the user, if not indicated otherwise (see "Table of Interferences").
- Any work on the electrical system is strictly to be carried out by qualified electricians.

Electrical system

DANGER!
Danger of fatal electric shock!

Contact with electrically powered components is perilous. Energized electrical components may perform uncontrolled movements which can lead to severe injuries.

Therefore:

– Turn off the electrical supply and check whether it is electrically isolated before starting any work.

WARNING!
Risk of injury due to inappropriate trouble shooting!

Inappropriate trouble shooting may lead to severe physical injury or loss of property.

Therefore:

– Strictly follow the trouble shooting instructions stated in this operating manual

9.2 Table of interferences

General interference

Interferences	Possible causes	Trouble shooting	By
Door cannot be fully opened	Door is subjected to a load	Close the door and open again	Operator
	Unit is switched off	Switch the unit on	Operator
Tray lock does not engage	A foreign body is blocking the locking system	Remove foreign body	Operator
	Foreign body is under the table	Detach table from its axle, tilt it upwards and remove the foreign body	Operator
	Tray is bent or damaged	Replace the tray	Operator
Tray is not being released	Door is not fully open	Press the door downwards to its lowest position	Operator
Status display is not illuminated	Unit is switched off	Switch the unit on	Operator
	Power plug has been disconnected	Connect the power plug	Operator
	Fuse has blown	Replace fuse	Operator

Interference of shaker drive

Interference	Possible causes	Trouble shooting	By
Shaking function is not working (with error message)  	Table is mechanically blocked	Remove foreign body	Operator
	Torn drive belt	Contact Infors representative	Qualified technician
	Defect motor fuse	Contact Infors representative	Qualified technician
	Defect motor	Contact Infors representative	Qualified technician
	Motor not connected to electronics	Contact Infors representative	Qualified technician

Interferences

Interference	Possible causes	Trouble shooting	By
Shaker drive accelerates too quickly or operates too quickly  	Defect motor control unit	Contact Infors representative	Qualified technician
	Speed measurement is malfunctioning	Switch unit off and then on again	Operator

Interference of temperature control

Interferences	Possible causes	Trouble Shooting	By
Temperature higher than 65 °C Error message  	Defect measuring electronics	Contact Infors representative	Qualified technician
Temperature of the unit is too low < 0 °C  	Defect measuring electronics	Contact Infors representative	Qualified technician
No value on temperature display  	Pt100 sensor or sensor cable is defect	Contact Infors representative	Qualified technician

Interferences

Interferences	Possible causes	Trouble Shooting	By
Temperature in flask with mobile Pt100 is too high (> 65 °C)   	Defect measuring electronics	Contact Infors representative	Qualified technician
Temperature in flask with mobile Pt100 is too low (< 0 °C)   	Defect measuring electronics	Contact Infors representative	Qualified technician
No value on temperature display   	Pt100 sensor or sensor cable is defect	Contact Infors representative	Qualified technician
Temperature too high. No error message	Cooling is not switched on	Switch on cooling	Operator
	No power supply to cooling system	Check fuse of cooling system, replace if necessary	Operator
		Connect unit to power supply	Operator
Temperature is not reaching the desired value	Heating is not switched on	Activate the temperature parameter	Operator
	Setpoint value is too low	Increase setpoint value	Operator

Interferences

Interferences	Possible causes	Trouble Shooting	By
	Capillary thermostat is set too low (must be at least 10 °C above the setpoint value)	Set capillary thermostat to higher temperature	Operator
	Heating fan is not working	Contact Infors representative	Qualified technician
	Door is not completely closed	Close the door properly	Operator
	Top-mounted cooling: cooling fins are dusty	Contact Infors representative	Qualified technician
	Side-mounted cooling: cooling fins are dusty	Clean cooling fins	Operator

9.3 Returning for repair

The operator must return the equipment 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.

The following must be observed if this is the case:

- The equipment or the component part which is to be repaired must be entirely decontaminated before sending to the manufacturer.
- The operator is obliged to firstly fill in and sign a decontamination agreement and decontamination form and either send it together with the written request for the repair work to the licensed dealer before returning the faulty equipment to the manufacturer or, **at the latest**, together with the faulty equipment on return to the manufacturer.
- These forms can be obtained from the licensed dealer or the manufacturer, contact details can be found on page 2 of this manual.

10 Disassembly

The equipment must be disassembled and disposed of in an environmentally-friendly manner if it is not in use anymore.

10.1 Safety

Personnel

- Disassembly may only be carried out by qualified personnel.
- Qualified electricians only may carry out work on the electrical system.

Inappropriate disassembly

WARNING!
Risk of injury due to inappropriate disassembly!

Residual energy and sharp-edged components of the equipment or tools may cause injuries.

Therefore:

– Before starting the disassembly process, ensure that there is sufficient space for the whole procedure
– Take care regarding sharp-edged components.
– Keep the work place tidy and clean! Discarded components and tools may be a source of accidents.
– Professionally disassemble units: Take note of the high dead weight of some parts. Use hoists, if necessary.
– Secure units to avoid them falling or tumbling down.
– Call the manufacturer in case of any lack of clarity.

Electrical system

DANGER!
Danger of fatal electric shock!

Contact with energised electrical units/components is perilous. Electrical components which are energised may be subject to uncontrolled movements and may lead to most severe injuries.

Therefore:

– Definitely switch and cut off the electrical supply before starting the disassembly-

Disassembly

Biological safety

WARNING!
Danger to biological safety!

Non-compliance with all biological safety regulations signifies an increased health risk to the user and the functionality of the equipment.

Therefore:

– Strictly follow all biological safety regulations

– Decontaminate and sterilize every part including any peripheral in- and outlet that comes in contact with any infectious biochemical substances (e.g. liquids which contain bacteria or viruses).

10.2 Disassembly

Prior to disassembly:

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

Clean and disassemble component parts professionally with regard to any local regulations concerning employment and environmental protection.

10.3 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.

CAUTION!
Environmental damage or loss due to inappropriate disposal!

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

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

11 Examples

11.1 Delay a speed change

EXAMPLE

The incubator shaker is to operate at a speed of 250 rpm and a temperature of 40 °C. After 10 minutes, the speed is to be reduced to 100 rpm and the temperature control is switched off.

The unit then operates continuously with these parameters until other values are entered.

Procedure

1. Select the appropriate deck with the UP/DOWN key.

2. Select the timer function with the F key.

The timer symbols lights up red.

The right-hand display shows 00'.

3. Set the value to 10 with the PLUS key.

The right-hand display shows 10'.

4. Activate the timer with the ON/OFF key.

The cycle symbol lights up green.

The right-hand display alternates between "ON" and 10', followed by a permanent display of the remaining cycle time.

Examples

5. Select the temperature by repeatedly pressing the F key.

The temperature symbol lights up red.

6. Set the temperature to 40.0 with the PLUS or MINUS key.

The right-hand display shows the setpoint value of 40.0.

7. Activate the temperature with the ON/OFF key.

The right-hand display shows "ON" and then "40.0", followed by a permanent display of the current actual value.

8. Select the speed by repeatedly pressing the F key.

The RPM symbol lights up red.

9. Set the speed to 250 with the PLUS or MINUS key.

The right-hand display shows the setpoint value of 250.

10. Activate the RPM with the ON/OFF key.

The right-hand display shows "ON" and then "250", followed by a permanent display of the current actual value.

Setting up the follow-up phase

11. Select the speed by repeatedly pressing the FT key.

Examples

The RPM symbol lights up red.

12. Set the speed to 100 with the PLUS or MINUS key.

The right-hand display shows the setpoint value of 100.

13. Activate the RPM with the ON/OFF key.

14. Select the temperature by repeatedly pressing the FT key.

The temperature symbol lights up red.

15. Deactivate the temperature with the ON/OFF key.

The temperature symbol does not light up.

16. Select the timer by repeatedly pressing the FT key.

The timer symbols lights up red.

17. Deactivate the timer with the ON/OFF key.

The timer symbol does not light up.

Programming is complete.

11.2 Switch-on delay

EXAMPLE

The incubator shaker is to start after a delay of 5 minutes and then operate with a speed of 250 rpm and a temperature of 37.5 °C until other values have been entered.

Procedure

1. Select the appropriate deck in the stack.

2. Select the timer by repeatedly pressing the F key.

The timer symbols lights up red.

The right-hand display shows 00'.

3. Set the timer value to 5 with the PLUS or MINUS key.

The right-hand display shows 5'.

4. Activate the timer with the ON/OFF key.

The right-hand display alternates between "ON", 5' and the remaining cycle time.

5. Select the temperature by repeatedly pressing the F key.

The temperature symbol lights up red.

6. Deactivate the temperature with the ON/OFF key.

Examples

The temperature symbol does not light up.

7. Select RPM by repeatedly pressing the F key.

The RPM symbol lights up red.

8. Deactivate the RPM with the ON/OFF key.

The RPM symbol does not light up.

Right-hand display shows "OFF".

A delay of 5 minutes has now been activated.
All the functions of the unit have been deactivated for the first phase.

9. Select RPM by repeatedly pressing the FT key.

The RPM symbol lights up red.

The FT symbol lights up green.

10. Set RPM to 250 with the PLUS or MINUS key.

The right-hand display shows 250.

11. Activate the RPM with the ON/OFF key.

The right-hand display shows "ON" and then "250", followed by a permanent display of the current actual value.

Examples

12. Select the temperature by repeatedly pressing the FT key.

The temperature symbol lights up red.

13. Set the temperature to 37.5 °C with the PLUS or MINUS key.

The right-hand display shows the setpoint value of 37.5 °C.

14. Activate the temperature with the ON/OFF key.

The right-hand display shows "ON" and then "37.5", followed by a permanent display of the current actual value.

15. Select the timer by repeatedly pressing the FT key.

The timer symbols lights up red.

The right-hand display shows 00'.

16. Deactivate the timer with the ON/OFF key.

The timer symbol does not light up.

Programming is complete.

11.3 Cyclic operation

EXAMPLE

The unit continuously alternates between two operating states.

This can be used e.g. to simulate a day/night rhythm with the illumination.

The Multitron operates with two alternating phases:

Phase 1	
Speed	250 rpm
Temperature	40 °C
Time	10 minutes

Phase 2	
Speed	100 rpm
Temperature	37 °C
Time	7 minutes

The unit operates continuously with these parameters until other values are entered.

Procedure

1. Select the appropriate deck with the UP/DOWN key.

2. Select the RPM parameter with the F key.

RPM lights up

3. Set the value to 250 with the PLUS or MINUS key.

Examples

The right-hand display shows 250.

4. Activate the RPM with the ON/OFF key.

5. Select the temperature parameter with the F key.

The temperature function symbol lights up red.

6. Set the temperature to 40 °C with the PLUS or MINUS key.

The right-hand display shows 40.

7. Activate the temperature parameter with the ON/OFF key.

8. Select the timer function with the F key.

The timer function symbol lights up red.

The right-hand display shows 00'.

9. Set the value to 10' with the PLUS key.

The right-hand display shows 10'.

10. Activate the timer function with the ON/OFF key.

The right-hand display alternates between "ON" and 10', followed by a permanent display of the remaining cycle time.

Examples

11. Select the RPM parameter with the FT key.

The FT function symbol lights up green.

12. Set the value to 100 with the PLUS or MINUS key.

The right-hand display shows 100.

Activate the RPM parameter with the ON/OFF key.

13. Select the temperature parameter with the FT key.

The temperature function symbol lights up red.

14. Set the temperature to 37 °C with the PLUS or MINUS key.

15. Activate the temperature parameter with the ON/OFF key.

16. Select the timer function with the FT key.

The timer function symbol lights up red.

17. Set the value to 7' with the PLUS key.

The right-hand display shows 7'.

18. Activate the timer function with the ON/OFF key.

Examples

The cycle function symbol lights up green.

The incubator shaker starts with the preset values and then changes into the programmed cycle.

12 Appendix

12.1 Circuit diagram

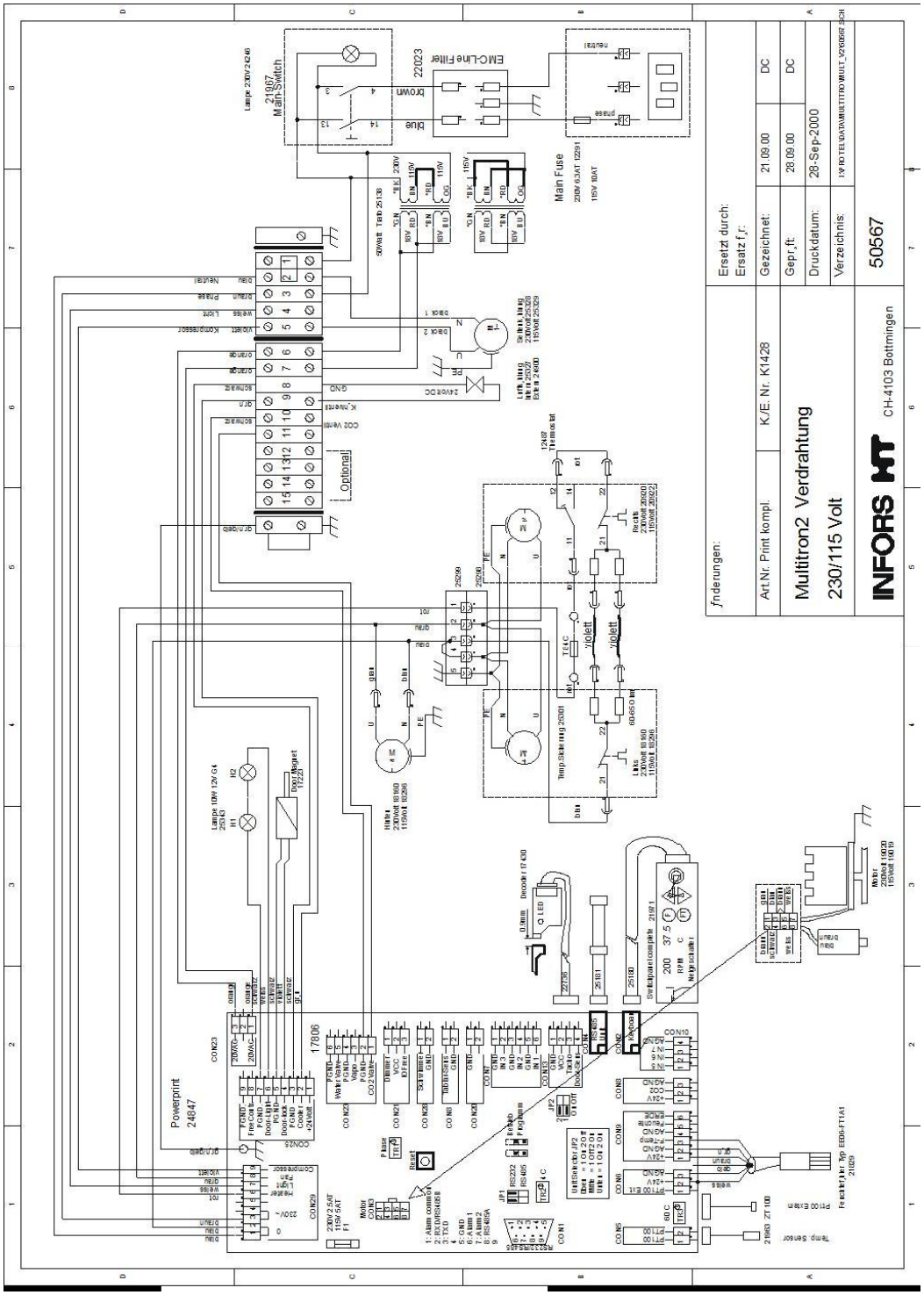


Fig. 52

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