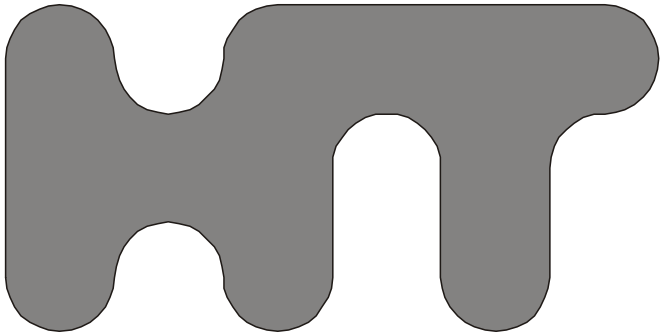


Manual

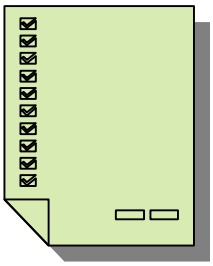
MINITRON ®

Incubator Shaker

INFORS EQUIPMENT
Read this FIRST!

SAFETY

COMPLIANCE



SPECIFICATIONS

MAINTENANCE & SERVICING

CE conformity declaration

INFORS equipments are CE-labelled from the factory and supplied with an EC declaration of conformity. It can be found in the appendix of this manual, too.

INFORS equipment complies with the following Directives:

Directive on Machinery 2006/42/EC
EMC Directive 2004/108/EC

Quality Management Systems

All INFORS equipment is manufactured in accordance with INFORS' quality management system which is certified by BVQI in accordance with the requirements of ISO 9001.

Testing

All INFORS equipment undergoes electro-mechanical operational testing before it leaves the factory. The exact nature of the tests varies according to the equipment type.

All equipment is delivered with a signed test certificate. The tests described are conducted in accordance with the procedures set out in INFORS' quality management system and in accordance with international classification companies.

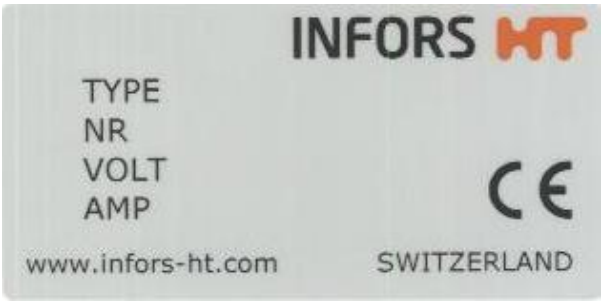
Applicability

This is specified in the specifications table included within this section of the document.

If any of these specific sections appears to be missing for your equipment please contact INFORS and this can be rectified.

Please be aware that if the equipment is acquired second-hand from an original user, it may have been modified, upgraded and enhanced such that some details of the configuration may differ to those described in this manual. We will provide any help and information necessary to bring the documentation up to date but individual options may not be the standard ones supplied by Infors. In this case, it is the responsibility of the previous owner to supply any additional manuals, configuration information and safety-related items. **INFORS disclaims responsibility for all equipment that is not in original condition i.e. modified by the user without prior agreement from INFORS.**

Identification plate



The identification plate is located on the housing of every piece of equipment

The identification plate must <u>never</u> be removed from the equipment.
If the name plate is removed, it is not possible to identify the equipment, and it will not be possible for warnings contained in this manual to relate to the specific applications for which the equipment is used.

General Safety Points

 **NEVER** open or remove covers (internal or external with the power switched on.

 No operations beyond those expressly stated in this guide are authorised by INFORS as being suitable for the equipment.

 All work on the equipment – including adjustments, repairs, pipe couplings, etc. – must be undertaken by professionally qualified staff.

 When repair and maintenance work has been completed, any safety equipment provided must be refitted in its original state before the equipment is started.

 The equipment must be installed in accordance with the instructions contained in this user manual.

 The equipment's weight is over the permitted allowance of kilos/pounds that people may lift, so it must be lifted mechanically. –see specifications sheet.

 Users are responsible for ensuring that the equipment is used in accordance with safety procedures applicable to their work and is free of any biological or chemical contamination if an examination by INFORS staff is requested.
INFORS will not be held responsible for any equipment which has been improperly used, maintained, modified or repaired; nor for any consequential losses arising.

 All the housing covers of the basic unit and operating panel are, as they may cover critical areas, only to be removed by personnel explicitly authorised by INFORS to do so.

If in doubt about any aspect of the use of this equipment or its suitability for an application, please contact INFORS.

 Please ensure a Risk Assessment is carried out according to your safety regulations before using the equipment

Safety points relating to installation & use

 Electrical connections should only be installed and fitted by a qualified electrician to current electrical safety regulations.

 Installation of all services lines should be made only with pressure resistant tubing retained with suitable tubing clamps.

 Authorization for use of an oxygen supply and its operation in accordance with your own safety guidelines are the responsibility of the customer'

 Never use the main ON/OFF switch to end operation!

 Always work to GMP and observe other appropriate standards

 Observe all safety issues relating to hazardous chemicals, biological material and equipment under pressure, especially points regarding skin and eye contact.

 The equipment is only to be operated by suitably qualified and trained personnel, both in terms of equipment use & microbiological expertise.

 In normal use, operators should ware appropriate safety clothing, gloves, safety goggles and a face mask as appropriate to the degree of microbiological risk.

 The nature of the microbiological and chemical risks associated with the use of individual units cannot be assessed by the manufacturer and its specification is the responsibility of the user.

 The environmental hazards associated with the use of individual units cannot be assessed by the manufacturer and its specification is the responsibility of the user.

Safety points related to testing the equipment

 The main power switch should not be used as a functional ON/OFF.

 Never put your hand into an operating unit – risk of injury due to high rotational forces.

 Handle glass vessels, reagent bottles and other glass components with care to minimise the risk of breakage or other damage resulting is sharp edges

 Do not apply excessive pressure when handling any glass components in case of breakage and consequent sharp edges.

 Ensure hair, loose clothing etc cannot come into contact with any rotating parts.

Emissions and Warning indications

 Any loud and/or unusual noise from any part of the equipment should be taken as a sign of a problem and the equipment closed down and inspected immediately.

 Any smoke or smell of burning should be taken as a sign of a problem and the equipment closed down and inspected immediately.

In normal operation, some additional noise and heat may be generated, the extent depending on the phase of operation (see performance data)

Service & Maintenance

- Only fully qualified and authorised persons may service the equipment
- Cleaning and routine maintenance information in provided in the main manual.

MINITRON ® - Incubator Shaker

Table of Contents

Chapter

Modifications
Due to the constant development and improvement of our products, the equipment supplied may differ from the description in this manual. INFORS explicitly retains the right to make such deviations and modifications.

Guarantee
You can find the guarantee in chapter 18.2.

1. Safety Considerations

The MINITRON ® incubator shaker corresponds to modern demands for safe and easy-handling. Any exposed current-carrying components (exception: lamps outside of the incubation chamber) are low-voltage only, switching networks are physically separated and the chance of mechanical injuries minimised.

Nevertheless, the following basic hints are indispensable for the safety of the user and the protection of the machine. These hints, both here and in the following text, are printed in italics in conjunction with a warning symbol (hand with pointed finger). They are to be followed in every case.

*All the **housings and covers** of the shaker are only to be removed by personnel explicitly authorised by INFORS to do so. This is because safety-critical zones may be covered by housing panels.*

*The movement of the shaker table can cause injury due to the high torque when in operation. Therefore, the **tray** is only to be handled when **at rest**.*

*The vent holes at the sides and in the back are **not to be obstructed** in any way. On no account allow objects to become stuck in the fan or air intake openings.*

*The **minimum distance** has to be followed when installing the shaker.*

***Remove the transport security device** before bringing the shaker into operation.*

*If rollers are attached to the shaker the **front swivelling rollers have to be pulled** so that they are approximately 2-3mm above the level of the floor, with the machine resting on the static feet located beneath the wheels.*

During long absences or interruptions of operation, according to location (eg. humid laboratory or unprotected position), it is recommended to withdraw the main power plug in order to avoid the risk of accidents.

*The shaker must **never** be operated **without a tray**.*

The specifications in chapter "4.2. Chemical Resistance" have to be followed precisely.

2. Description of the Product, Technical Specifications

2.1 Comfort

In the same way as its successful "siblings" the UNITRON ® & MULTITRON ®, the downwards opening door provides a convenient and practical place on which to rest the tray whilst exchanging flasks.
The important features of simple operation and virtually silent running are guaranteed for a wide range of applications in your laboratory, coupled with an attractive design.
A range of parameter set-points and timer functions can be programmed via a sensitive and ergonomic splashproof operating panel eg. day/night cycling or switching between temperatures.

2.2 Useful Space and Required Space

Despite having a relatively small footprint, the MINITRON ® offers all the possible features required in an incubator shaker. It provides space for cooling, lighting and humidification in addition to the room required for a tray of 480x420mm.
Thanks to the downwards-opening front door, it is not only a bench-top shaker but can also be located under a laboratory bench. In the best traditions of the MULTITRON ®, one unit can be stacked on top of another. A substantial base support is used to raise the bottom unit when a stackable system is assembled.

2.3 Technical points

After decades of experience of building magnetic drive systems, a completely new version has been developed which is so well enclosed that liquids cannot penetrate.

The heating system for the incubation chamber guarantees a rapid and even temperature distribution across the whole of the shaker tray. Supply of coolant is regulated for the most economical use of energy.

The latest innovations in the field of micro processing and PID-regulation allow precise maintenance of the set values.

The RS-232 interface for data logging and control is standard, as for all the latest Infors machines.

2.4 Safety

Additional operational safety is provided by an over temperature cut-out and a potential-free output for linking to a central alarm system.
Following a power failure, the machine will automatically re-start using the current set-point on resumption of the power supply.
Thanks to the sealed drive chamber and control electronics, the infamous consequences of cleaning up following a flask breakage can be greatly reduced. As the walls of the incubation chamber finish below the level of the shaker table, it is possible to rinse this area with water.

2.5 Fittings

In the most basic configuration, the MINITRON ® is provided with shaker, temperature and timer functions.
Cooling can be supplied either from an external chiller connected to a cooling coil with magnetic control valve or via an integral cooling system.
Optional extras include a gassing nozzle, daylight or photosynthesis lighting, CO_2 and humidification control.

A shelf is also available for static cultures within the incubation chamber eg. Petri dishes.
The “N” size table can has standard options for adhesive matting, clamps and/or test tube racks.

2.6 Dimensional Drawing

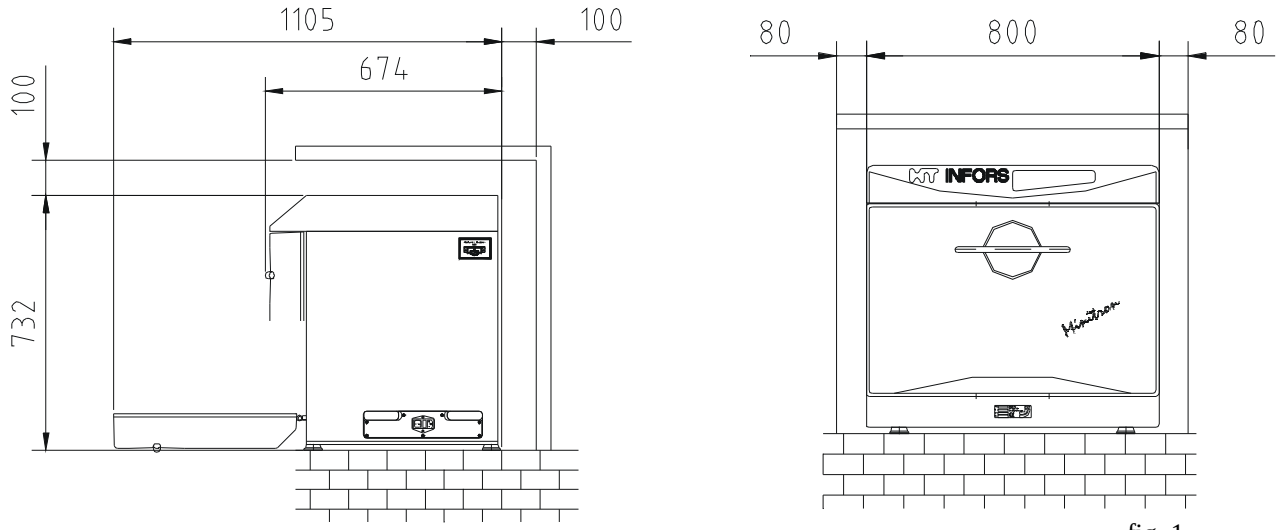


fig. 1

2.7 Technical Data

width	800 mm
depth:	674 mm
depth with opened door:	1105 mm
height:	732 mm
incubation chamber: (h x b x d)	410 x 555 x 495 mm
incubation chamber: (volume)	approx. 113 l
required footprint: (b x d)	960 x 774 mm
weight without tray- cooling	90 kg
weight without tray -no cooling	75 kg
electric connection:	230 V ± 10%, 50/60 Hz
current consumption:	approx. 6 amperes
power:	approx. 750 watt (heating, excl. cooling)
rotation speed:	see chapter 8.2.
max. deviation:	1 % with maximal speed of rotation
temperature control:	electronic proportional action controller with Pt-100 probe
temperature precision (Pt-100):	± 0.2 °C
temperature range[3)]: (without light)	5 °C over ambient temperature to 65 °C
with ext. cooling[3)]:	depending on the temperature of the coolant and the environment
with int. cooling[3)]:	approx. 14 ± 1°C beneath ambient temperature up to 65 °C, but not under 5°C
air circulation: (total)	110 m^3/h
heating power:	500 watt
cooling power:	213 watt/hour at an evaporating temperature of 1 °C
power capacity of the cooling	105 watt at 230V/50Hz at an outside temperature of 32 °C 115 watt at 115/60Hz at an outside temperature of 32 °C
allowed humidity:	90 % r.H. at 37°C incubation temperature (controlled, if required, higher available)
tray:	tray size N (480 x 420 mm)
flask:	according to the specifications of the customer
weight of tray:	average value approx. 8.5 kg (depending on the size of the clamps and the quantity)
allowed loading: (incl. tray)	see 8.2
dimension drawing:	see above
order number:	varies according to the type
Lighting:	Various spectral options available, if required

[3)] for outside temperature up to max. 30 °C

3. Transport

3.1 Transport

In view of the heavy weight of the MINITRON ® it should never be transported or moved by one person alone. For displacements over longer distances within a building the use of a fork li_T or a small trolley is recommended. However the shaker is only to be moved by a fork lift if it is still standing on the original palette on which it was delivered by the manufacturer. Also, transport on a small trolley has to be effected with great care.

Danger of shearing off the shaker's feet and of collapsing the bottom plate in case of exceptional stress. Therefore, never push the apparatus without lifting it.

Should it no longer be possible to transport the MINITRON ® using a small trolley it should be carried by two adults using the two handles on each side. Weight without tray and cooling 75 kg.

3.2 Packing

Depending on the version and the destination the MINITRON ® shaker is either packed seaworthy or placed on a large special palette. Non-polluting packing material was chosen in order to minimize pollution.

3.3 Unpacking

Please be sure that the shaker, especially the window, will not sustain damage (scratches) during unpacking.

4. Location

4.1 In General

The following points have to be considered when choosing the location:

- Protection from mechanical dangers (small trolleys, kicks, etc.)
- For a shaker without cooling, the outside temperature should not be higher than 5 °C above the desired minimal incubation temperature.
- For a shaker with cooling the outside temperature should not be higher than 15 °C above the desired minimal incubation temperature.
- The outside temperature may not exceed 30 °C.
- The machine should not be exposed to direct sunlight!
- The surface on which the shaker stands has to be horizontal and absolutely flat.
- The shaker should not be unprotectedly exposed to extreme masses of dust and dirt.
- The control panel is not waterproof and must not be exposed to spraywater.
- The optional base on which the shaker may be placed must be positioned safely and stable.
- Please think of all the different connections you need for the interfaces.

The main switch must stay free and easily accessible.

4.2 Chemical Resistance

The housing was tested with different solvents. With the solvents listed below neither a relevant change of weight nor a change of the Shore D-hardness was found:

- water
- inorganic acids: phosphorus, nitric, hydrochloric or sulphuric acid, watery 10%
- organic acids: formic, acetic and lactic acid, watery 10 %
- inorganic bases: soda lye, at 10 % solution (aqueous)
- inorganic chemicals in aqueous solution: hydrogen peroxide 10 %, calcium chloride saturated solution, bleaching lye solution concentrated
- hydrocarbons: fuel, motor oil, diesel

The housing should not be exposed to the following solvents in large quantities nor over a long period of time:

- methanol
- ethanol
- acetone
- cyclohexanon
- ethyl acetate
- ethylglycolacetate
- methylenchloride

The inner inspection window can be cleaned with a damp cloth and a normal neutral cleaner.

5. Interfaces

5.1 Electricity

Sparkplug with a double protective system ("Europlug")
115/230 Volt +- 10 %
50/60 cps

5.2 External Cooling

The temperature of the coolant depends on the cooling system. We would like to point out that temperatures of the cooling medium below freezing point may cause icing of the radiator grill.

Connection internal width nipple 8 mm
internal width tube 10 mm

When using an external cooling the maximal pressure must not exceed 4.0 bar.
For a higher pressure, please contact an INFORS representative.

5.3 External Gassing

Connection bore internal thread 1/4" with hose nipple
internal width nipple 8 mm
internal width tube 10 mm

5.4 Drain

For security reasons the drain is supplied with a blind plug. A hose liner is enclosed with every unit. Please install it (screw it in place) yourself.
Connection bore internal thread 1/4" with hose nipple
internal width nipple 8 mm
internal width tube 10 mm

5.5 Serial Port

RS 232, 9-PIN
Standard PINs: potentialfree exit integrated into the RS 232 interface as control for the alarm (pins 1, 6, 7) contact 1-6 = observation, contact 1-7 = alarm.

Connections at the rear of the unit

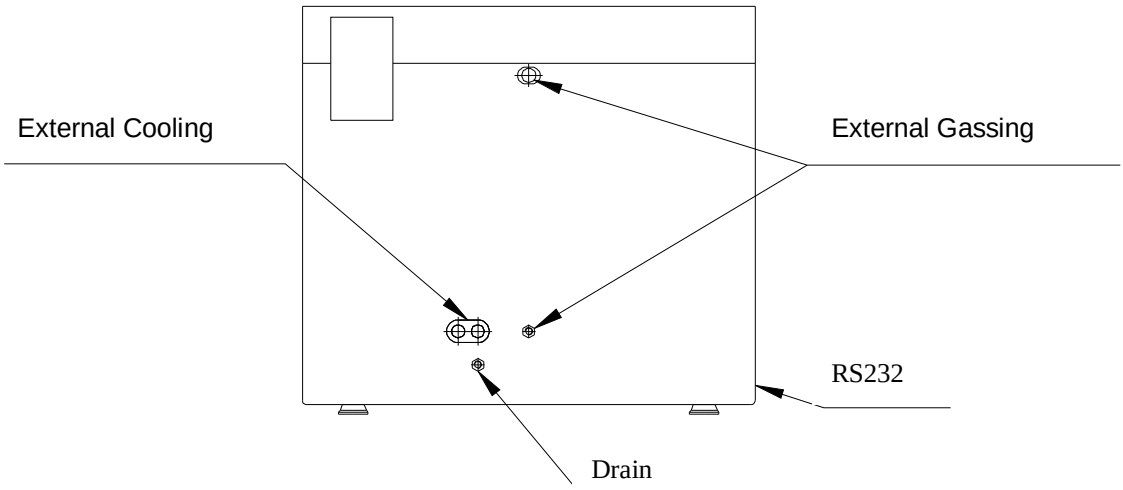


fig. 2

6. Assembly, Installation

For special equipment the installation manual is printed on a separate sheet and is enclosed with every unit.

Please make sure that the main switch is always freely accessible.

6.1. Levelling of the MINITRON ®

When a unit on a base support is installed for the first time or an existing unit is moved to a new location, the whole structure must be levelled to prevent vibration and mis-balancing.

6.1.1 Levelling of the MINITRON ® with movable base

- Pull the front, swivelling wheels so that they are approximately 2-3mm above the level of the floor, with the machine resting on the static feet located beneath the wheels.
- To level the movable base, adjust the orange nut on the front wheels.
- Start all shakers at 100 rpm and look for any rocking or obvious vibration of the machine.
- Also refer to the instructions given in Sections 6.1,2 & 3.

6.1.2 Levelling of the MINITRON ® with fixed base support

- The front, left-hand foot can be moved up or down by a screw thread with the help of an SW12 spanner (item 2). First, a locking nut at the top of the thread (item 1) must be loosened to allow movement using an SW18 spanner (see figure 3)
- Start all shakers at 100 rpm and look for any rocking or obvious vibration of the machine.
- If everything is OK, increase shaker speeds in increments of 100 rpm to the maximum operating speed of each unit.
- If movement or vibration is found at any speed, look for the foot which is too high or too low and adjust the levelling foot accordingly.
- To do this, screw the adjustable leg up or down a little as necessary.
- Repeat this procedure until the MINITRON ® is steady at the test speed. Increment the speed and test again until the maximum for each unit has been reached.
- Ensure the locking nut on the adjustable foot has been tightened before allowing normal use of the machine.
- For a particularly slippery floor surface, the use of small friction pads under each foot of the MINITRON ® is recommended.
- Any vibration or movement during normal use must be reported so a re-levelling can be carried out.

6.2. Stacking

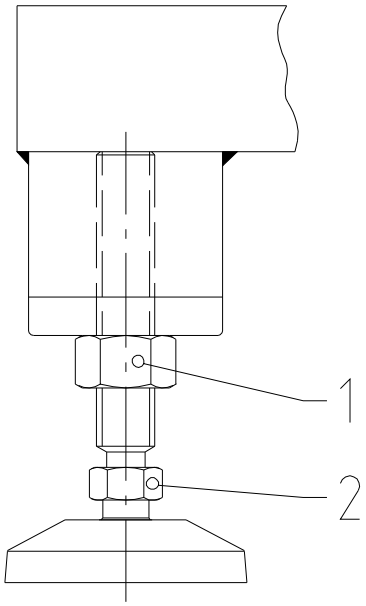


fig. 3

- Remove the four caps on the four corners of the top cover of the bottom MINITRON ®.
- Screw the special EMF"bolt" (Part No 24646) onto the threaded bolt on the left rear corner on the bottom machine.
- Screw the 3 other bolts (Part number 24635) into the remaining corner threaded bolts on the bottom machine.
- Mount the upper unit onto the lower.
- Remove the covers from the left and right sides of the top unit (see figure 4).
- Screw in the M6x16 retaining screws to secure the locating bolts in place.

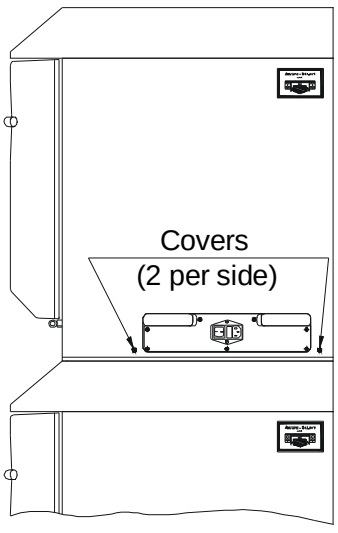


fig. 4

7. Putting into Operation

7.1 Main Switch

The main switch of the shaker is located on the right side wall. It is an ON/OFF selection switch which has to be turned on (position ON) first of all. If you turn off the switch (position OFF) the shaker is completely separated from the power system.

It is possible to leave the main switch on during normal operation even if neither shaker nor heating are working. In this "Stand-by" position the shaker consumes approx. 6 Watt. Frequent turning on and off (e.g. every hour) should be avoided in order to minimize stress of the electronic parts. If the shaker is not used for several days we recommend you switch off at the mains switch.

The set points of all parameters (temperature, speed, timer, lights) are memorized after turning off the main switch or during an interruption of current.

7.2 Operating Panel

7.2.1. General

Several parameters are set with the help of the operating panel, which is located at the top right of the machine.

The panel comprises:

- 5 Keys
- 1 alphanumeric display
- 9 icons for:
  - timer functions
  - Power
  - Speed
  - Temperature
  - Humidification
  - Lights

The icons are only visible when activated.

Keys

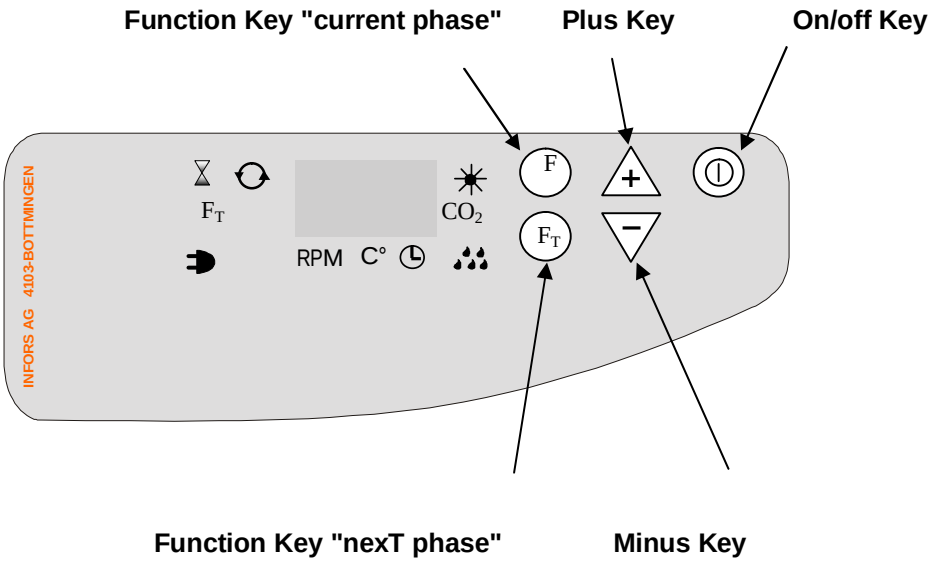


fig. 5

There are two different groups of icons:

Parameter

These light when the corresponding value is shown on the display, during which the set point values can be changed for that parameter. They are:

- The lights diode
- The speed diode
- The temperature diode
- The humidity diode

- The power diode, which comes on when the mains switch is turned ON

If the parameters humidity, light and CO_2 have not been installed, they can not be selected.

Timer

These are shown during the display and programming of the various timer functions. They are:

- The "Duration" diode, which lights when this value is to be changed
- The "Timer" diode lights when the timer function is switched ON.
- The "Cycle" diode is on when the unit is set to operates by switching between two different sets of operation conditions eg. day and night simulation
- The "NexT phase" diode lights when the non-current (later) time phase is being programmed.

7.2.2 Display

Possible displays in Standard mode of operation:

- Numeric value for actual process variables or set-points
- Numbers and symbols relating to operating hours
- "ini" (only when the unit is first switched on)
- "Sta" or "Stp" (on starting or stopping the shaker drive)
- ON/OFF
- hi/lo
- Time (only for timer)

Without User Intervention
The display alternates between the following two parameters every 10 seconds:
- Shaker speed
- Temperature

If the parameter control is switched on, the current actual value is displayed. For temperature, the display will also indicate a warning of either "hi" or "lo" if the actual value deviates from set point by more than 1.5°C.

If the parameter control is switched off, the display alternates between the set-point value and OFF.

With User Intervention
On adjusting a parameter, the set-point value is displayed. Approximately 2 seconds after the last key press, the display is exchanged for the actual value (eventually with "hi" or "lo" also, if appropriate). After a further 10 seconds, the display begins alternating between rpm and °C.

Duration for the Timer function
For setting duration, the display shows a "tick" for minutes (**'**) and **h** for hours.
The display can alternate between the following:

- Up to 99 minutes: 99' (numbers before the "tick")
- UP to 9 hours, 50 minutes: 9h5 (first number for hours, second for increments of 10 minutes)
- Up to 95 hours: 95h (numbers before the "h")
- UP to 9 days, 23 hours: 9.23 (whole numbers for days, decimal value for hours)

7.2.3 Operation

Before switching each Parameter on, the set-points must be entered:

Entering the Values for RPM, °C, Humidity & Lights
- Press the function key "F" repeatedly until the desired icon is illuminated
- Enter the required set-point value using the Plus and Minus keys. For lights, the only possible options are ON or OFF.

The control can be given concurrently with this operation.

Switching Control ON

- Press the function key "F" repeatedly until the desired icon is illuminated.
- Switch the parameter ON with the ON/OFF key.

IMPORTANT: Set-point values are not validated but simply accepted as entered without checking.

7.2.4 Timer

Using the Minitron timer functions is simple, making possible the following modes of operation:

- Operation without any timer functions (standard)
- A single change. The unit runs with the chosen parameters for a definite time span, then makes a single change without returning to the original settings.
- Cyclic operation. The unit alternates all active parameter settings between two states at regular time intervals.

The following rules are important for understanding the timer functions:

1. The "F" key ALWAYS sets the current parameter values
2. The "F_T" key ALWAYS sets the relevant parameters for the following (or nexT) phase
3. **The unit always finds itself in the phase "F". The values set by "F_T" are only utilised when (if) the next exchange actually takes place.**

Operation without Timer Function

See Section 7.2.3.

Single Change

- All parameters are set to the desired operating conditions
- Press the "F" key repeatedly until the Timer Duration symbol is lit (Hour)
- Set the duration of the phase using the Plus and Minus keys
- Switch Timer control to ON
  The hourglass begins to blink
- Press the "F_T" key. The F_T diode is shown and now the parameter values for the following phase can be given.
- All the alternative parameter values are accepted by pressing the "F_T" key. These will become active after the previously defined time interval has expired. Either alternative values can be used or it is also possible to switch control of parameters OFF (eg. After 12 hours the temperature is reduced to 4^{o}C and the shaker drive switched off)

WARNING: Don't forget that as well as entering set-point values, the control for each desired parameter also has to be switched ON! The Display of the set-point value switches to OFF or ON to indicate if the control is switched on or off.

- Timer function in the "F_T" phase is not switched to ON, as this starts cyclic operation.
- End (the F_T diode goes out after a short time)

If you wish to know when the current phase expires, press the "F" key until duration time is selected once more. The time remaining is then shown in the display. A single key press of the Plus or Minus key shows the original set time for the current phase.

NOTE: press more than once and the set-point time is shown once again. By pressing the key ON/OFF twice, the timer can be reset.

Cyclic Operation

- All parameters are set to the desired operating conditions (eg. lights ON)
- Press the "F" key repeatedly until the Timer Duration symbol is lit (Hour)
- Switch Timer control to ON
  The hourglass begins to blink
- Set the duration of the phase using the Plus and Minus keys
- Press the "F_T" key. The F_T diode is shown and now the parameter values for the following phase can be given.
- All the alternative parameter values are accepted by pressing the "F_T" key. These will become active after the previously defined time interval has expired (eg Lights OFF).

WARNING: Don't forget that the as well as entering set-point values, the control for each desired parameter also has to be switched ON!

- Enter the duration for the following (nexT) phase
- Switch ON the Timer control in the "F_T" phase
  The cycle icon lights
- End

7.2.5 Operating Hour Counter

See Section 11.1

7.3 Over-temperature Cut Out

The MINITRON has a temperature "watchdog" to prevent uncontrolled overheating of the machine. This is set to 80°C.

7.4 Humidity

The operation is the same as for the other parameters (see 7.2.3). Please make sure that the supply is connected:

- Water with max. 1 bar pressure (0.5 bar is sufficient)
- Hose connected
- Water on

This option is used for sequential control of relative humidity in the range of 55-85% rH in temperature controlled incubation chambers. Relative Humidity means: the capability of the air to absorb water depends strongly on the temperature. After an increase of the temperature setpoint, the relative humidity will go down until the system supplied enough water. On the other hand, after a strong decrease of the temperature setpoint the relative humidity will rise to 100% and even condensation might eventually occur inside the chamber. The humidification system works actively only in one way, it does not perform a de-humidification. For this reason it is possible that after a strong decrease of the temperature setpoint the alarm “Humidity HI” will be displayed for a longer period of time. In this case, open the door to let the moist air escape.
If there should be a lack of water, the alarm “Err” and the humidity diode light up. In this situation the humidity control will be automatically turned off.

Caution: Only use demineralized (soft) water! The use of tap water will lead to a breakdown of the system. On the other hand, distilled water is very aggressive and will shorten the lifetime of the vaporizer membranes.
The spray device of the humidification system must be cleaned with vinegar only!

The bottom part of the MINITRON® is designed as a watertight well which can accept condense water or culture liquid after a flask breakage without any damage to parts of the machine. Removal of water can be done easily using the drain nozzle which is fitted on the left hand side of the housing.

The option “humidification” is available in two different versions: with and without door heating. If a door heating is necessary depends on the gradient deltaT between Incubation Temperature (IT) and Room Temperature (RT):
IT – RT > 15°C: Door heating is highly recommended to prevent condensation on the door window!

A very high setpoint for the relative humidity of up to 100% is not necessary and is not recommended. Usually, a setpoint of 70% rH will be entirely sufficient to prevent evaporation of culture liquid. A setpoint of 85% should only be used under ideal conditions!

IF CONDENSATION OCCURS IN THE CHAMBER THE MAXIMUM POSSIBLE HUMIDITY OF THE AIR IS REACHED AND THE SETPOINT MUST BE REDUCED. OTHERWISE IT WILL LEAD TO A FAILURE OF THE HUMIFICATION DUE TO AN PREMATURELY WEAR OF THE HUMIDIFICATION MEMBRANES!

While the humidification is switched on, the cooling is automatically disabled.

Measuring

Ranges	20…100% rH
Accuracy at 20°C at 54%rF	± 3% rH
Indication	1% rH
Probe	Capacitive

Maximum Temperature

With humidification	40°
Humidification switched off	65°

Control

Range	20….max. 85% rH
Control by Vaporizer	
Water Inlet Pressure	max 1Bar (0.5 Bar is sufficient)

The maximum available humidity depends also on the incubation temperature:

System without door heating

Incubation temperature	Max. Humidity
27°C	85% rH
33°C	80% rH
37°C	70% rH

System with door heating

Incubation temperature	Max. Humidity
27°C	85% rH
33°C	85% rH
37°C	85% rH

If these values are exceeded, condensation might occur and the humidity setpoint must be reduced.

7.5 CO_2

The operation is the same as for the other parameters (see 7.2.3). Please make sure that the supply is connected:

- CO_2 gas with max. 0.5 bar pressure, flow 40-60 lt/h

If the pressure of the gas supply is too high the control will show a „shoot over“ and the actual value will oscillate around the setpoint! An adjustment of the flow without a control valve can be achieved following this procedure:
Connect a hose to the CO_2-supply and put the loose end in a beaker with water. Open the supply carefully until bubbles rise up in the beaker with a frequency of about 1-2 bubbles per second. Then, connect the hose to the machine. Only if the desired setpoint of CO_2 can not be reached with this adjustment, the supply can be opened carefully a little bit more.

IT IS IMPORTANT TO ENSURE THE DOOR IS FULLY CLOSED WHILE USING THE CO_2 OPTION, OTHERWISE IT WILL LEAD TO A HIGH CONSUMPTION OF GAS. FOLLOW THE SAFETY ADVICES IN THE APPENDIX!

Measuring

Ranges	0-10% or 0-20% CO_2
Repeatability	<+- 1%FS
Accuracy at 25°C	+- [1%vFS + 1.5% of reading]
Temperature dependence of output (typically)	0.1%FS/ °C
Pressure dependence (Typic.)	0.1 FS/ hPa
Long-term stability	< +- 5%FS/2 years

Control

Range	0-10% CO_2 or 0-20% CO_2
Control by Valve	
Inlet Pressure	max. 0.5 Bar
Supply Gas CO2	40-60lt/h, a flow control valve is recommended in order to reach an optimal control

8. Operation

If the unit is set properly (see chapter 7. ‘Starting Apparatus’) there will not be many many alterations necessary during the ordinary operation of MINITRON ® apart from the tray loading and unloading. The unit will be running according to the selected programme:

- Constantly in the same mode of operation
- Alternating between two operational modes or
- Firstly operating in a timed mode and then constantly in a subsequent mode

The relevant steps for programming these options is given in Section 7.

MINITRON ® operates without any emissions of any kind apart from the operational sound. Sudden noise, smell, abnormal strong vibrations and so on are indicators of a problem and have to be examined immediately.

IN THE EVENT OF SUCH EMISSIONS, TURN OFF AT THE MAINS SWITCH IMMEDIATELY.

8.1 Loading the Tray

A counterweight works to compensate the centrifugal forces of the moving tray.

For physical reasons this counterweight has to be balanced for a certain tray weight.

Equally important is the height of the centre of gravity of the shaken load above the tray (high load = higher centre of gravity, low load = lower centre of gravity). The higher the total height of the load, the more the unit can vibrate.

Although INFORS has optimised the band width of the possible loading, the following points should be respected in order to minimise possible wearing:

- Always load the tray as evenly as possible, so that the weight of the flasks is spread over the whole tray.
- Flasks with an extraordinary height and an extremely high centre of gravity should not be shaken at too high a speed.
- The allowed loading should generally not exceed or remain under the following values:

An under or over loading around these values does not have an acutely damaging effect on the unit (especially at low speed) but should be avoided if possible.
A constantly higher or lower loading is possible but you have to contact a representative of INFORS first in order to obtain the necessary advice.

8.2 Shaking speed

The maximum rotation speed allowable depends on the position, the diameter and the loading (see above).
Weight: tray, clamps, flask and medium
The following standard values must be observed:

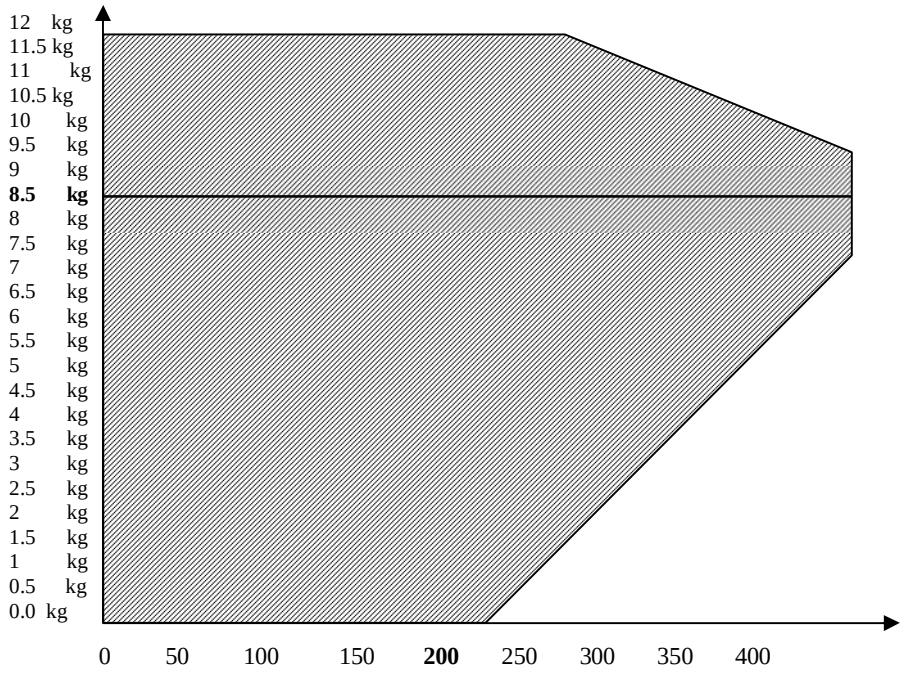


fig. 7

It is possible to achieve higher rotation speed, however the customer has to contact a representative of INFORS first in order to obtain the necessary advice.

With the stacked Minitron version vibrations can occur at a higher rotation speed (300-400 rpm) although the load limit has been controlled as in the diagram. This appears when both units run with almost the same rotation speed.

AT HIGHER SPEED (>200 RPM) WITH LITTLE LOAD, FLASKS WITH WATER SHOULD BE APPLIED TO BALANCE THE TRAY!

8.3 Starting the Apparatus

see chapter 7. 'Putting into Operation'

8.4 Opening the Door, Pause

When the door opens, the shaker brakes gently and comes to a complete stop (unless the brake function has been deliberately de-activated by the user). The working light goes off. As soon as the shaker platform is still, the tray can be handled.
The temperature control and the blowers stop working when the incubation chamber is opened in order to avoid an internal environment change and reduce energy costs. The operational lights also go out automatically.
If you close the door the blower, and the set-point control, will automatically start working again after a brief delay.

8.5 Application of the Tray and Handling of the Interior

8.5.1 Handling of the Shaking Load Without Removing the Tray

- Stop the Shaker temporarily (open door slightly)
- Wait until the motor has come to a complete stop
- Open the door
- Manipulate the shaker contents
- Close the door again
- The shaker starts operating again automatically

ATTENTION: The moving shaker table can cause injuries because of the considerable torque.The tray is therefore only to be handled in state of rest.

8.5.2 Removing the Tray

- Stop the machine temporarily (open the door slightly)
- Wait until the motor has come to a complete stop
- Open door to an angle of 90°
- Remove the retaining screw at the front of the tray
- Pull out the tray at the handle along the guide rails

ATTENTION: The moving shaker table can cause injuries because of the considerable torque. The tray is therefore only to be handled in state of rest.

8.5.3 Inserting the Tray

The insertion of the tray functions independently of the position of the shaking table. Note the following rules:

- Put the tray between the two lateral guide rails
- Push the tray on the platform in the incubation chamber up to the end stop.
- Make sure the tray locks right in both cones.
- Fix tray with retaining screw.
- If the tray cannot be pushed into the proper position, remove the tray and check it for distortion and curves.
- If the shape of the tray is normal, search for items lost in the incubation chamber and remove them.
- If the tray still cannot be positioned properly please contact the nearest INFORS dealer.
- The shaker restarts automatically if the tray is positioned properly

NEVER START THE SHAKER IF THE TRAY IS NOT INSERTED CORRECTLY!

The door is designed to resist to forces which result from normal service (e.g. weight of a tray loaded according to instructions). Under no circumstances should you use the door as charging space for heavy weights or even as a seat. Such stress may cause damage to the shaker.

8.6 Operational and Working Lights

A single press of any key on the operating panel will switch on the working light in the incubation chamber. This light only has an observation function. The working light automatically goes out after approximately 1 minute.

8.7 Alarm functions

MINITRON ® distinguishes between alarms and errors:

Alarm: Setpoint is not reached → Mostly operating error! See below for a trouble shooting guide	**Error** (Malfunction): Display shows „Err“ → Shaker blocked or some part defective Continue in chapter 10

In the case of errors (display shows Err) please see chapter 10 „Trouble shooting“.

Alarms:
An alarm will not occur on opening or closing the door and if the value of the respective parameter is rising/falling with normal speed. The alarm will occur only if a desired set point is not reached. Then, the alarm relay switches and opens the contact. It is not necessary to confirm an alarm, it will disappear as soon as the condition triggering the alarm is no longer fulfilled.
The display will show the message **“HI”** or **“LO”** respectively as long as the actual value of the corresponding parameter shows a deviation from it’s setpoint for more than one unit (°C, RPM or %).

If an alarm occurs the reason is mostly an operating error and can be corrected easily:

Function	Display	Description	Description
Temp	LO	Temperature remains too low after a time (deviation > 1°) and is not increasing	Over-temperature safety switch open or ventilators not running. Door not fully closed.
Temp	HI	Temperature remains too high after a time (deviation > 1°) and does not decrease	External Cooling: valve closed or ventilators not working
RPM	LO	The speed does not reach set point	Loading too high. Drive belt is loose or greasy.
RPM	HI	The speed is above the set point	Resonance effect. Control problem.
CO_2	LO	CO_2-concentration is too low after some time (deviation > 1%) and does not rise	CO_2-valve blocked or closed. Bottle empty.
CO_2	HI	CO_2-concentraiton is too high after some time (deviation >1%) and does not sink	Gas pressure too high, control overshoot
Humidity	LO	Humidity is too low after some time (deviation > 10%) and does not rise	Door not fully closed. Vaporizer defective/ membrane worn out. Fuse Humidification burned.
Humidity	HI	Humidity is too high after some time (deviation > 10%) and does not sink	Strong decrease of the temperature set-point. Open the door to let the moist air escape.

IF A SETPOINT IS NOT REACHED AND THERE IS NO ALARM OR ERROR, PLEASE CHECK IF THIS PARAMETER IS SET TO "ON" (see 7.2.3)!

8.7.1 Alarm relay contact

The alarm relay shows an existing error or an alarm and can be connected to a central alarm system to provide acoustic indication and/or optical display. The alarm relay constantly indicates an existing error or alarm condition. In the event of a power failure, alarm or error conditions contact on PIN 1-7 of the serial port is closed, contact on PIN 1-6 is open.

8.7.2 Testing of the alarm function

For testing the function of the alarm or the alarm relay, follow this procedure:
Set the Temperature to a very low value (e.g. 0°C, see chapter 7.2). Block the door in a slightly open position, e.g. by placing a folded peace of paper in the gap. The machine will not be able to reach this setpoint and the alarm will occur after some time.

8.7.3 Power failure

In the event of a power failure, the alarm relay closes and all functions (RPM temperature control etc.) cease. As soon as the power is restored, the machine immediately re-starts using the previous set-point values. The alarm relay operates normally again.

8.8 Serial Communication

For information about serial communication and control please contact your nearest INFORS representative or INFORS Switzerland directly. Also see the diagram in Section 5.5 (fig 2).

For display and control of one or several MINITRON ® we offer you as option the software "LABWORLDSOFT" (see chapter 13.1).

8.9 Electronic Breaking

As standard, the MINITRON has electronic breaking activated.

Should very shear-sensitive cells be cultured, this can be de-activated. Please contact INFORS AG Switzerland for further details.

9. Putting out of Operation

9.1 Switching the Unit OFF

Depending on the time the unit is to be left switched off, the following options are available

- A short stop intending to allow access to the incubation chamber (see Section. 8.4
- Switching off for some hours, up to a day
  - In addition to Pause
  - Switch off at the main switch (control need not be switched off for each parameter if it will be needed again the next time the unit is operational).
  - Switching off for a longer time
  - In addition to switching off at the mains switch
  - Clean the inside of the unit, (liquids can accumulate at the bottom over time)
  - Withdraw the mains plug, especially if the unit will be unused for some weeks or months.

9.2 "EMERGENCY"-Stop

Should there be danger for humans and /or the shaker turn off the main switch immediately.

Danger may especially arise when there are sudden unusual emissions (loud noise, smoke, smell, strong vibrations).

After an "EMERGENCY"-stop please note the following:

- Avert the danger (in case it still exists)
- If a repair is necessary to the shaker or if the cause of the emergency cannot be found, please contact your nearest INFORS representative.

10. Trouble Shooting / Fault Rectification

In case of trouble please read the following list and follow the instructions.
If your shaker still does not work correctly or the fault is not listed please contact your supplier or the next INFORS representative.

The Operational Display Shows "ERR" (Error)
In this case please contact an INFORS representative for repairs.

The Large Display Stays Dark

- Check if the working light still functions
  if NO continue, if YES please contact your nearest INFORS supplier
- Check if the main switch is turned on
  if NO: turn it on and try again, if YES continue
- Check the power cord
  if the power cord is plugged in: continue, otherwise plug it in and try again
- Check the socket
  if the socket supplies current: contact an INFORS supplier, otherwise eliminate the fault and try again

The Heating/Cooling Does Not Work

- Check if the large display shows "ERR" and the icon for °C is displayed
  if NO: continue, if YES: contact INFORS representative
- Check if the heating/cooling control is activated
  if YES: continue, if NO: turn it on and try again
- Check if the set point is correctly adjusted
  if YES: continue, if NO: adjust it and try again
- Check the ventilator fans are operating
  if NO: continue, if YES: contact INFORS representative
- Contact an INFORS representative

The Shaker Drive Does Not Work

- Check if the large display shows "ERR" and the icon for RPM is lit
  if NO: continue, if YES: contact INFORS representative
- Check if the motor control is activated
  if YES: continue, if NO: turn it on and try again
- Check if the set point is correctly adjusted
  if YES: continue, if NO: adjust it and try again
- Check if you can manually turn the shaker table
  YES it is possible to turn it: continue
  NO it is not possible: dismount the shaker table (see Section. 11.5) and search the interior for mechanical obstacles and foreign matter. Remove the foreign matter. In case a new test results in no improvement or no foreign matter is found: continue
- Contact an INFORS representative

The incubation illumination does not work

- Not applicable to the current machine
-

The table does not locate on both 'Cones" on the shaker platform

- Take out the tray and try again
- If the tray still does not locate properly, withdraw the tray and turn it over to check for any warping
  Tray is normal: Continue
  Tray in twisted: Continue
- Contact an INFORS representative

NEVER START THE SHAKER WHEN THE TRAY IS NOT PROPERLY LOCATED AND IS NOT LOCKED WITH A HAND NUT !

The Parameter Values Cannot Be Reached
Check if the control of the concerned function (temperature, speed or light) has been activated (see Section 7)The °C and/or the RPM-LED light up if the control is activated.

Operating Mode/Timer Function Cannot Be Programmed
Follow every instruction systematically. Complex programming steps should not be taken in a hasty way i.e. you should wait for the results before you continue.

11. Maintenance / Service

11.1 Operating Hour Counter

The operating hours display can show the following three times:

- Operating hours for the motor drive control
  - Icons "Timer" and “RPM” lit
- Operating hours for the temperature control
  - Icons "Timer" and “°C” lit
- Operating hours for the time the mains switch has been ON.
  - Icon "Timer" lit

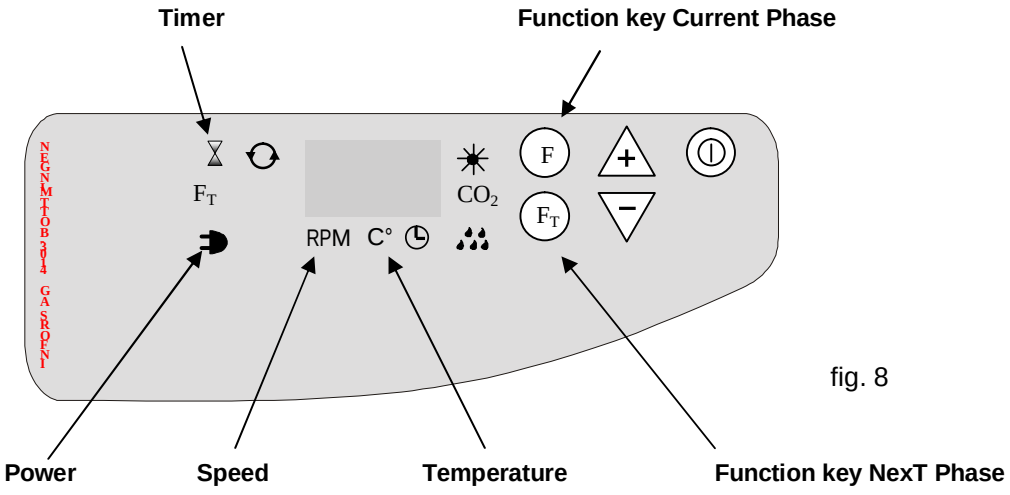


fig. 8

The following steps are employed to activate the operating hour counter:

- Press the "F" key (keep the key depressed)
- Press the "F_T" key (keep the key depressed)

Thereupon, the operating hour counter will cycle between the three possible displays. Each part of the overall display switches between two types of displayed value.

The meaning of each display phase

In the first phase, the display shows thousands of hours expressed as 00.0 to 99.9
Eg. 00.5 = 5000 Hours 10.3= 103,000 hours

In the second phase, hundreds of hours are shown expressed as 000 to 999.
Eg. 005=5 hours 163=163 hours

By adding the values from the first and second display together, the total operating time for the parameter shown by the relevant icon can be determined:

Eg. The first phase = 01.4 = 14,000 hours
The second phase = 042 = 42 hours
TOTAL **= 14,042 hours**

11.2 Service

MINITRON ® is designed as a service-free shaker and does not need any regular services. The shaker table works with closed bearings, the electronic system needs no maintenance.

After approx. 10.000 hours of operation however, we would recommend an overhauling of the shaker by the specialists of INFORS. You are invited to contact your INFORS representative when your shaker reaches this operation time.

11.3 Cleaning the Apparatus

You can clean the apparatus with a damp cloth and a normal neutral cleaner without any difficulties. We recommend to take off the shaker platform only if liquids were spilled on the bottom of the apparatus e.g. from a broken flask. In this case, remove the platform and clean the base accordingly.

Please observe the instructions in chapter "4.2 Chemical Resistance".

11.4 Cleaning of the Tray and Shaker Table

The tray and the table can be cleaned in the same way as the rest of the apparatus. But after every cleaning, the two cones and the two corresponding holes in the tray should be lubricated with a thin lubricating film (use Molikot paste or similar lubricants)

11.5 Opening of the Shaker Table

- Detach the two rear screws (countersunk screws with hexagonal recess M5 x 16) as well as the two front screws (cheese-head screws with hexagonal recess M5 x 20)
- remove the platform (with cone)
- Clean the bottom, remove foreign matter
- Put the table (with cone) back down and replace screws

*IMPORTANT: Tighten the screws * alternating crosswise (as for the wheels of a car). One-sided tightening of the screws may cause poor fixing of the table and thus considerable damage to the apparatus.*

Cleaning of the bottom well can be done with water and a mild detergent. In order to remove the remaining nutritions after a flask breakage, washing out the bottom well with hot water is recommended. The water can easily be drained using the hose connector that can be installed on the back side of the housing.

12. Replacement Parts

Should your shaker suddenly show defects please contact your dealer or the nearest INFORS representative. For security reasons and because of the shaker's complex design INFORS offers a detailed list of replacement parts only to its dealers. Please find a list of normal spare parts attached.

In case you will ask one of our INFORS representatives for advice please give type and serial number of the shaker. Both are written on the number plate (see point 15.1).

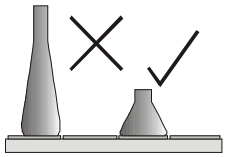
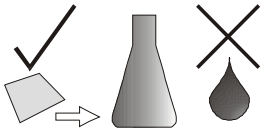
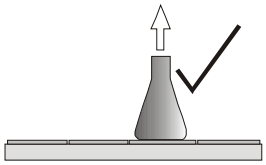
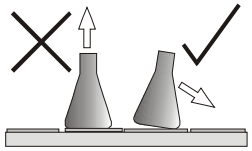
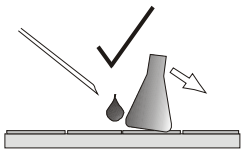
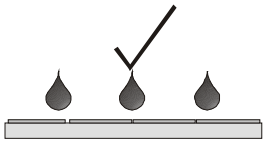
13. Additional Equipment, Options

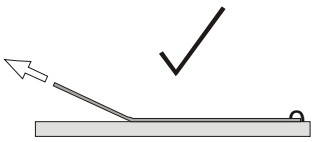
For a detailed list of all available options and supplements please get in touch with your next INFORS representative.

13.1 Software

For display and control of one or several MINITRON ® we offer you as option the software "LABWORLDSOFT". For more information please get in touch with your nearest INFORS representative.
For the use of other software, you find on the last page of this manual a voucher for a protocol for MINITRON ® communication.

13.2 Points for Using Sticky Stuff

	Always use protective goggles and gloves while handling glassware!
	• Only use containers with a wide, flat base. Large Erlenmeyer flasks (e.g. 3000 mL) will stick stronger than small ones (e.g. 100 mL) • Before putting on the INFORS reagent tubes holders, clean the Sticky Stuff to esure the maximum adhesice power.
	Before putting on containers: • Check that bottom is dry and clean • Check flask for any damages:**never use damaged flasks!**
	Before shaking: • Tug gently to ensure each flask is stuck. Keep in mind that **formation of condense water** might occur at low temperatures or using the timer function, possibly causing accidental release of containers.
	To remove flask: • Push or pull neck gently and evenly and wait a few seconds. **Do not use much power!** With large containers, it can take up to 30 seconds until flasks is released.
	Flasks which are firmly attached can be released with water. • Simply apply water with a syringe to the bottom. Especially Fernbach-flasks are difficult to remove because of their geometry (large bottom, short neck), therefore cover the adhesive matting partly with the protective foil supplied with each new tray.
	The adhesive power will diminish gradually, due to dust and dirt sticking on the surface. To regenerate proceed as follows: • Clean regularly with water and mild detergent. Shrub vigorously with a brush or hard sponge. **Do NOT use solvents!** • Let dry over night • Disinfection with 70% ethanol or usual disinfectants. • Do not exceed specified treatment times and rinse thoroughly with water. If disinfection is done routinely, it might be necessary to replace the Sticky Stuff earlier.
	It is possible to apply the Green Adhesive Matting “Sticky Stuff®” to universal trays.



Changing of adhesive matting:

- Thoroughly wet the tray
- Release Adhsive Matting on a side and pull obliquely away from the tray. Deagrease tray with Acetone and apply new matting with water (see installation instructions). Do not remove protective foil until first use.
- The Adhesive Matting is reusable and can be applied again after regeneration in water.

Max shaking speed

Angabe	Wert
25 up to 750 mL	Max. 200 rpm
1000 mL	Max. 250 rpm
2000 mL	Max. 250 rpm
3000 mL	Max. 300 rpm
5000 mL	Max. 250 rpm

Maximum shaking speeds are only valid on condition that:

- Only original Schott Duran Erlenmeyer flasks with 20% filling volume and paper- or cotton stoppers are used. **Plastic Erlenmeyer flasks are not appropriate for use with the adhesive matting.**
- Glass and Adhesive matting must be totally undamaged, clean, dry and free of grease.

All information supplied without liability.
Data in the left column are valid for 50 mm shaking diameter. With 25 mm shaking diameter, slightly higher shaking speeds are possible

14. Components from Suppliers

All the components from suppliers have been tested before the constructional implementing into the INFORS product. As a general rule INFORS uses only proven components.

In exceptional cases faults may still occur in suppliers' products. In such cases INFORS cannot take any liability leading further than the normal warranty. We kindly ask the customer for understanding and will of course do our best to keep the highest quality standard possible.

The above mentioned exclusion of liability is not effective for safety issues.

15. Graphics, Overview

15.1 Where to Find the Identification Plate (Serial No., Type etc.)

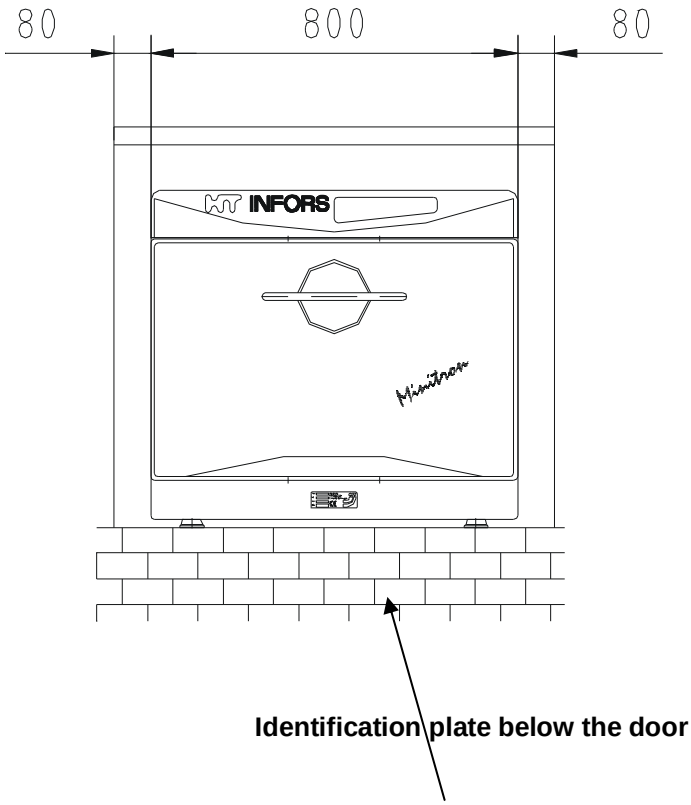
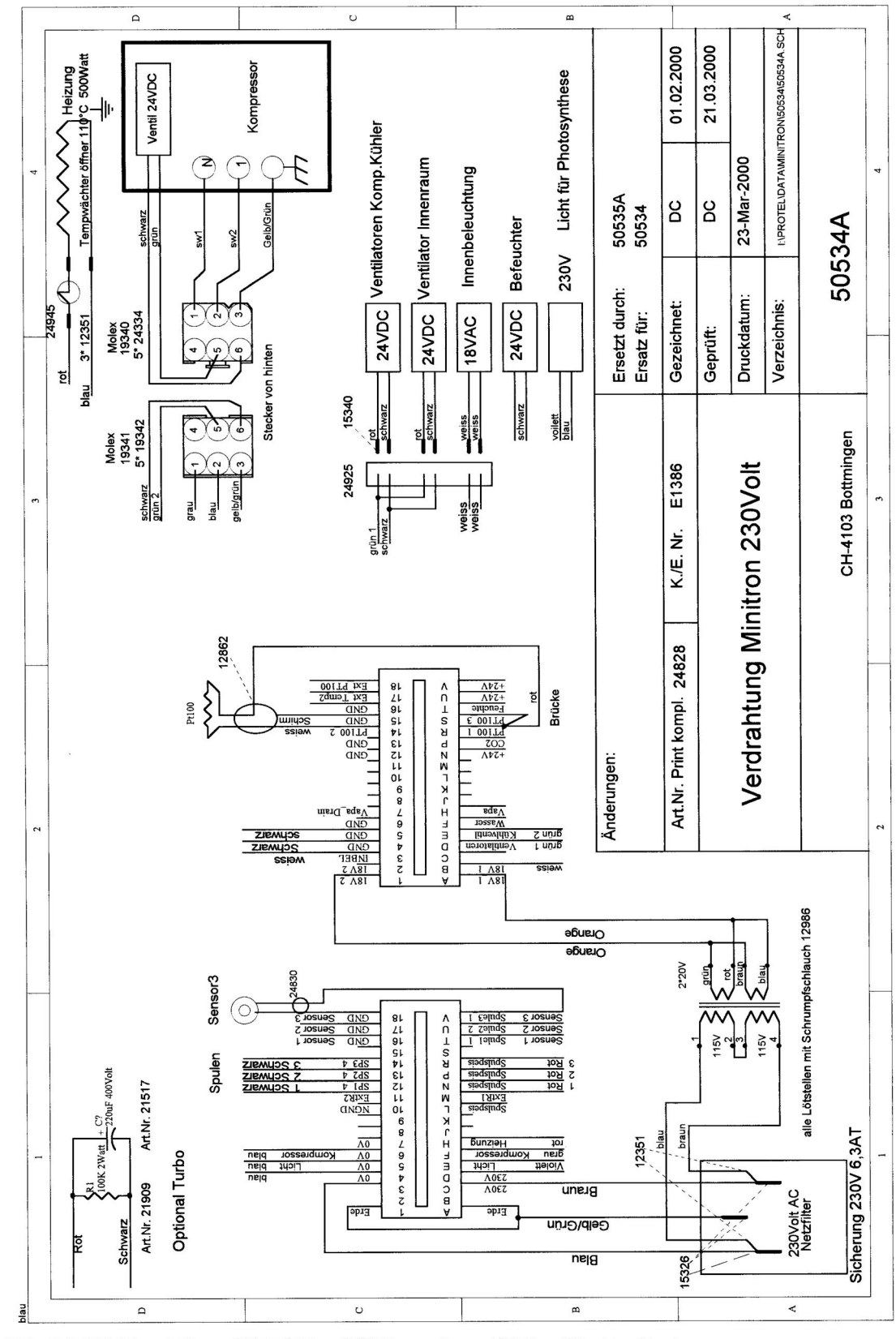


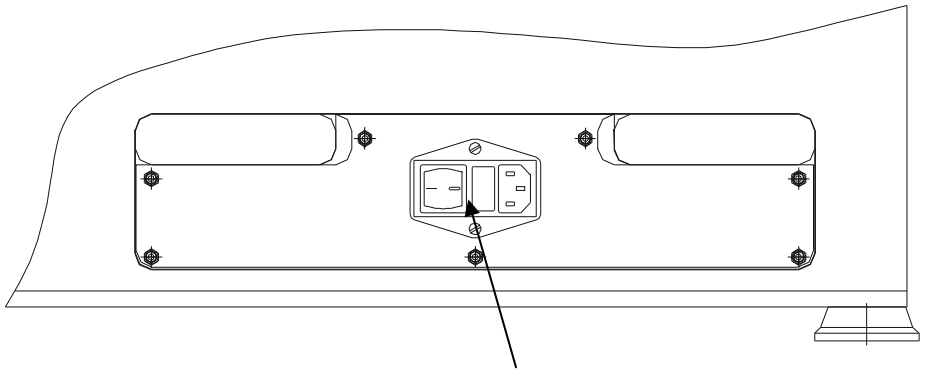
fig. 10

15.2 Electrical schematic



15.3 MINITRON ® Fuses

Both fuses are identical and located above the power cable inlet socket.
Fuse type: T 6.3 A, slow blow fuse



Two fuses, 250V: T 6.3 A

fig. 11

16. Reselling

For reasons of operating reliability, for legal reasons, in order to ensure a smooth maintenance and supply of replacement parts and to protect the intellectual property of INFORS the customer is obliged to inform INFORS in case of resale or change of the owner.

As a service in return for this information INFORS offers, if necessary, support for the new installation as well as the training of the new operator.

Should a customer not fulfil this duty INFORS reserves the right to henceforth refuse any possible maintenance or supply of replacement parts.

17. Disposal

The plastic housing of MINITRON ® is produced without CFC elements. It consists of polyurethane and a normal disposal is possible.

Also elements like the motor, blower, flywheel etc. may be treated the same way.

Please make sure that the coolant will be handled correctly (freezing mixture R 134 a) in the event of disposal of the refrigerator. The whole cooling or at least the cooling fluid should be handed over to an official handler.

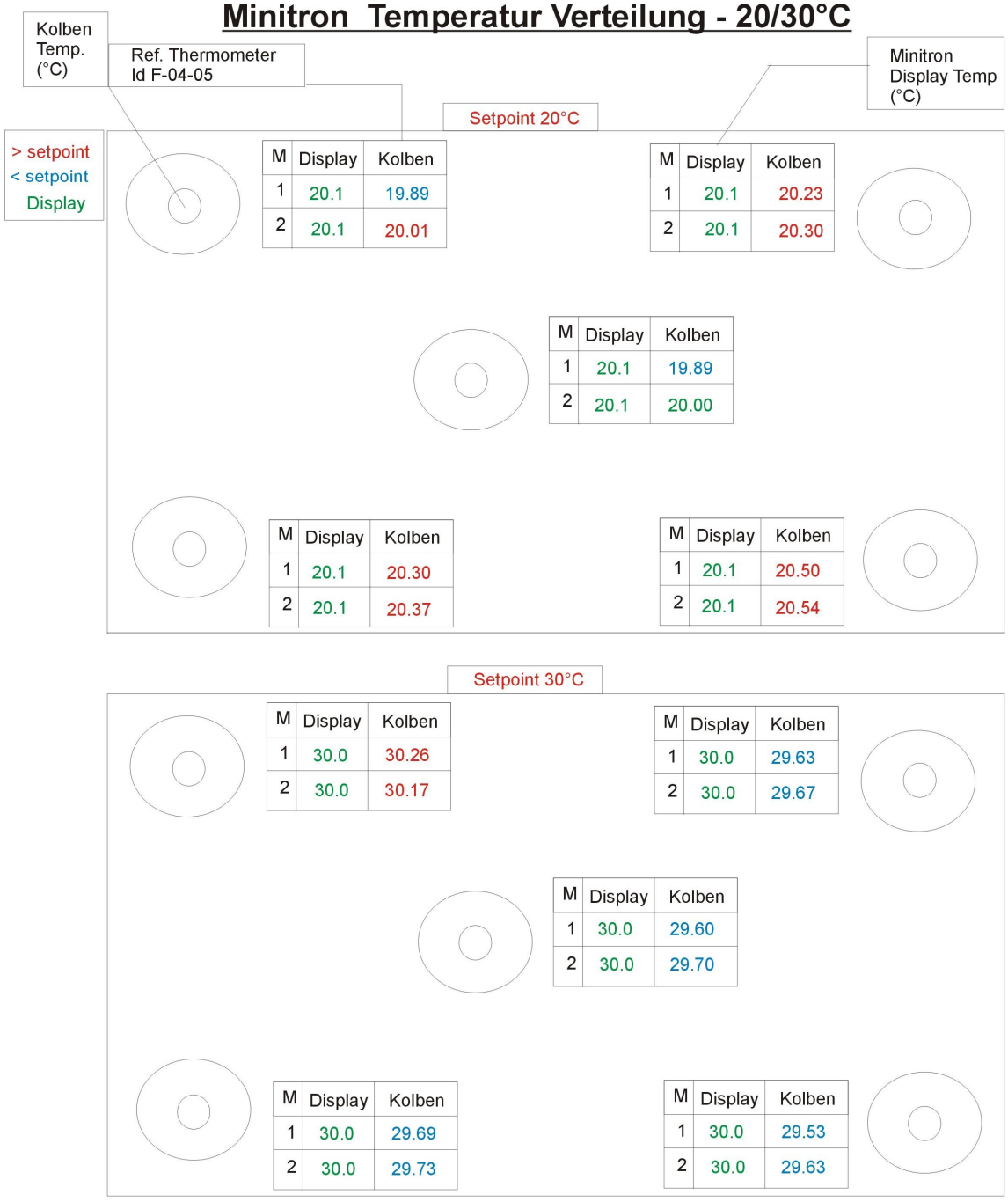
18. Example for the temperature distribution in the incubation chamber

If the temperature distribution in the incubation chamber is to be checked, it is necessary to strictly follow the protocol given below, otherwise the measured values will be wrong. Especially the use of a **calibrated** thermometer and the observation of the incubation times are indispensable. The data shown on the following page are examples, measurements on other machines may yield different results.

- Temperatures are measured in 5 *closed* Erlenmeyer flasks of 2000 mL, one flask in the middle and one on each corner of the tray (see graphic on the following page).
- The flasks must be incubated **at** least 4 h at 100 rpm for each temperature.
- Take at least two measurements in a distance of minimum 4 h.

-

Minitron Temperatur Verteilung - 20/30°C



Setpoint 20°C	100 UPM	Umgebungs Temp: 21 +-1°C	Prüfer: JK 15/05/01
Setpoint 30°C	100 UPM	Umgebungs Temp: 21 +-1°C	Prüfer: JK 16/05/01
Inkubationsschüttler: 103565 SARL		Erste Messung M1 8Std ab Setpoint, zweite Messung M2 mini 4Std nach M1	

19. INFORS Agencies, guarantee regulations

19.1 INFORS Agencies

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Contact details of our local dealers world wide can be found on our website

www.infors-ht.com

QUALITY
MADE IN SWITZERLAND

Engineering and production in Switzerland

19.2 Guarantee

The perfect functioning of our equipment is warranted, as long as it has been installed and handled correctly, according to our instructions (Glass equipment excluded).

Our warranty becomes invalid, if, without our specific permission, the customer or a third party interferes with or makes changes on the equipment. The warranty is valid for 2 years from the date of delivery.

If Production or Material faults can be proved, the defective parts will be repaired or replaced free of charge at our discretion. The duration of the warranty is not influenced through making a claim on the warranty service.

20 Safety advice for working with CO_2

Extract from EC safety data sheet

CO_2 is a colour- and odourless, non flammable gas, which may cause asphyxiation in high concentrations. Heavier than air, may accumulate in confined spaces, particularly at or below ground level.
Exposure limit value TLV(ACGIH) 5000 ppm.

EC-classification:
Not classified as dangerous substance.

Personal Precautions:
Ensure adequate air ventilation.

Accidental Release Measures:
Evacuate area. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate ventilation and try to Stop release. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

First Aid Measures:
Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Low concentrations of CO2 cause increased respiration and headache. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Other Information:
The hazard of asphyxiation is often overlooked and must be stressed during operator training.

General:
When discharged in large quantities may contribute to the greenhouse effect.

21. Alarm Description (from version V1.50)

The Minitron makes the difference between alarm and error. Errors only occur at a failure.
There is an alarm, if a wished set point is not reached after a certain time. It is signalised with an alarm relay and its contacts, who are switching. Loss of power (Net power fail) is also defined as an alarm. In this case, the relay is also switched.

RPM Alarm
There is a RPM Alarm if difference is > 20RPM. The alarm is activated after 60 seconds after starting (end of ramp).

Temperature Alarm
There is a temperature alarm if difference of measurement and set point is > 1°C, after a certain time. The alarm is activated 5 min after start of temperature control, or closing the door. If the rise of temperature is greater than 1°C in 5 minutes by heating, the time calculation of 5 min is reset to 0. Therefore, there is no alarm if temperature is normally rising in heating phase. If the sink of temperature is greater 0.5°C in 5 minutes by cooling, the time calculation of 5 min is reset to 0. Therefore, there is no alarm if temperature is normally decreasing in cooling phase.

CO2 Alarm
There is a CO2 Alarm if difference of measurement and set point is > 1%, after a certain time. The alarm is activated 5 min after start of CO2 control, or closing the door.
Phase actual value < setpoint: If the CO2 value is rising more than 1% in direction of set point in 5 minutes, the time calculation of 5 min is reset to 0. Therefore, there is no alarm if CO2 concentration is normally rising. Phase actual value > setpoint: If the the CO2 value is decreasing more than 0.5% in direction of setpoint in 5 minutes, the time calculation of 5 min is reset to 0. Therefore, there is no alarm if CO2 concentration is normally decreasing.

Humidity Alarm
There is a Humidity Alarm if difference of measurement and set point is >10%. The alarm is activated 5 min after start of humidity control or closing the door.
Phase actual value < setpoint: If the humidity value is rising more than 10% in direction of set point in 5 minutes, the time calculation of 5 min is reset to 0. Therefore, there is no alarm if humidity is normally rising.
Phase actual value > setpoint: If the humidity value is decreasing more than 5% in direction of set point in 5 minutes, the time calculation of 5 min is reset to 0. Therefore, there is no alarm if humidity is normally decreasing.

Remark
The display shows HI and LO as long as actual value and setpoint difference is bigger than +-1°C, respectively +-1% CO2. This message is not dependent on time, so it can be shown in state of alarm or not alarm.

Alarm Relais
All alarms are led to a relay (alarm encoder)
The relay provides a change-over contact.
Contacts: Dsub 9p. (RS232)
- Pin 1 Kommon
- Pin 6 NOC
- Pin 7 NCC

State: currentless or alarm: Pin1-7: closed contact; Pin1-6: open contact

22. Declaration of Conformity

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Switzerland

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INFORS HT

EC Declaration of Conformity

In terms of Directive 2006/42EC on machinery
Annex II Part 1 Section A

Company Infors AG
Rittergasse 27
CH-4103 Bottmingen

Declares that the type of construction of the machine

Name	Incubator shaker
Type	Minitron
From serial number	**S-000115223**
Date:	January 4, 2010

complies with the following relevant regulations:

Directive on machinery	**2006/42/EC**
EMC Directive	**2004/108/EC**

Bottmingen, January 4, 2010

Person authorised
to compile the technical file

Infors AG
S. Giannone
Rittergasse 27
CH-4103 Bottmingen

Company management

L. Gutzwiller, CEO

✂----------

Telefax-Message to **INFORS AG**
++ 41-61-425 77 01

Please fill in and send us your voucher.

VOUCHER

for

Protocol for MINITRON ® communication

YES, ✔ **I would like to receive the protocol**
Please send it to my adress:

Name: .....

Company: .....

Address: .....

.....

Infors AG
Rittergasse 27
CH-4103 Bottmingen
FAX: ++41 61 425 77 01

Uddrag af manual for MINITRON

Ingen dæksler må fjernes af andre end specielt uddannet personale, da disse daeksler dækker for sikkerhedskritiske områder på apparatet.

Rystebordet kan under bevægelse udøve personskade på grund af dets store moment. Rystepladen må derfor kun håndteres ved stilstand.

Ventilationsportene på bagsiden og i bunden af apparatet skal holdes rene og må Ikke tildækkes, da elektrisk overgang kan opstå.

Tildæk ikke ventilationshullerne i køleenheden på oversiden af apparatet, da dette kan medføre overophedning.

Sæt under ingen omstændigheder objekter i klemme i dørens føreskinner.

Minimum afstanden skal overholdes ued installation af rysteapparatet.

Transportsikringen skal fjernes før brug.

Hvis der er hjul på rysteapparatet, skal de forreste hjul hæves ca. 2 – 3 mm over gulvet, når apparatet hviler på de stationære ben placeret tæt ved hjulene.

Ved lange perioder uden brug af apparatet, tilrådes det at tage stikket ud af kontakten af sikkerhedsmæssige årsager.

Apparatet må ikke tages i brug uden at rystepladen er monteret.

Specifikationerne i kapitel 4.2 “Kemisk resistens” skal følges nøje.

MINITRON käyttöohjeen tiivistelmä

Ravistelukoneen koteloa ei saa avata, koska se suojaa jännitteellisiä osia.
Laitteen saa avata ainoastaan INFORS AG:n valtuuttama henkilö.

Liikkuvaa ravistelulevyä tulee varoa ravistelukoneen korkean vääntömomentin johdosta; tästä syystä levyä tulee käsitellä vain kun se ei liiku.

Tuuletusaukkoja laitteen sivuilla ja takana ei saa peittää eikä ilmanvaihtoa muutenkaan estää koska se saattaa aiheuttaa laitteen ylikuumenemisen. Sähköiskuvaaran takia ei tuuletusaukkoihin saa työntää mitään esineitä.

Poista kuljetustuet ennen laitteen käyttöönottoa.

Jos laitteeseen on asennettu pyörät, tulee kääntyviä etupyöriä vetää noin 2-3 mm irti lattiasta. Tällöin laite seisoo pyörien alla olevien kiinteiden jalkojen varassa.

Jos laitteen käytössä tulee pidempi tauko, on hyvä irroittaa laite sähköverkosta jotta vältyttäisiin mahdollisilta vahingoilta.

Laitetta ei saa koskaan käyttää ilman levyä.

Ohjeita kohdassa ”4.2. Kemikaalikestävyys” tulee noudattaa tarkasti.

Extrait du mode d'emploi MINITRON

Toutes les parties démontables du boîtier de l'appareil, peuvent couvrir des zones critiques pour la sécurité et ne doivent donc être enlevées que par la personnel explicitement autorisé par la société Infors.

La table l'agitation en mouvement peut provoquer des blessures à cause du couple moteur élevé. Le plateau ne doit donc être manipulé ou chargé qu'à l'arrêt total de l'appareil.

Les fentes de ventilation situées sur les côtés et à l'arrière de l'appareil doivent être maintenues dégagées. Aucun objet ne doit être inséré dans ces fentes à cause du risque de choc électrique.

La distance minimum doit être maintenue lors de l'installatiion de l'appareil.

Retirer la sécurité de transport bloquant la table d'agitation avant toute mise en route.

Si l'incubateur agité est fourni avec un châssis à roulettes, les deux roulettes avant doivent être abaissées afin qu'ils soient 2-3mm au-dessus du niveau du sol, avec l'appareil reposant sur deux pieds fixes.

Pendant les périodes d'arrêt prolongé et suivant remplacement de l'appareil dans le laboratoire (ex: zone humide ou non protégée), il est recommandé de débrancher la prise secteur pour éliminer toute possibilité d'accident.

L'appareil ne doit pas fonctionner sans plateau.

Les instructions données au paragraphe "4.2 résistance chimique" doivent être absolument suivies.

Uittreksel uit de handleiding van „MINITRON“

De behuizingsafdekplaten van de schudder, die, uit het oogpunt van veiligheid, kritische plaatsen afdekken, mogen uitsluitend door personeel verwijderd worden dat hiervoor door INFORS uitdrukkelijk gemachtigd is.

De bewegende schudtafel kan door de grote kracht lichamelijk letsel veroorzaken. Aan het plateau mag daarom uitsluitend in stilstand gewerkt worden.

De ventilatieopeningen in de achterwand en de zijwanden dienen vrijgehouden te worden en vanwege het gevaar voor elektrische schokken mogen er geen voorwerpen doorhen worden gestoken.

Er mag nooit iets in de ventilatieopeningen van de koeling worden gestoken, die boven op de machine staat, want dit kan oververhitting veroorzaken.

Bij de installatie van de schudder moeten de volgende minimale afstanden in acht worden genomen.

Voordat de machine in bedrijf wordt gesteld dient de transportblokkering verwijderd te worden.

Wanneer de schudder voorzien is van draaibare wielen, dienen de voorste wielen
2 - 3 mm. ingetrokken te worden zodat het systeem op de vaste poten rust.

Afhankelijk van de lokatie waar de machine geplatst is (vochtig laboratorium of in een vrij toegankelijke ruimte) is het uit veiligheidsoverwegingen aan te bevelen om bij langdurige afwezigheid of uitschakeling de stekker uit het stopcontact te verwijderen.

De apparatuur mag nooit zonder een goed vastgezet plateau worden ingeschakeld.

De instructies die in Artikel „4.2 Chemicalienbestendigheid“ vermeld staan, moeten strikt opgevolgd worden.

Norme de Sicurezza (dal manuale del mod. MINITRON)

Tutti i coperchi della struttura esterna dell'apparecchio devono essere necessariamente rimosse da personale autorizzato della INFORS, in quanto possono proteggere zone critiche per motivi di sicurezza.

Data l'alta torsione, il movimento del tavolo di agitazione può causare danni. Pertanto il vassioio deve essere maneggiato solo quando l' apparecchio è in posizione di fermo.

Le aperture di ventilazione nella parte laterale e posteriore dell'apparecchio devono esssere libere (sgombre) e, onde evitare il rischio di scosse elettriche, nessun oggetto deve essere messo in tali aperture.

Non inserire alcun oggetto nelle aperture di ventilatione dell'unità di refrigerazione, nella parte superiore del corpo dell'apparecchio, in quanto ciò può causare un surriscaldamento.

Per nessun motivo inserire oggetti nella guida laterale dell'albero selettore dei supporti curvi della porta.

Prima di metterein funzione l'apparecchio, togliere la protezione di sicurezza per il trasporto.

Se c'è un sistema di illuminazione per colture nella camera di incubazione, prestare molta attenzione a non toccare alcun contatto elettrico delle lampade.

Se vi sono delle ruote fissate sotto l'apparecchio, le due ruote frontali devono essere tolte in ogni caso prima di mettere in funzione l'agitatore e il basamento deve essere collocato sugli appositi piedini.

Durante periodi prolungati di assanza o non funzionamento, si raccomanda di staccare la spina per evitare il rischio di incidenti.

L'apparecchio non deve mai essere messo in funzione senza un vassoio.

Devono essere assolutamente seguite le istruzioni al par. "4.2 Resistenza chimica".

Utdrag fra bruksanvisning for MINITRON

Av sikkerhetshensyn må maskinens deksel-plater kun fjernes/ demonteres av personell som er godkjent av Infors, fordi de kan beskytte spesielt sikkerhetskritiske områder i maskinen.

Maskinens rystebord kan, når den er i bruk, forårsake skade på grunn av styrken. Rysteplattformen bør derfor betjenes kun når maskinen står stille.

Ventilasjonsåpningene på sidene og på baksiden må ikke tildekkes, og for å unngå elektro-sjokk må under ingen omstendighet objekter føres inn i viften eller gjennom disse åpningene.

Minimumsavstand må følges ved installasjon av rysteinkubatoren.

Fjern transport-sikring før maskinen startes.

Hvis hjul er montert under maskinen, må de to front-hjul erstattes med føtter som medsendes maskinen, før start av maskinen. Føttene må justeres til ca. 2-3 mm over gulvnivå.

Ved lengre tids avbrudd i bruk av maskinen bør maskinens støpsel dras ut av kontakten.

Rystemaskinen må aldri brukes uten rysteplattform.
Spesifikasjonene i kap. “4.2 Kjemisk motstand” må følges nøyaktig.

Utdrag ur handboken over MINITRON

Alla skyddskåpor på skaken får, då de kan täcka känsliga områden, endast avlägsnas av personal med särskilt tillstånd från INFORS.

Skakbordet kan under användning orsaka skador pga den kraftiga rotationsrörelsen. Bordet får därför endast hanteras då maskinen står still.

Ventilhålen på sidorna och på baksidan måste lämnas öppna och fria från hinder. Inga främmande föremål får införas i apparaten pga hög risk för kraftiga elstötar.

Ventilations öppningarna på ovansidan av kyldelen får ej övertäckas då detta kan orsaka överhettning.

Minimiavstånd till vägg måste beaktas vid installation.

Avlägsna ”transport säkringen” innan användning.

Om det finns rullar/valsar fastsatta under skaken måste de två främre rullarna/valsarna avlägsnas innan användning och hyllan måste placeras på de medföljande fötterna.

Under långa peroder av overksamhet är det rekommenderat att dra ur elkontakten för att undvika olyckor.

Skaken får aldrig användas utan bricka.

Instruktionerna i kapitel ”4.2 Kemiskt motstånd” måste följas minutiöst.

Extracto del manual del MINITRON

“La carcasa y las tapas del agitador nunca deben ser abiertas por personal no autorizado por INFORS, ya que aquellas pueden ocultar elementos peligrosos.

El movimiento de la plataforma de agitación puede causar lesiones, debido a la alta fuerza con que gira mientras el equipo está en functionamiento, por ello la bandeia sólo debe manipularse con el equipo completamente parado.

Nunca deben obtruirse las salidas de ventilación situades a los lados y en la cara posterior del equipo, tampoco debe permitirse que objetos pequeňos senn succionados por los ventiladores o por las tomas de aire.

Debe respetarse la distancia minima de seguridad, en la installación del equipo.

Retire todos los elementos de transporte del equipo, antes de ponerlo en functionamiento.

Si el agitador lleva rodillos incorporados, debe empujarse los rodillos frontales hasta que queden aproximadamente a unos 2 o 3 mm. sobre el nivel del suelo, con el aparato apoyado sobre los pies estáticos situados tras las ruedas.

Durante largas ausencias o periodos sin operación, de acuerdo a las condiciones del lugar (ej. humedad en el laboratorio o positión poco protegida) se recomienda no sólo apagar, sino desenchufar el equipo, para evitar riesgo de accidentes.

Nunca debe hacerse funcionar el agitador sin bandeja.

Las especificaciones del capitulo “4.2 Chemical Resistance (Reistencia Quimica)” han de ser seguidas estrictamente.