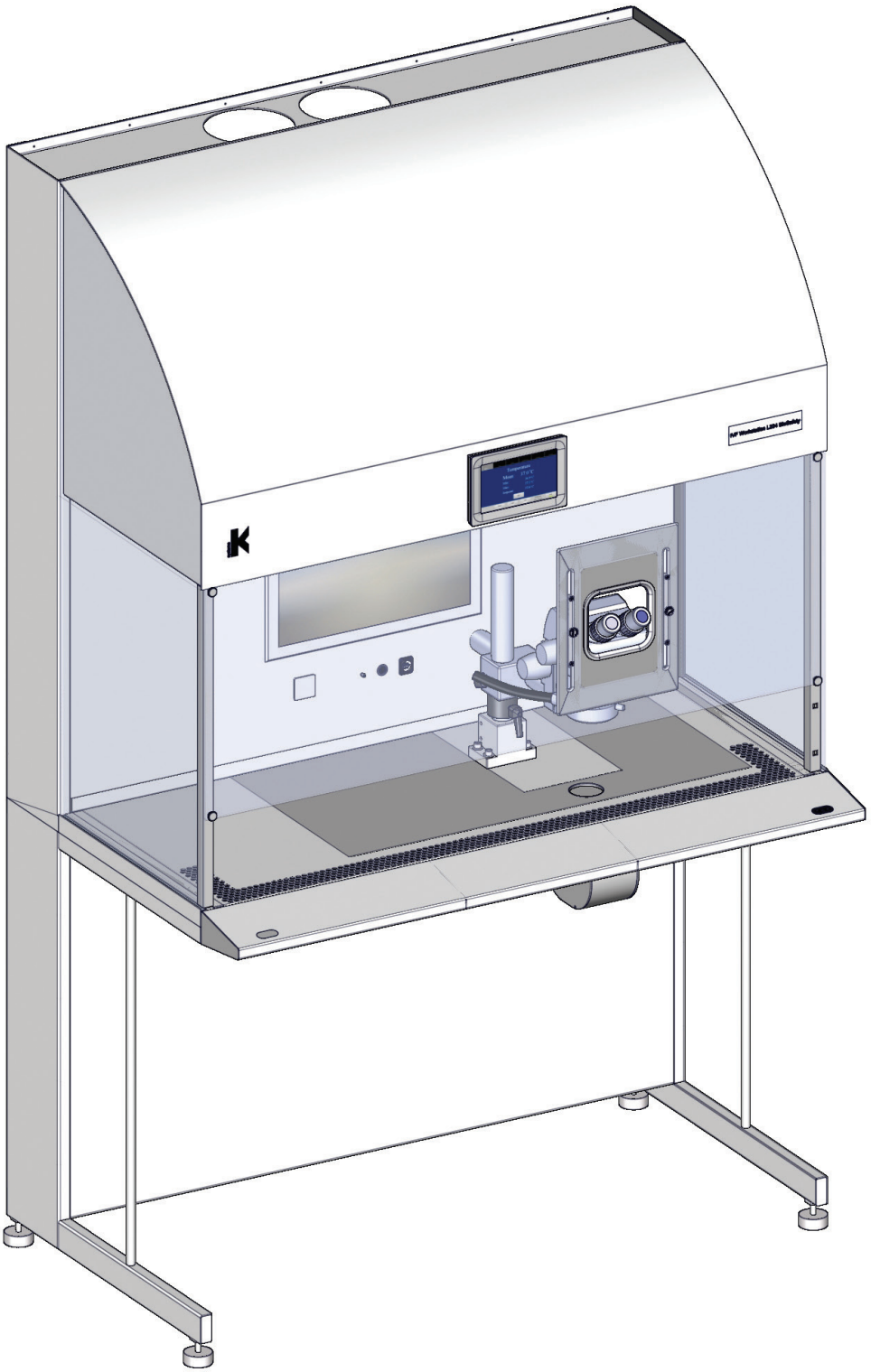
SYSTEMS
KIVEX BIOTEC LTD

User manual
L234 IVF Workstation BioSafety



Dear Customer

Congratulations with your new K-SYSTEMS product.

Before installation, please check the product for obvious damage, which may have happened during transport.

K-SYSTEMS encourage you to register your product on our homepage. This will enable us to inform you about important updates and safety issues directly.

Please go to http://www.k-systems.dk/product-registration.html for registration

For further information on installation and validation of your new product - Please read and follow carefully the instructions in the User Manual.

If you need further assistance, please contact your local K-SYSTEMS supplier or K-SYSTEMS directly.

Best regards,
Kivex Biotec Ltd. - K-SYSTEMS

Content

Safety 6
General safety 7
Safety symbols on the unit 8
Other symbols on the unit 9
Intended use 10
Operating principles 10
Safe handling of embryos and blastocysts 11
Characteristics 11
Overview 12
Airflow and filter 14
Touch screen 14
Microscope light 14
AluHeat Technology 14
Monitor 14
Gassing and humidification system – GH01 14
Tray lid 14
Connections panel 15
Lock 16
Network connection 16
Gas system connector 16
Alarm output 16
Backside of unit 17
Setup 18
Moving the unit 18
Environment 18
Touch screen menu 19
Time settings 20
Ethernet configuration 21
Unit lock 21
Calibration 22
Heat zones and temperature measure points 22
Adjustment procedure 23
Access control 26
Access levels 26
Access control settings 26
Login 27
Change password 27
Create new user 28
Edit user 29
Delete user 29
Log 30
Logging out 30
Lost password 30
Use 31
General workflow overview 32
Fans 32
Temperature setpoint 33
Logs 33
Timers schedule 34
Alarm 35
Microscope light 36
Microscope light 37
Filters 37

Monitor 38
On-screen display (OSD) menu 38
Picture 39
Position 39
Clock and phase 39
Color temperature 39
Management 40
OSD Display 40
Language 40
Input source 40
Recall 40
Gas humidifier system GH01 41
Glass bottle 42
Tube connections 42
Warming 43
Condensation 43
Gas flow adjustment 43
Glass incubator hoods 44
Warming blocks for tubes 45
Warming blocks for culture dishes 46
Warming blocks for syringes 47
Warming blocks for media flasks 47
Maintenance 48
Daily maintenance 48
Weekly maintenance 48
Annually maintenance 48
Additional maintenance 48
Service information 49
Fuses 49
Replacing interior light 50
Troubleshooting 51
Technical data 53
Disposal 56
Recyclable components 56
Warranty and product liability 57

Models covered in this manual:
Model L234

This manual is subject to change without further notice.

Version 1.00 10/2013
Original instructions

Safety

The following safety symbols may appear in this manual:

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTICE is used to address practices not related to personal injury.

General safety

WARNING

- Use only suitable premix gas. Use of other gasses could result in serious injury, depending on the gas connected.

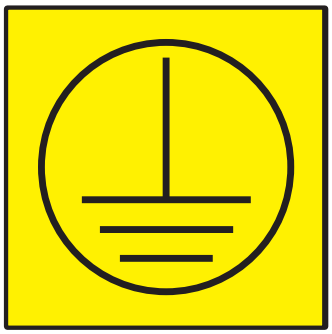
CAUTION

- **Read** and understand the manual completely before use. Keep the manual close to the unit.
- **Do not** use the workstation if the outer packaging is damaged.
- **Never** use and handle this unit in other ways than specified in this manual. Your safety may be at risk and the unit may be damaged.
- **Never** try to lift or move the unit alone.
- **Protect** the power cord from being walked on or pinched.
- **Always** use a grounding-type plug. If the plug does not fit into your outlet, consult an electrician for replacement of the outlet.
- **Unplug** the unit during lightning storms or when unused for a long period of time.
- **Always** wear protective shoes while moving the unit.
- **Do not** perform repairs, disassembles, assembly operations, extensions, re-adjustments or modifications on this unit. This must be carried out by K-SYSTEMS or by persons authorized by K-SYSTEMS only.
- **Never** use the device without the front windows correctly attached.
- **Always** have the tray closed when using the unit.
- **Never** use the workstation without an original K-SYSTEMS HEPA filter.
- **Reduce the risk** of fire or electric shock. This equipment should not be exposed to rain or moisture and large objects filled with liquids (>500ml).
- **Do not** expose the filter to liquids. Change filters that have been exposed to liquids.
- **Always wear** full protective equipment and clothing i.e. gloves, masks and general clean room clothing.

NOTICE

- **Do not** change the calibration value yourself. This should be done only by an authorized K-SYSTEMS service technician, as described in the service manual.
- **Do not** use the workstation at room temperatures exceeding 30° C. Room temperature above 30° C will compromise the fertilization process. The relative humidity must not exceed 75% (non-condensing).

Safety symbols on the unit



Warning: This equipment must be protectively earthed

Biohazard

Consult instructions for use

Specific warning or precaution

Other symbols on the unit

Aux, light
T5.0AH, 250V

Controller
T10.0AH, 250V

Left table
T10.0AH, 250V

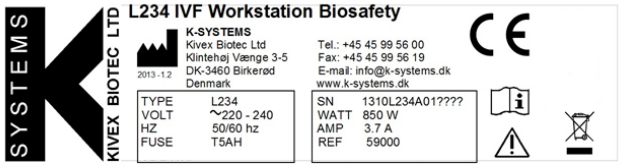
Fans
T4.0AH
250V

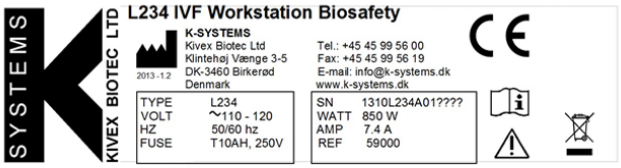
AUX, monitor
T1.0AH, 250V

Right table
T10.0AH, 250V

Outlets
T1.0AH, 250V

Fuse labels



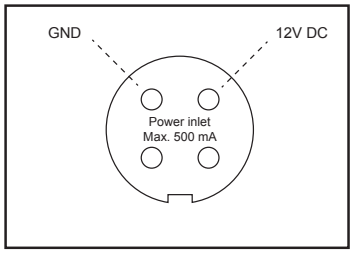


Main product label, K-Systems brand logo and address.

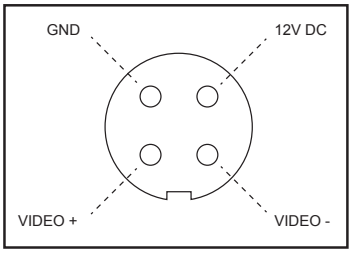
LOCK	Key label
MAIN SWITCH	Switch label
MAINS	Mains label
GAS INLET (MAX 1 BAR)	Gas label
GAS OUTLET	Gas label
CAUTION SAMPLE PORT KEEP SILICONE CAP ON	Label for sample port
ETHERNET	Ethernet label
HDMI	HDMI label
ALARM OUTPUT	Alarm label
WARRANTY VOID IF BROKEN	Warranty label
O **I**	On / Off
WARNING USE ONLY SUITABLE PREMIX GAS	Gas warning label

IVF Workstation L234 BioSafety

Product model label



Power inlet for camera



Video inlet / power outlet for camera

Intended use

Intended medical indication / Intended use definition
The intended use for the L234 Workstation according to the MDD Article 2 is defined as:
The intended use of the L234 IVF Workstations is to establish a single or multiple workplaces with a laminar flow hood supplied with a HEPA filtered gas mixture of atmospheric air and CO2 suitable for manipulations of embryos and blastocysts.

Requirements to the operator
The L234 IVF Workstation shall be used by personnel trained in using IVF workstations.
When using the L234 IVF Workstation operator shall wear full protective equipment and clothing i.e. gloves, masks and general clean room clothing.

Operating environment
The L234 IVF Workstation is intended to be used at room temperature, in a stand-alone environment, at medical clinics and hospital laboratories under normal working conditions.

Intended Patient population
No patient is in contact with or treated by this workbench.

Intended part of the body or type of tissue applied to or interacted with
The type of tissue applied to or interacted with is the human egg fertilized with the sperm.

Intended User Profile
The user profile is the trained health professional who as a qualified person provide the functions of fertilizing the human egg.

Operating principles

The L234 Workstations typically works the following way:

- the unit is connected, the gas is attached and the unit is turned on
- after 30 minutes the unit will be at a constant working temperature and air flow
- dishes with eggs and sperm are transferred to the working area, eggs and sperm will not come in physical contact with the workstation
- a dish with an egg is placed under the microscope
- the egg is fertilized with the sperm
- the embryo is removed from the L234 and placed in an incubator
- the embryo is repeatedly placed back under the microscope for control

Safe handling of embryos and blastocysts

To protect the embryos and blastocysts from particle emission from the operator, he or she must always wear protective equipment and clothing i.e. gloves, masks and general clean room clothing. Special attention should be given to hands and lower parts of the arms, as these are the parts of the operator most likely to emit particles near the product.

Minimizing the risk of mix up of eggs and sperm

- Never work in the unit with eggs and sperm from more than one pair of donors at the same time.
- Always mark the eggs and the sperm with name and journal number/social security number.
- Use color code labels. Use one color for one pair of egg and sperm cell to be fertilized. Use another color for another pair of egg and sperm cell to be fertilized. This method further prevent mix up as the operator only fertilizes for instance a red tabled egg with a red tabled sperm cell, and a green labeled egg with a green labeled sperm cell.
- Do not use the same workstation or the same room for handling of contaminated (i.e. HIV or Hepatitis) eggs and sperm and non-contaminated eggs and sperm. Always use separate workstations and separate rooms.
- Protect the workstations with an emergency power system in case of power failure.

Characteristics

Significant performance characteristics

The K-Systems L234 Workstation are devices for maintaining temperature and clean gas conditions for gametes and/or embryos. The L234 IVF Workstations are designed as a biological safety cabinet to protect both the embryos and the operator.

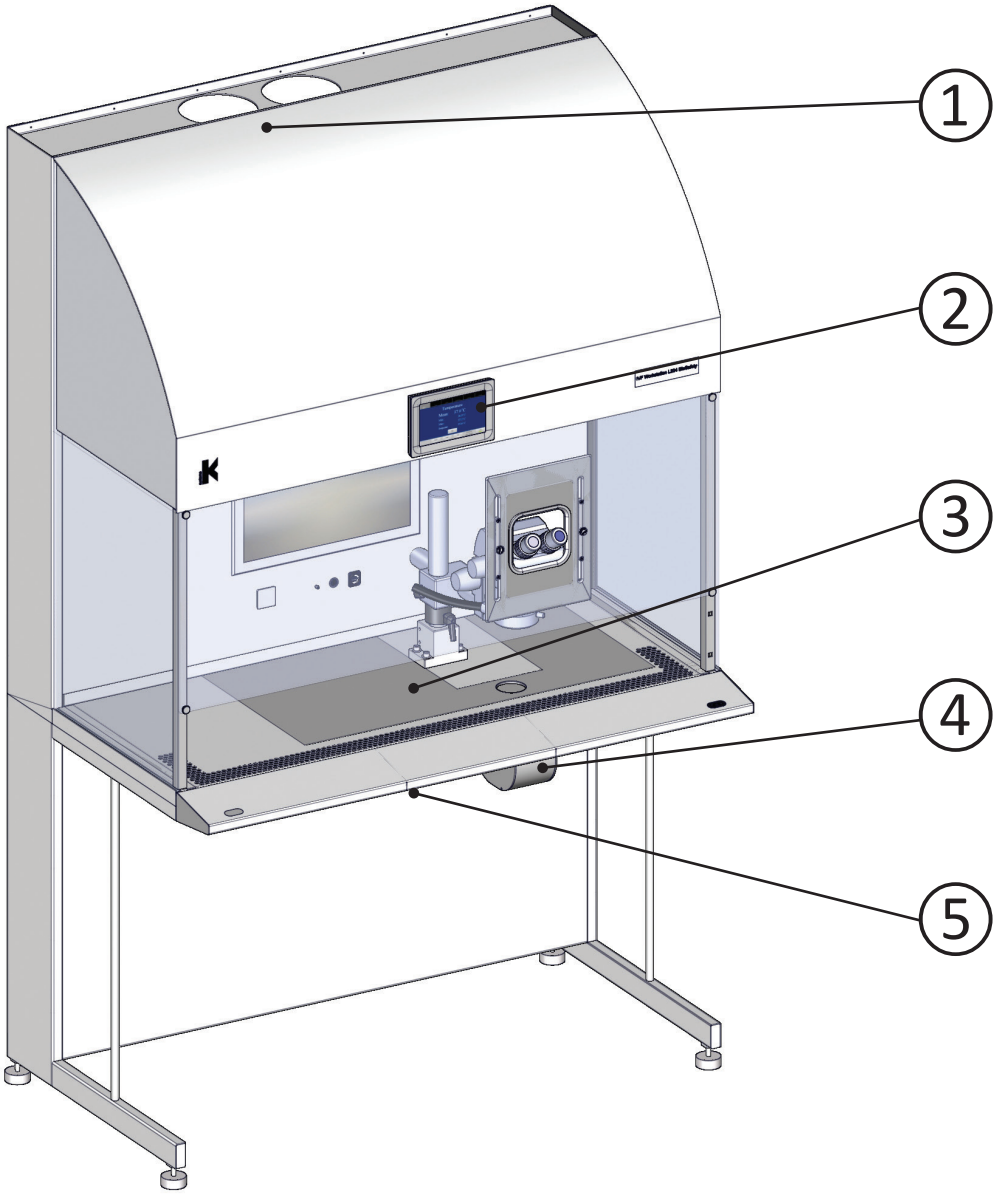
Significant physical characteristics

A single aseptic workplace created by the controllable laminar flow (with two HEPA filters) and a recirculation of air flow through HEPA filters (app. 60% recirculation – app. 40% exhaust).
The average air speed inside the work area is around 0.30 m/s and the velocity is measured via an anemometer placed inside the work area. The HEPA filter is a H14 grade filter having an efficiency of 99.995% regarding particles size < 0.3µm.

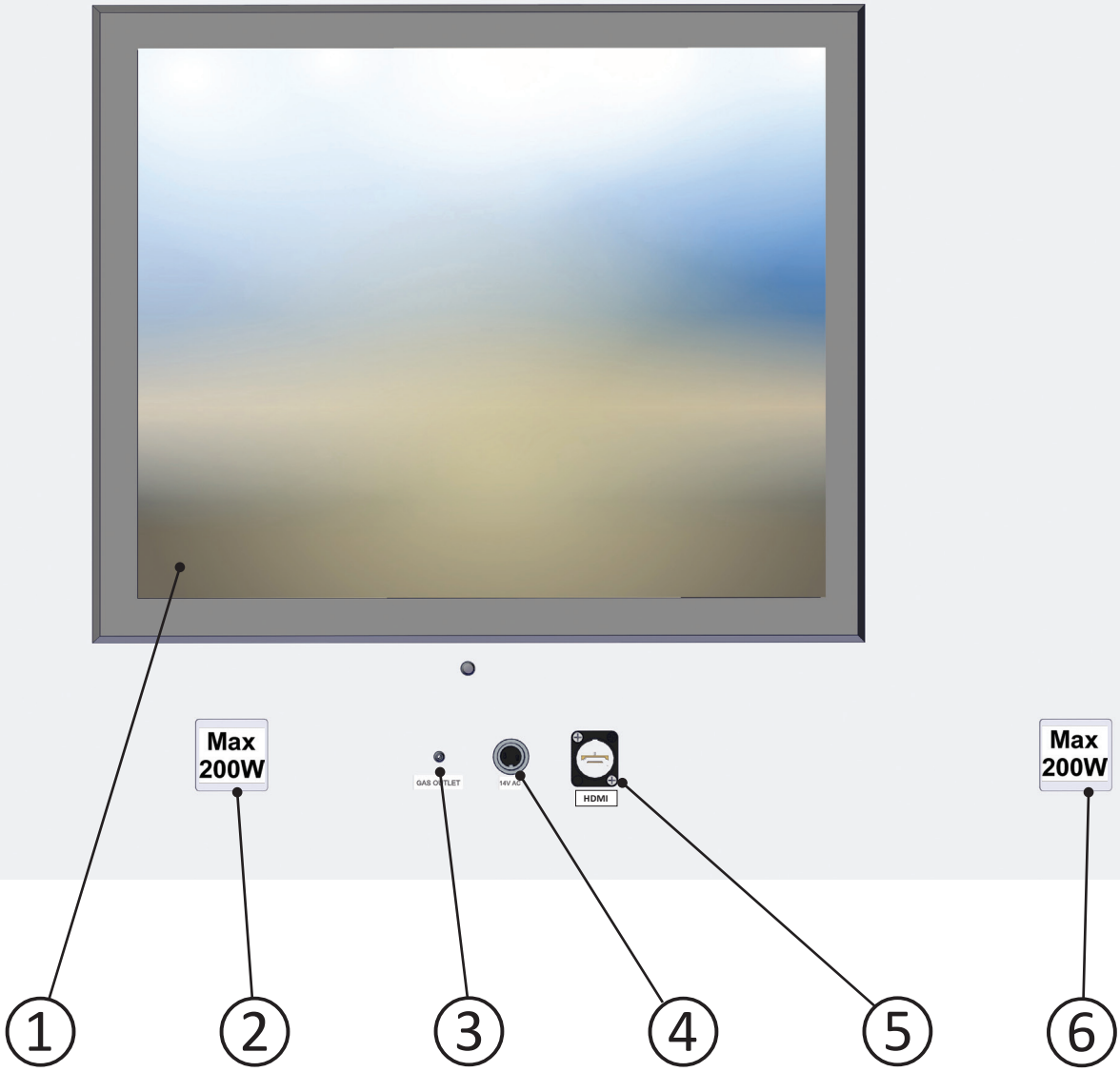
Incorporating a warm area together with the option of having humidified premixed gas helps in keeping correct pH-levels, required in various ART techniques.
The gas used for these workstations is a suitable premixed gas which ensures a correct pH-level.

The idea is to achieve the best possible environment for gametes and embryos during the various procedures. The workstations are prepared for the mounting of up to two stereo microscopes, one on the right hand side and one on the left hand side. The workstation will be operated from a touchscreen module, and it is available with the options of an incorporated external monitor.

Overview



Feature	
1	Airflow system
2	Touch screen
3	Heat zones
4	Microscope light unit
5	Tray lid



Feature	
1	Monitor
2	Power outlet 230 VAC / 115 VAC
3	Gas hose connector
4	Power outlet for video camera
5	HDMI connector for monitor
6	Power outlet 230 VAC / 115 VAC

External computing devices connected to the Ethernet and HDMI connector of IVF Workstation must only be Limited Power Source and SELV circuit according to the standards IEC/UL 60950-1.

Airflow and filter

The airflow keeps particles away from the operator. The air is filtrated through the HEPA filters to ensure it is clean when leaving and circulating the unit.

For more information about the airflow and filter, see chapter **Use** and **Maintenance**.

Touch screen

With the exception of the microscope light, all functions and adjustments are accessed via the touch screen.

For more information about the touch screen, see chapter **Use.**

Microscope light

The microscope light is adjustable.

For more information about the microscope light, consult the separate **Microscope light units manual**.

AluHeat Technology

The units are equipped with adjustable heat zones. The heat zones vary according to the unit model. The heat zones are marked on the tabletop.

For more information about the heating system, see chapter **Use** and **Calibration.**

Monitor

The monitor can be used to show images from the microscope camera, and is suitable for educational purposes.

For details about the monitor, see chapter **Monitor**.

Gassing and humidification system – GH01

The unit is prepared for usage of the K-SYSTEMS GH01 gas system.

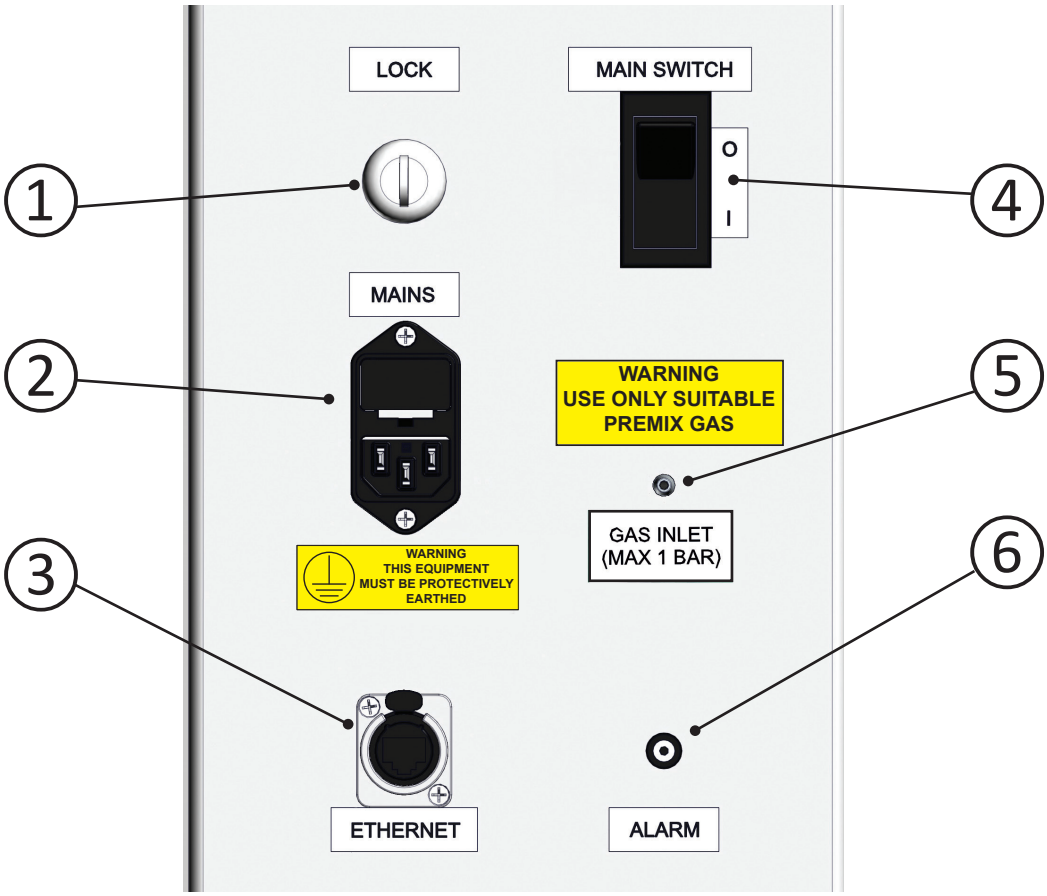
For more information about the gas system, see chapter **Gas humidifier system GH01**.

Tray lid

The lid allows access to the tray.

For more information about the tray lid, see chapter **Maintenance.**

Connections panel



#	Feature
1	Lock
2	Mains connection with fuse
3	Network connection
4	Main switch (**I**= ON, **O**= Off)
5	Gas system connector
6	Alarm output

Lock

The unit has a lock and a set of keys. It is only possible to switch the unit on when it is unlocked and the key is in place.

For more information about the lock, see chapter **Use.**

Network connection

RJ45 network connector for optional data logger.

For more information about the network connector, consult the **Data logger manual**.

Gas system connector

Gas hose connector for optional premix gas system GH01.

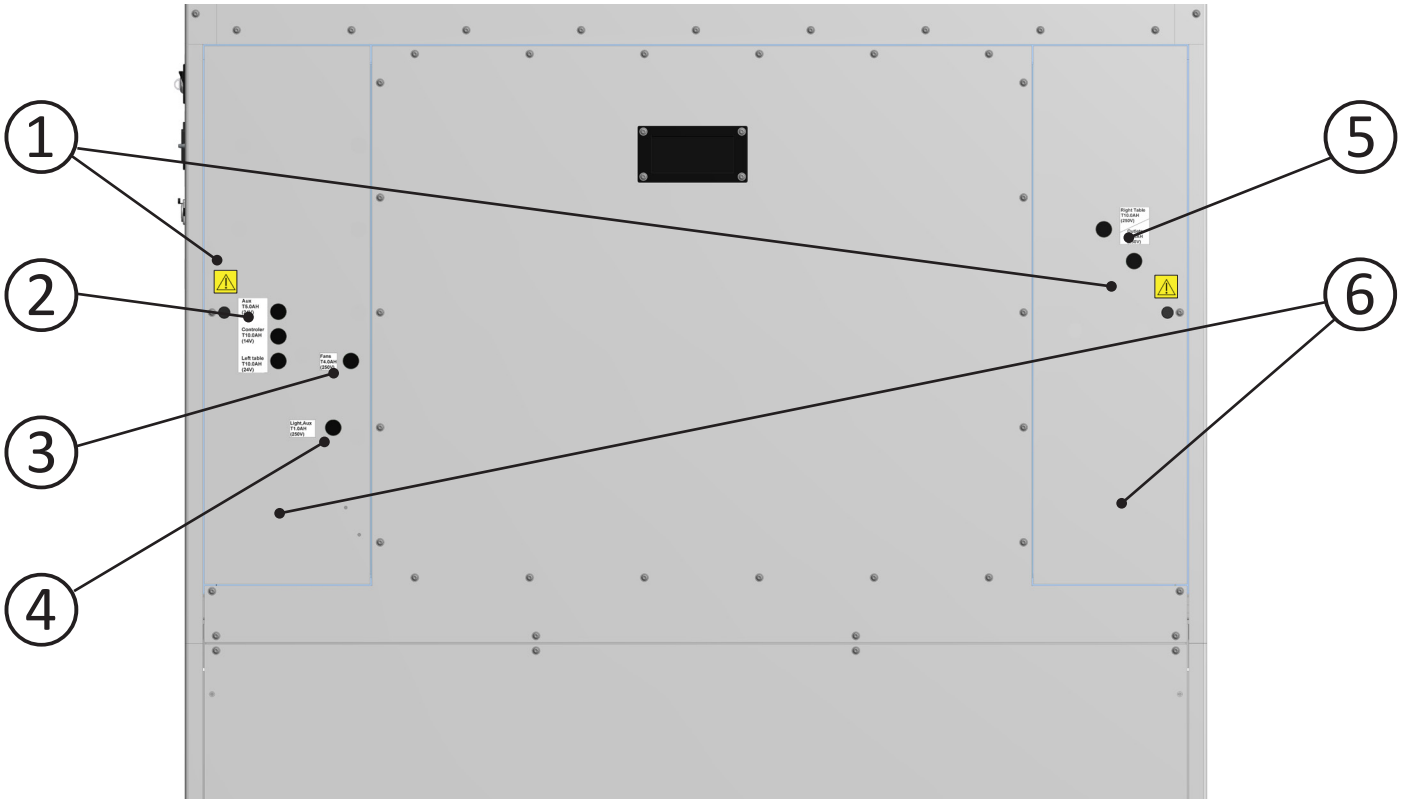
For more information about the gas system, consult the **Gas equipment manual**.

Alarm output

Output for external alarm system (e.g. sms alarm system).

For more information about the alarm system, contact an authorized **K-systems service representative**.

Backside of unit



#	Feature
1	Warning labels (Shock hazard)
2	Left table, controller and auxiliary fuses
3	Fan fuses
4	Light and AUX fuses
5	Right table and outlets fuses
6	Technique hatches

Setup

For installation and assembly of the unit, consult an authorized K-systems service representative.

Before use, see the chapters **Settings** and **Calibration**.

CAUTION

- **Make sure** that the device is correctly earthed using grounding-type plug
- **Never** place other heat generating equipment under the tabletop.
- **Never** attempt to block any of the air flow holes on the tabletop and on top of the unit.
- **Make sure** that all devices emitting electromagnetic radiation are kept at a reasonable distance from L234 IVF workstation in order to avoid any potential electromagnetic or other interferences.
- **Make sure** there are separate power circuits that are intended for use with medical equipment only.

Moving the unit

CAUTION

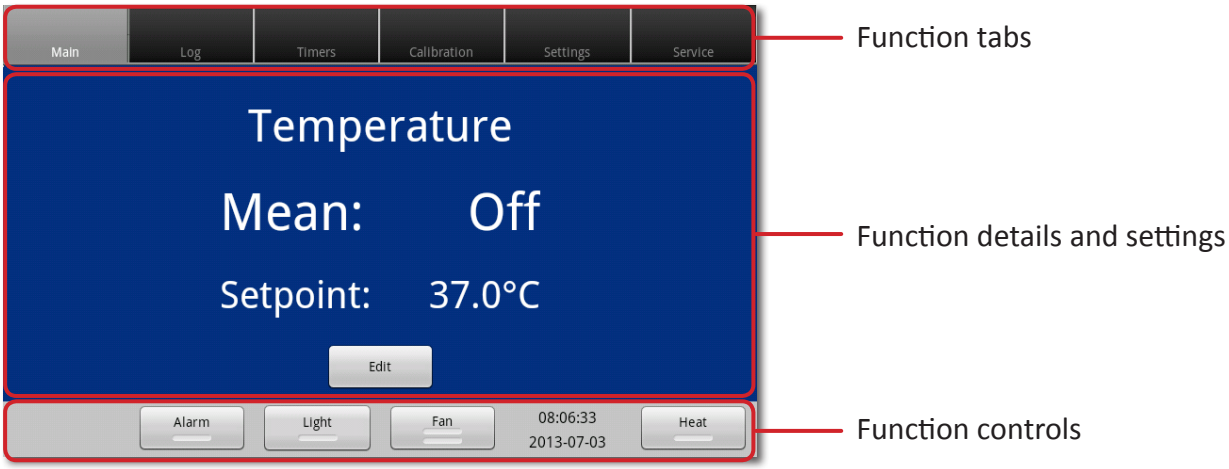
- **Use lifting gear**. Lift in all 4 corners of the tabletop at the same time.
- **Never** try to lift or move the unit alone.
- **Never** try to move the unit by lifting the middle part of tabletop.
- **Always** make sure to wear protective shoes while moving the unit.
- **Always** use the original casing for transportation.

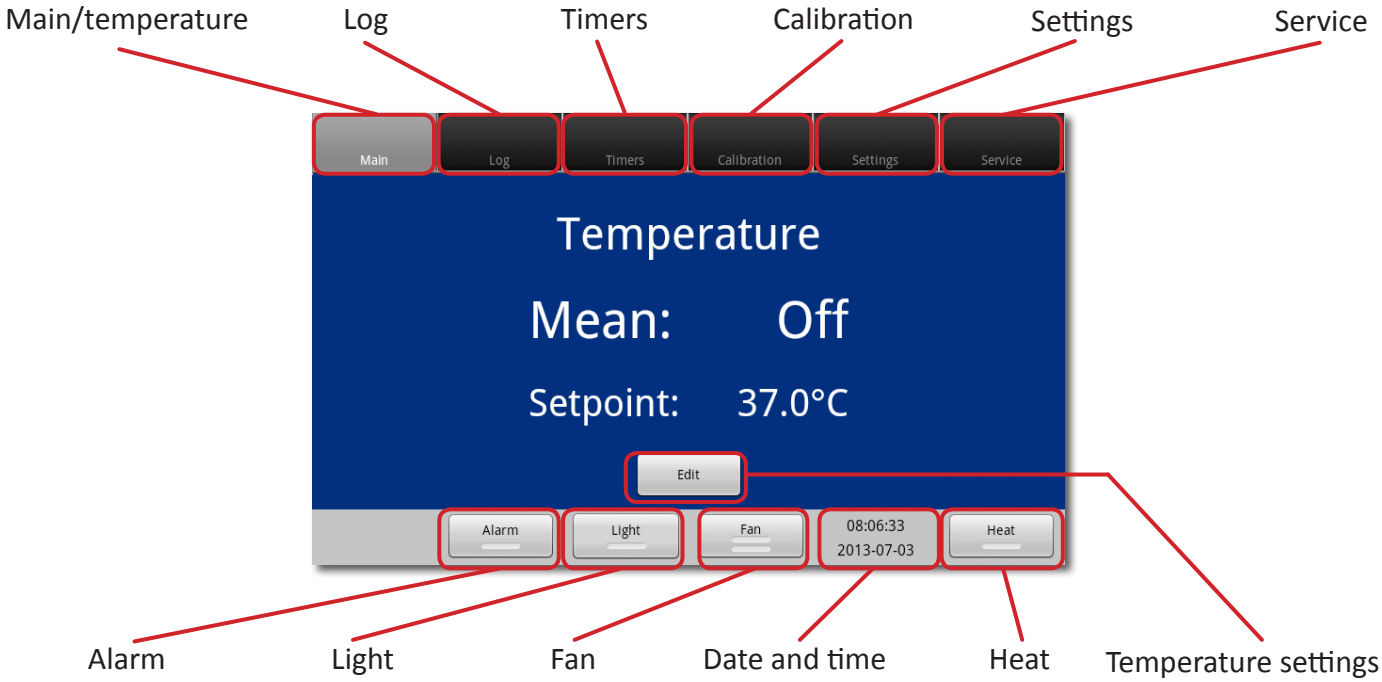
Environment

Temperature	20 – 30 °C
Humidity	Less than 75% (non-condensing)
Placement	On a flat, hard and stable surface. Unit must be kept away from heating and cooling devices
Clearance	Allow at least 2 cm clearance from the rear, 30 cm from the top and 20 cm from left and right for proper ventilation.
Environment	**Indoor use only**. Avoid high temperature, moisture, water and dust This unit must not be exposed to dripping or splashing. This unit is designed for use at altitudes under 2000 m.

Touch screen menu

You can control all the unit's functions and settings (except the microscope light) by touching the areas on the touch screen.



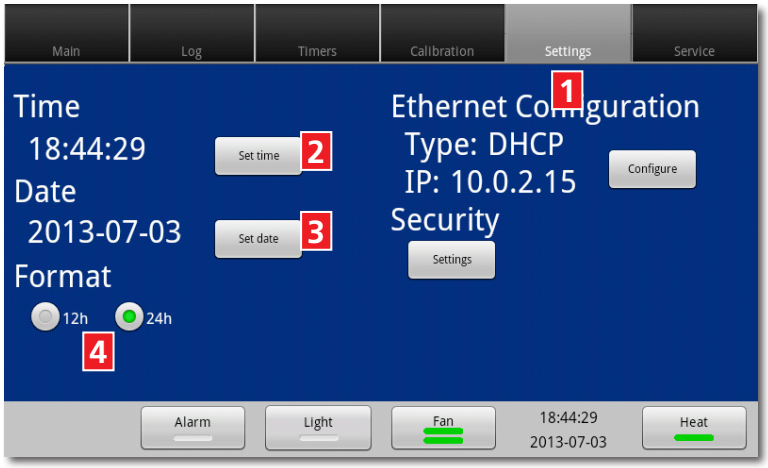


Heat		Alarm		Light		Fan	
Heat Left	**Off**	Alarm	**Not set**	Light	**Off**	Fan	**Off**
Heat Left	**Warming up**	Alarm	**Set**	Light	**On**	Fan	**Half speed**
Heat Left	**On**					Fan	**Full speed**

Time settings

During startup check system time and date, and correct if needed.

Several of these settings require login. See **Access control**.

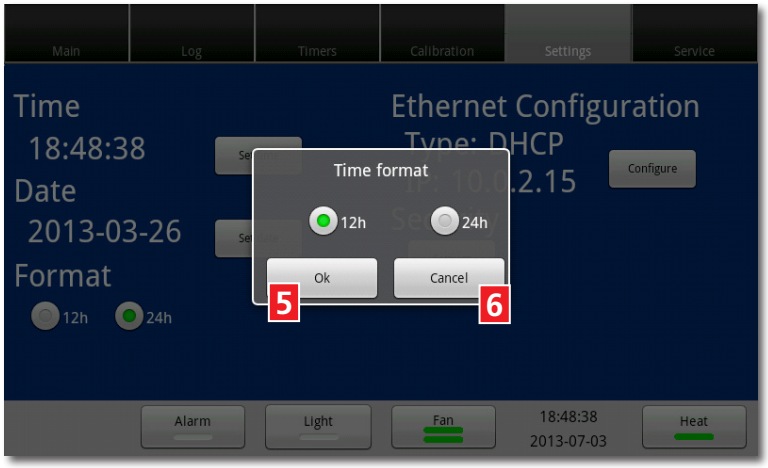


Press the **Settings** tab 1.

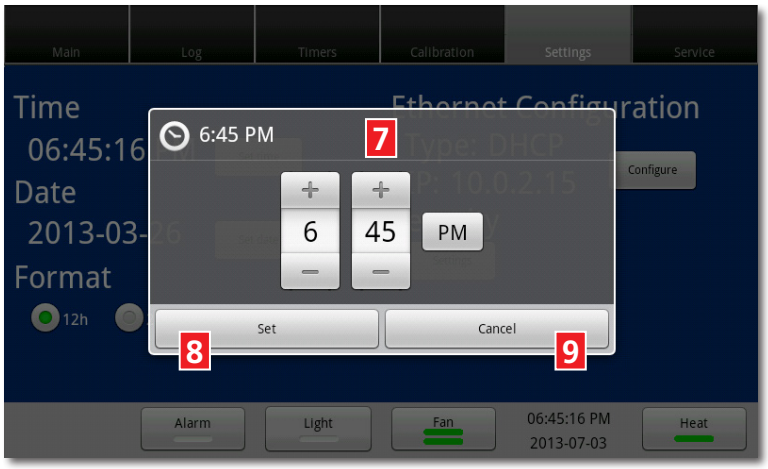
To adjust the time press **Set time** 2.

To adjust the date press **Set date** 3.

Select 12h or 24h time settings under **Format** 4.

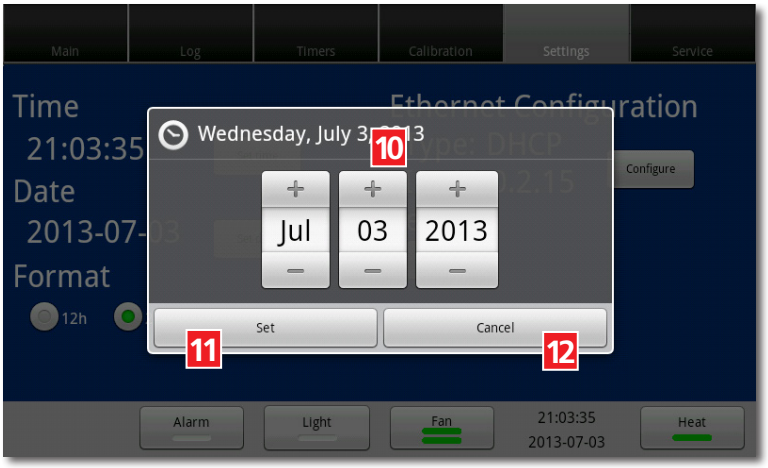


Select either 12h or 24h time settings, and press **Ok** 5 to save the setting or **Cancel** 6 to return to the previous screen.



Press the + or - buttons 7 to adjust the time.

Press **Set** 8 to save the setting or **Cancel** 9 to return to the previous screen.



Press the + or - buttons 10 to adjust the date.

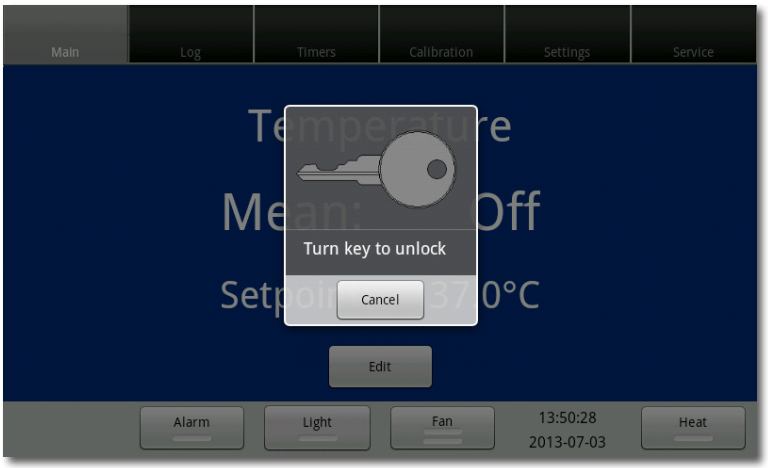
Press **Set** 11 to save the setting or **Cancel** 12 to return to previous screen.

Ethernet configuration

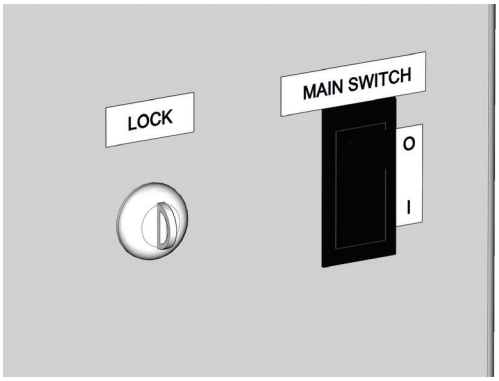
Select usb0, Dhcp or static IP.
If you choose static ip, enter the static IP adress 1.

Press **Save** 2 to save the setting or **Cancel** 3 to return to the previous screen.

Unit lock



The unit cannot be switched on while it is locked. It is only possible to switch the unit on when it is unlocked and the key is in place. Turn the key on the units' side to unlock.



Calibration

The units can be equipped with different heat zone and heated glass layouts. The temperature calibration procedure for a specific heat zones depends on the heat zone's layout.

NOTICE

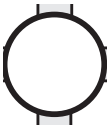
- Use only thermometer and temperature probe equipment that are specified in the service manual.
- Calibration must only be carried out by trained personnel. (i.e., a service technician authorized by K-SYSTEMS).

Heat zones and temperature measure points

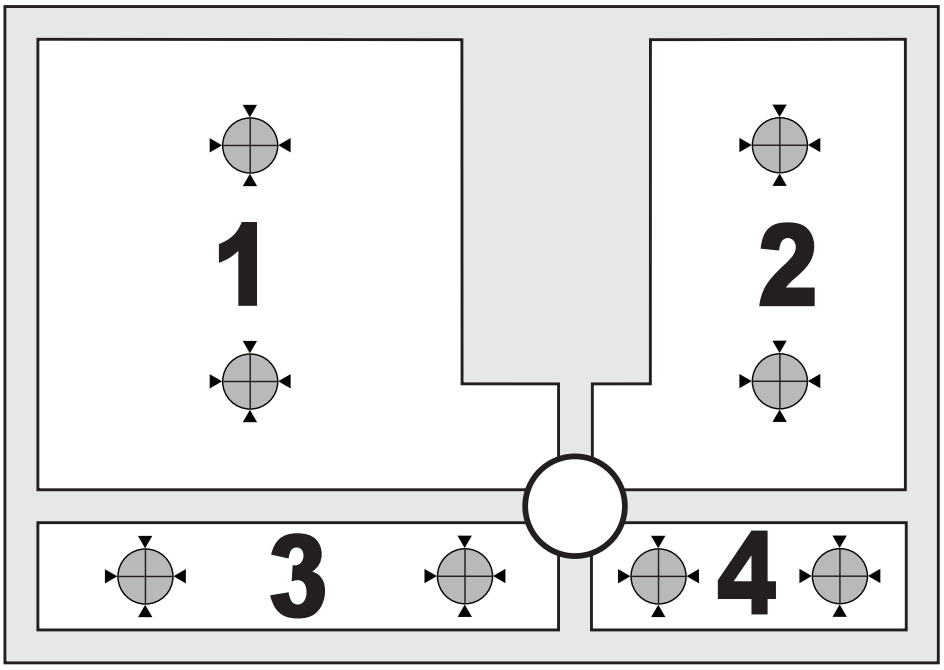
4 feet unit with 4 heat zones. Right.

Temperature measure points.

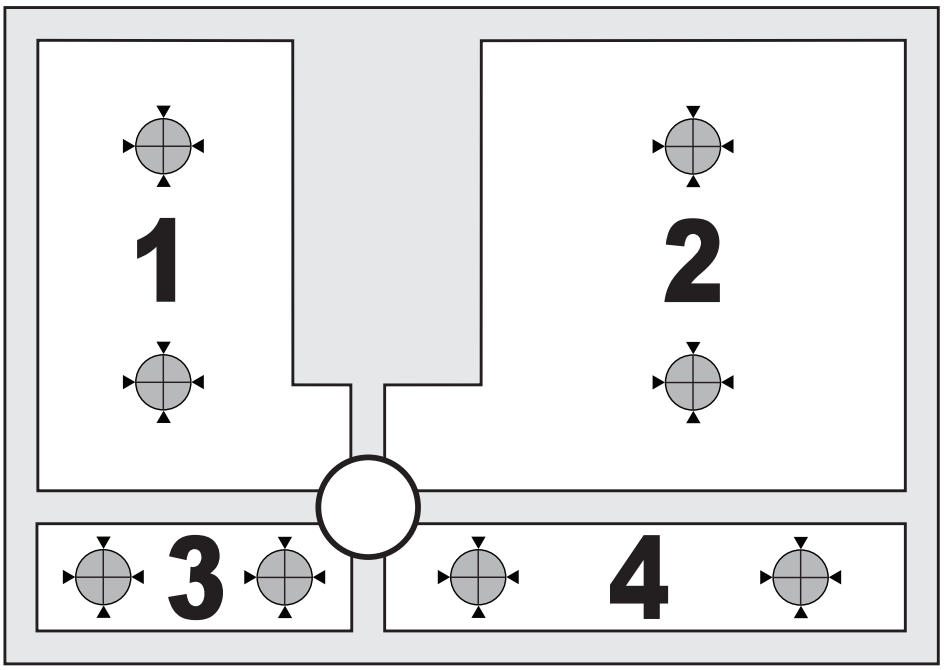
1 Heat zone number.



Temperature measure point for heated glass.



4 feet unit with 4 heat zones. Left.

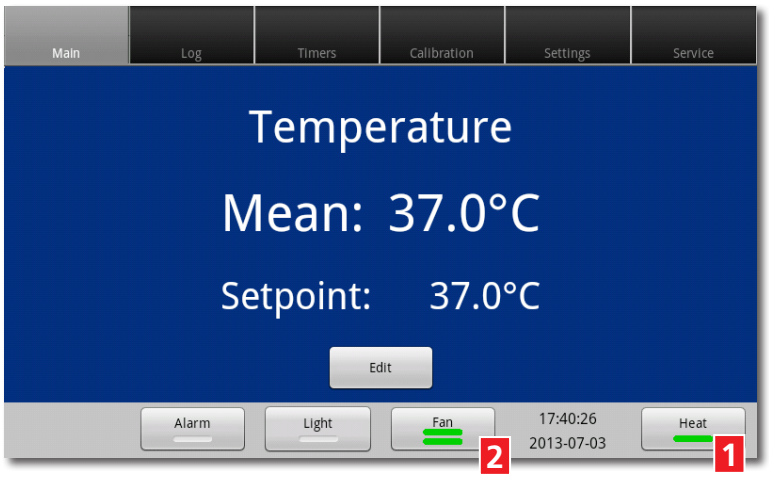


Adjustment procedure

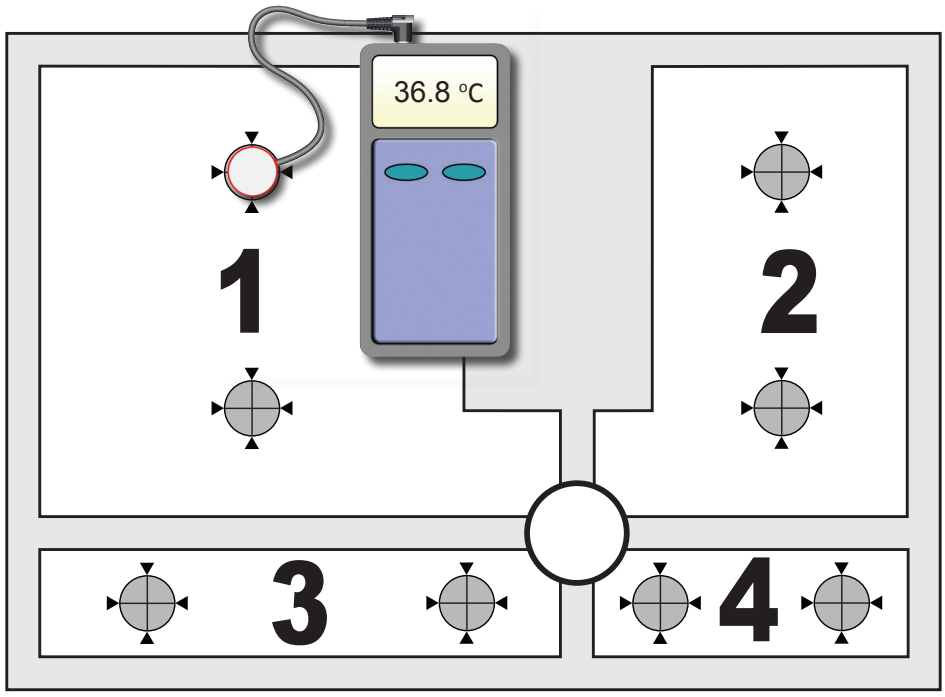
To calibrate the heat zones, K-Systems recommends that you use the precision thermometer F100 and a Falcon® or Nunc® dish with a PT-100 temperature probe. Alternatively, you can buy a probe from your local K-Systems distributor.

Identify your unit's heat zone layout. Refer to the section **Heat zones and temperature measure points.**

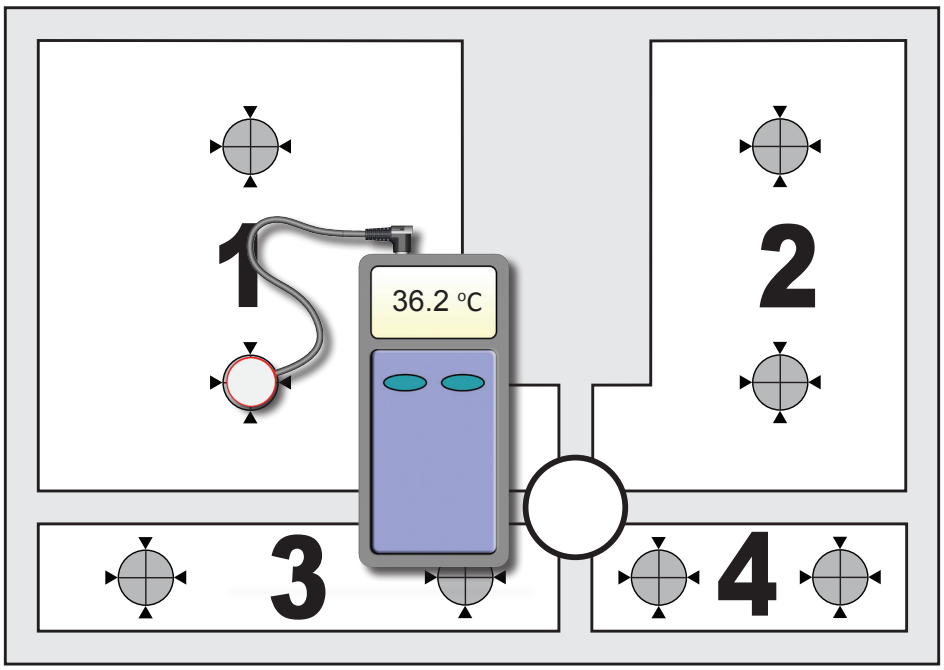
> Several of these settings require login. See chapter **Access control**.



1 Turn on the heat zone 1 and the fan 2. Wait at least 40 minutes for the temperature to stabilize.



2 Place the temperature probe on the first calibration point in one of the heat zones. Measure the temperature and write it down.



3 Measure the temperature at the second calibration point in the same heat zone. Write the value down.

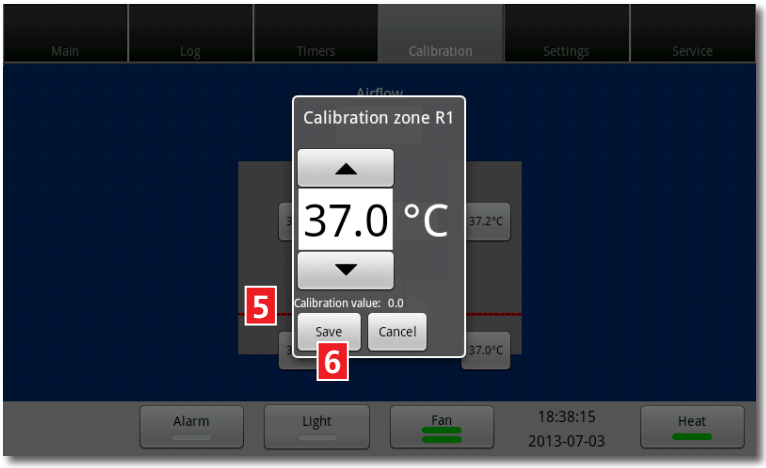
4 The mean temperature for the heat zone is calculated using the following formula:

$$\frac{\textit{Temperature 1} + \textit{Temperature 2}}{2}$$

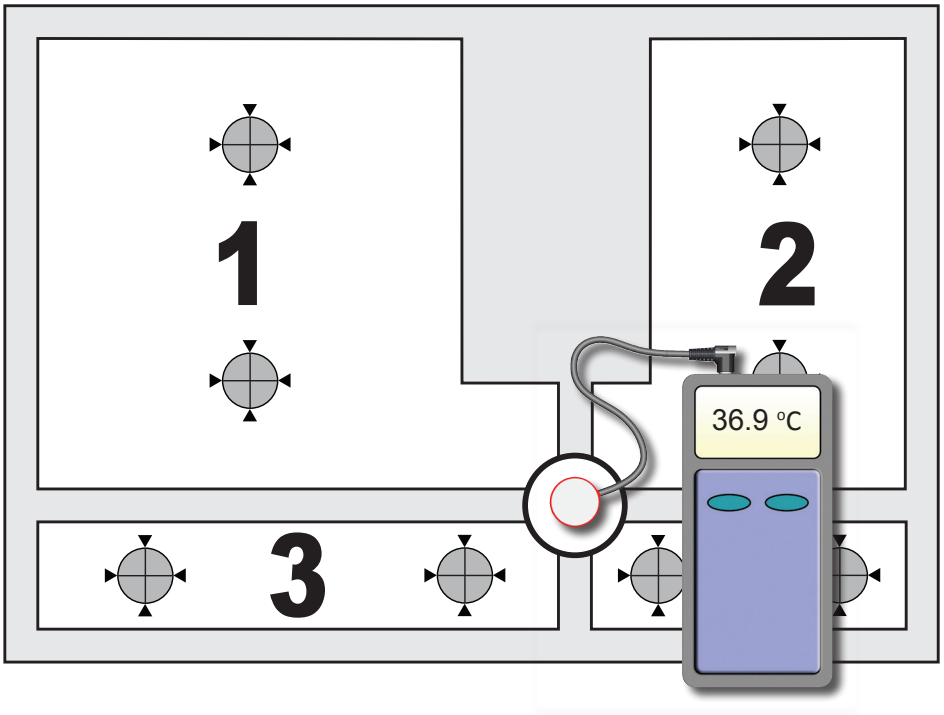
In the example shown above, the mean temperature would be:

$$\frac{36.8\ ^{\circ}C + 36.2\ ^{\circ}C}{2} = \mathbf{36.5\ ^{\circ}C}$$

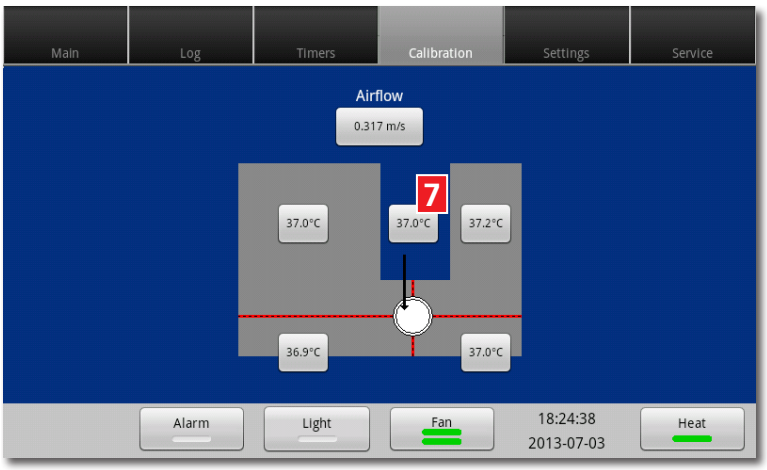
5 Press the **Calibration tab** 3 on the touch screen. Press the calibration button 4 at the relevant heat zone.



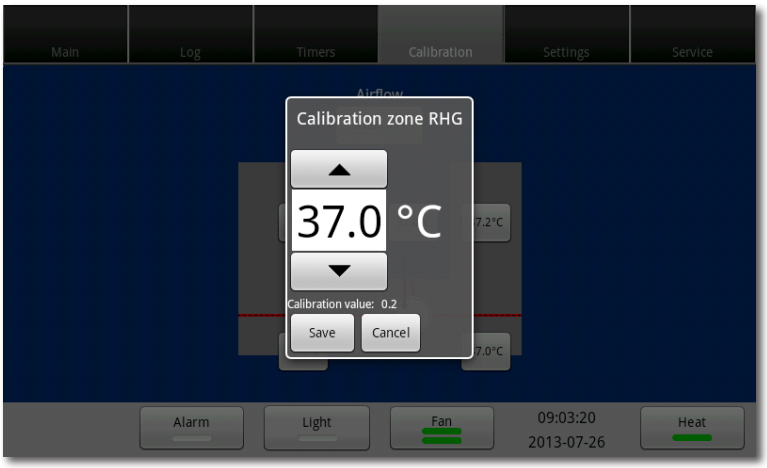
6 Adjust the temperature to the same value as the measured mean temperature. The calibration value 5 is shown just beneath the temperature value. Press **Save** 6 to store the new value.



7 Only one measurement is taken at the calibration point for the center of the heated glass. Calibrate using the measured value directly.



8 Press the calibration button 7 for the heated glass.



9 Adjust the temperature to the same value as the measured temperature.

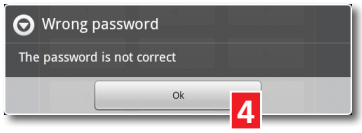
10 Continue with calibration on all heat zones. Calibration must be performed at least once a year.

Access control

In order to prevent unauthorized changes to setup parameters, the unit provides different access levels.

When you attempt to change a parameter that requires authorization, the login window will pop up on the touch screen. If you leave the topic that requires login, you will automatically be logged out.
The popup only shows users possessing a valid access level. Press your user name 1 and press **OK** 2.

Enter your password and press **OK** 3.



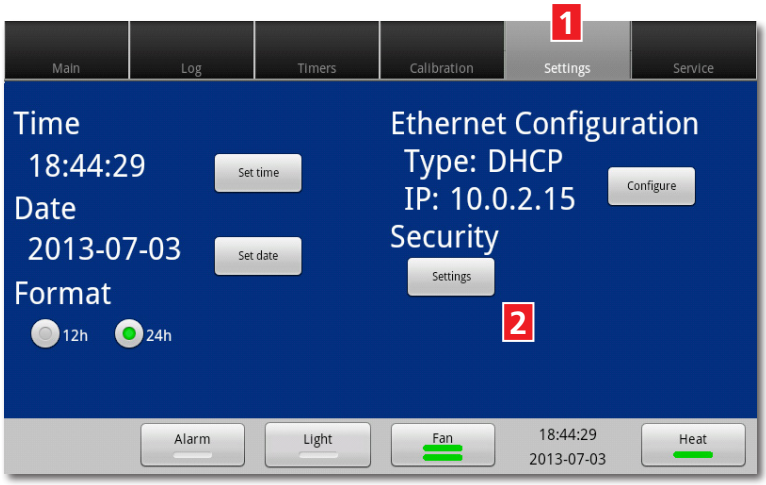
If you enter a wrong password, a message will be displayed. Press **OK** 4 and try again.

Access levels

The unit supports 3 access levels: **User**, **Advanced user** and **Super user.** Their characteristics are shown below:

User (no login required)	Advanced user (login required)	Super user (login required)
•Switch heat and light on/off	Same as **User** and	Same as **Advanced user** and
•Switch fan on/off/reduced	•Change setpoint	•Calibration
•Move between the different tabs	•Change timers	•Create new users
•See the alarm log	•Change settings	•Edit users
•See the security log and users	•Change own password	•Delete users

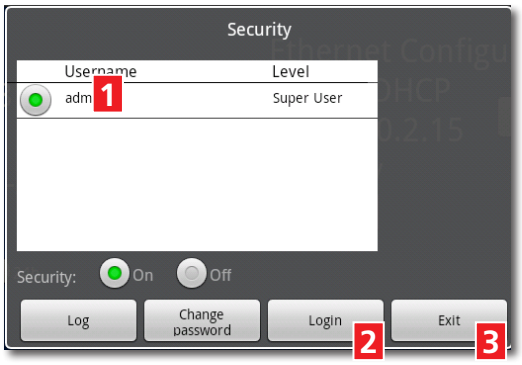
Access control settings



Press the **Settings** tab 1.

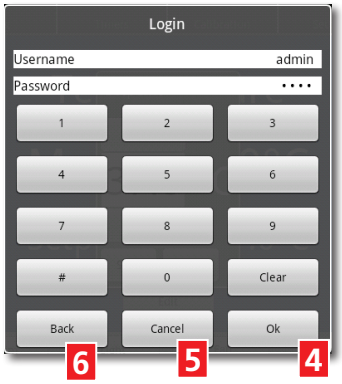
Press Settings 2 under Security.

Login



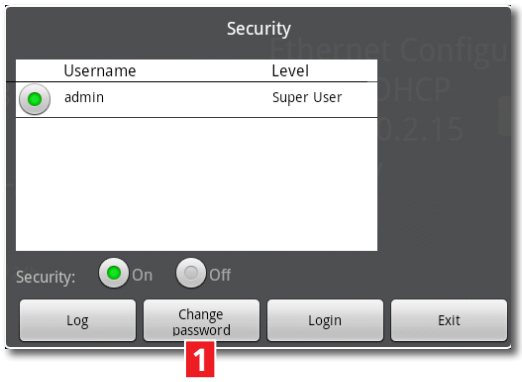
The user “admin” is the only active user upon delivery of the workbench. The admin's password is 1234. The user "admin" cannot be deleted. However, the password is editable and should be changed. See **Change Password**.

Press the "admin" user name 1 and press **Login** 2, or press **Exit** 3 to return to the previous menu.

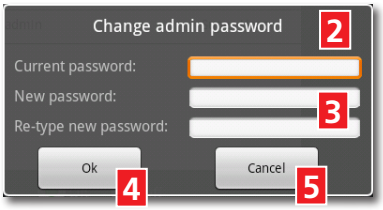


Enter the password. The default password is 1234.
Press **OK** 4 to proceed, **Cancel** 5 to abort or **Back** 6 to return to the previous menu.

Change password



Press **Change password** 1.



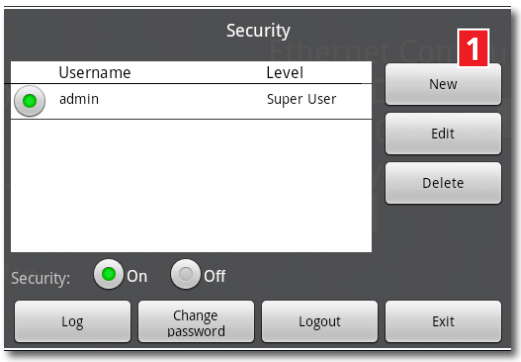
Enter the current password 2. Enter the new password twice 3.

The password must be between 4 and 10 digits long.

Press **Ok** 4 or **Cancel** 5 to abort.

If you don't enter the same password twice, this warning appears

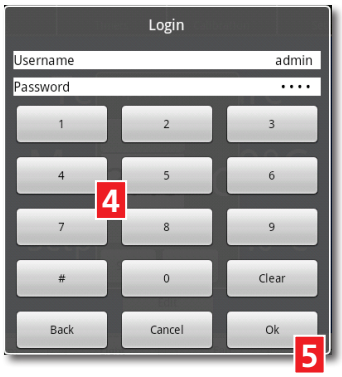
Create new user



In the main window, Press **New** 1.

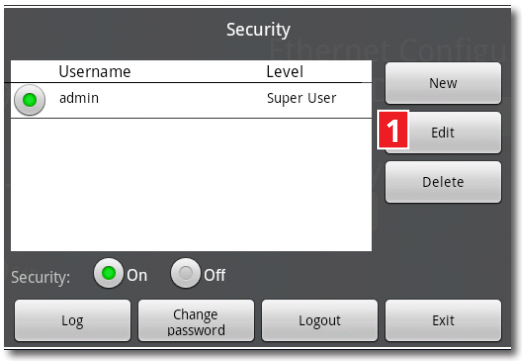
Select **Advanced** or **Super user** level 2.
When you press the buttons for the user's name 3, a keyboard pops up.

Enter **Surname**, **First name** and **User name**. Press **Next**.

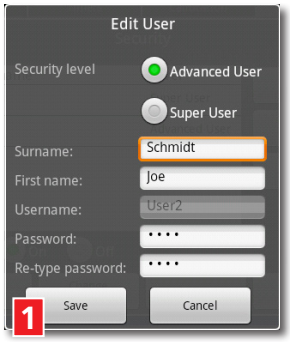


When pressing the buttons for the password 4, the numeric keyboard pops up. Enter a password between 4 and 10 digits. Press **OK** 5.

Edit user

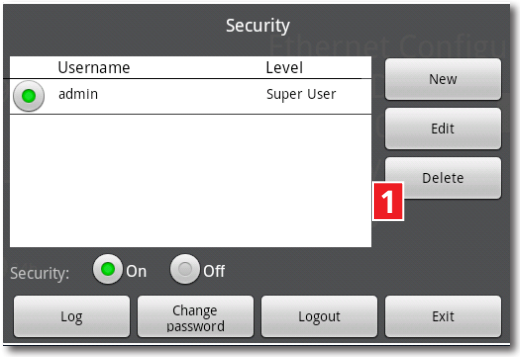


Select a user in the main window, and press **Edit** 1.

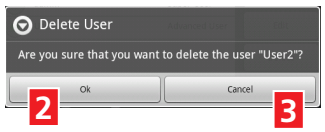


The security level, names and password can be edited here.
Press **Save** 2 when done.

Delete user

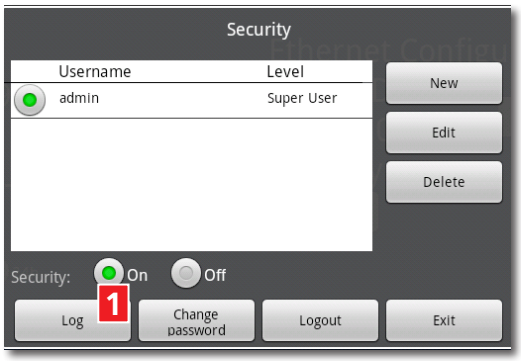


Select a user in the main window, and press **Delete** 1.

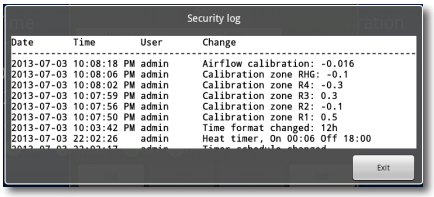


Press **OK** 2 to delete the user or **Cancel** 3 to return to the previous menu.
It is not possible to delete the "admin" user.

Log

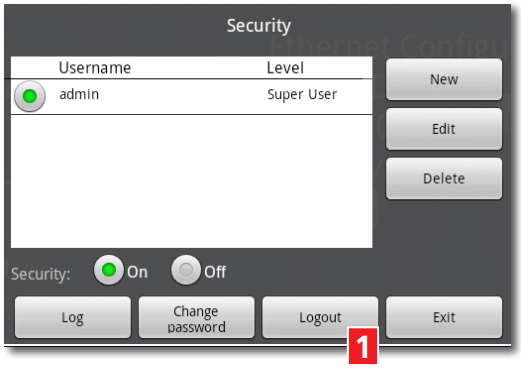


In the main window press **Log** 1.



The log shows the last 100 changes including their date, time and user. You can slide the screen up and down.

Logging out



In the main window press **Logout** 1.
Super users will be automatically logged out after 5 minutes without activity.

Lost password

If all super user passwords become lost, please contact your local K-System distributor to acquire a special login that is calculated from the unit's serial number.

Use

Clean the unit
The work chamber must be carefully cleaned and/or disinfected. Use only 70% ethanol or similar. NEVER use ammonia or chlorinated cleaners. It is recommended to use special lint-free wipes. Remember to clean the gas hose connector sitting inside and outside of the unit.

DANGER

Ethanol is highly flammable. Keep it away from open flames. Unplug all electrical equipment. Use only in well-ventilated room.

Personal protection
During cleaning the operator must wear full protective gear.

Clean the tools
Objects and tools must be carefully cleaned and/or disinfected before bringing them into the unit.

Switch the heat on if needed
Allow the unit to reach the set point temperature. The temperature is shown on the touch screen display.

Start the fan
The fan must be run at normal speed for at least 30 minutes prior to working inside the unit.

Avoid movement
Tools and objects must be placed within reach to avoid unnecessary movement inside the unit.

Do not overfill the working area
It is important to keep the air flow undisturbed as much as possible. Therefore, never overload the work chamber - insert only tools and objects necessary for the actual work.

Wear protective clothing
Wear protective clothing to reduce particle emissions from the operator (i.e. gloves, masks and general clean room clothing). Special attention should be given to hands and the lower parts of the arms, as these are likely to emit particles close to the sample.

Use premix gas
Use only suitable premix gas. Always use appropriate in-line filters for input gas to the unit. Make sure that the gas supply pressure is kept at a stable level, typically at 0.5-0.7 bar.

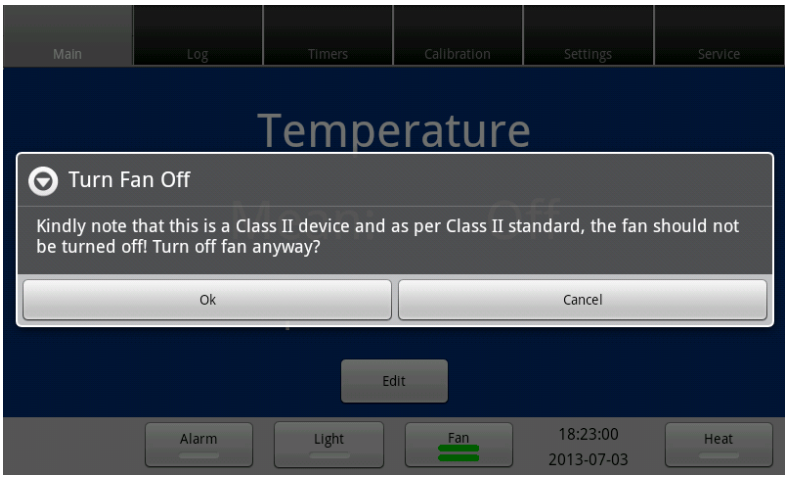
CAUTION

- **Always** have the lid closed when in operation.
- **Never** use the device without the front windows correctly attached.
- **Always** cover the air velocity sensor head before initiating any cleaning procedure on the working area.
- **Never** cover the air velocity sensor head when using the unit.

General workflow overview

1. Insert the key and unlock the unit
2. Turn the unit on
3. Attach the gas
4. Wait 30 minutes until the temperature and the air flow is constant
5. Transfer dishes with eggs and sperm to the working area
6. Place a dish with an egg under the microscope and fertilize the egg with the sperm
7. Remove the dish with the embryo from the unit and place it in an incubator
8. Control repeatedly the embryo back under the microscope for control

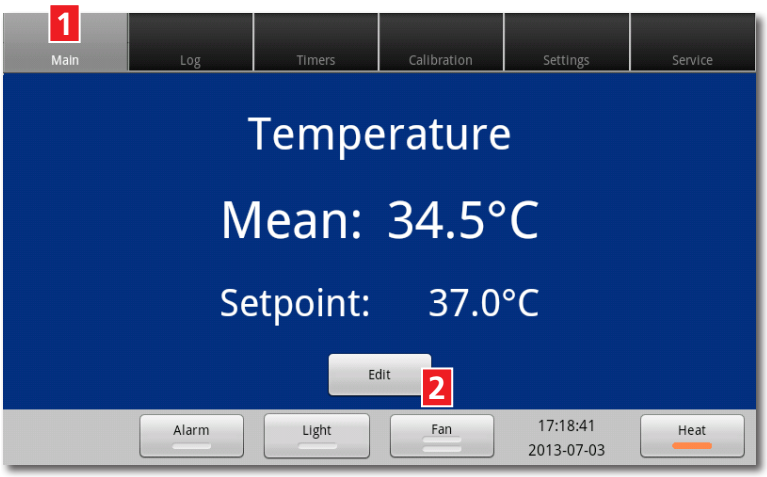
Fans



The fans of this unit are designed to run at all time. If you stop the fans, this warning appears.

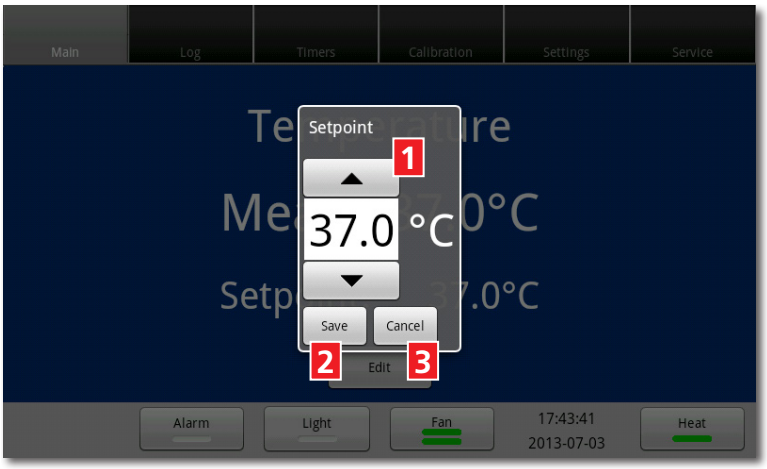
Temperature setpoint

Several of these settings require login. See **Access control**.



The temperature is displayed on the **Main** tab 1.

To adjust the temperature set point press **Edit** 2.

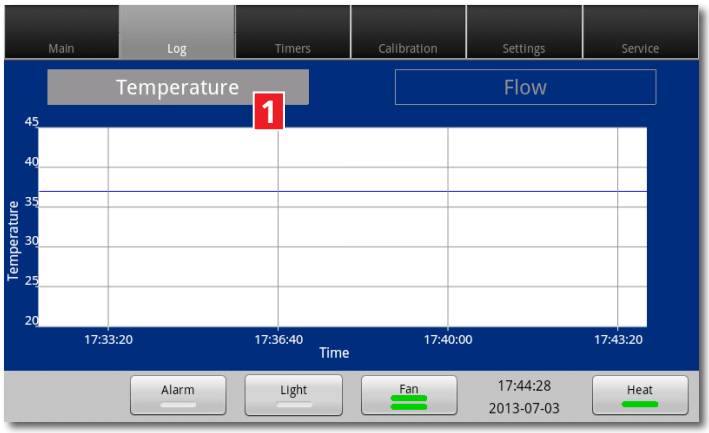


Press the arrow buttons 1 to adjust the temperature from 25 - 42°C.

When you keep your finger on the button, the temperature will change in steps of 0.1 °C at a time within a range of 2 °C. After that, the temperature will change in steps of 1 °C at a time.

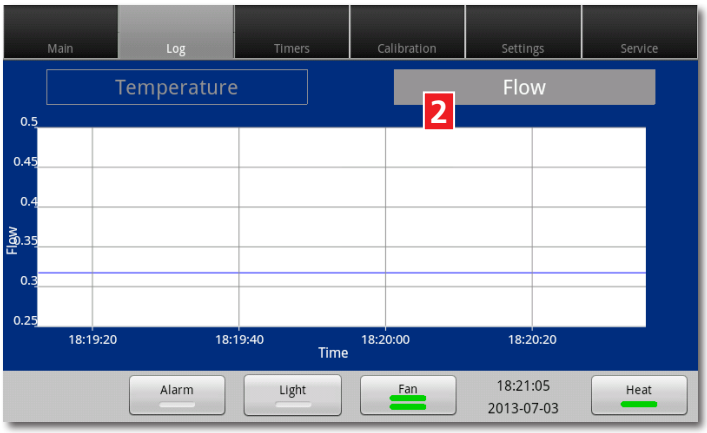
Press **Save** 2 to save the setting or **Cancel** 3 to return to the previous screen.

Logs



The temperature log is displayed on the **Log** tab 1.

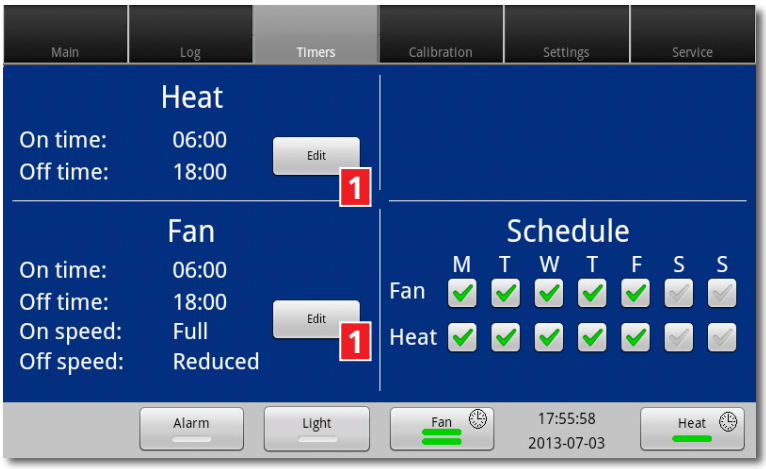
The log interval is 30 seconds and the graph shows the last 3 hours.



The flow log is displayed on the **Log** tab 2.

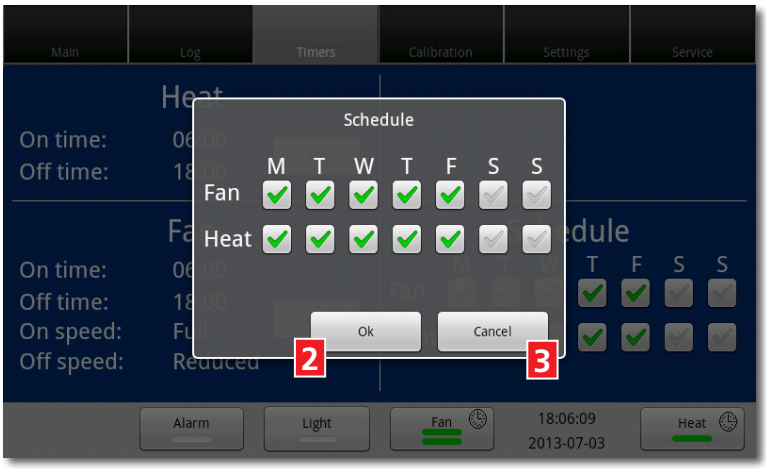
The log interval is 30 seconds and the graph shows the last 3 hours.

Timers schedule



The timers schedule lets users give the timers different settings on different days during the week.

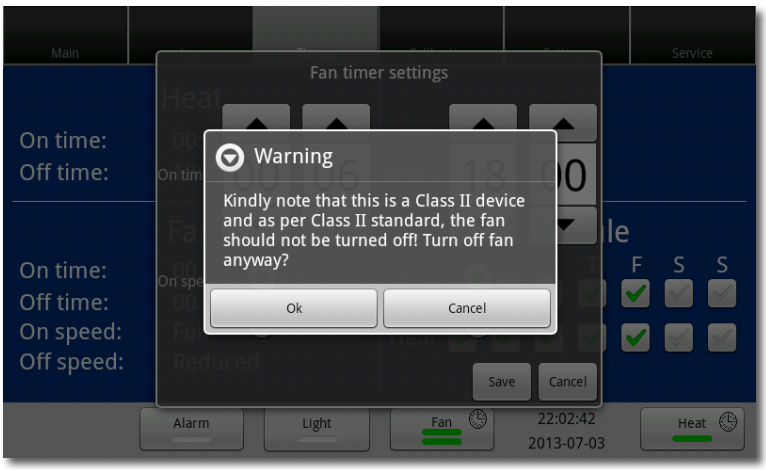
Press the **Edit** buttons 1 to set up a weekly schedule for the fan timer and the heat timer.



Press the day buttons for the fan and / or the heat. Press **Ok** 2 to save the setting or **Cancel** 3 to return to the previous screen.

In this example the fan and heat timer is set weekdays.

When one or more timers are set, a clock icon 4 is displayed on the relevant button.



If you set a timer that turns the fan completely off, this warning appears.

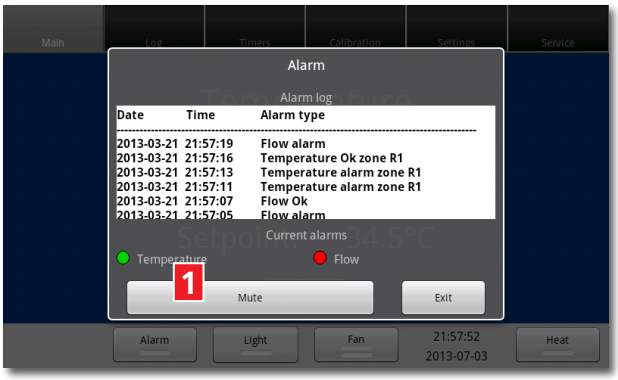
Each day can have its own individual time settings. See **Timers**.

Alarm

The alarm will be activated:

- If the heat zone's temperature is too high or too low
- If the airflow is too low
- When the HEPA filter must be checked
- When there is a hardware error

A flashing red light on the alarm button indicates that an alarm has been activated. An audio alarm will be heard. Press the alarm button to open the alarm message box.



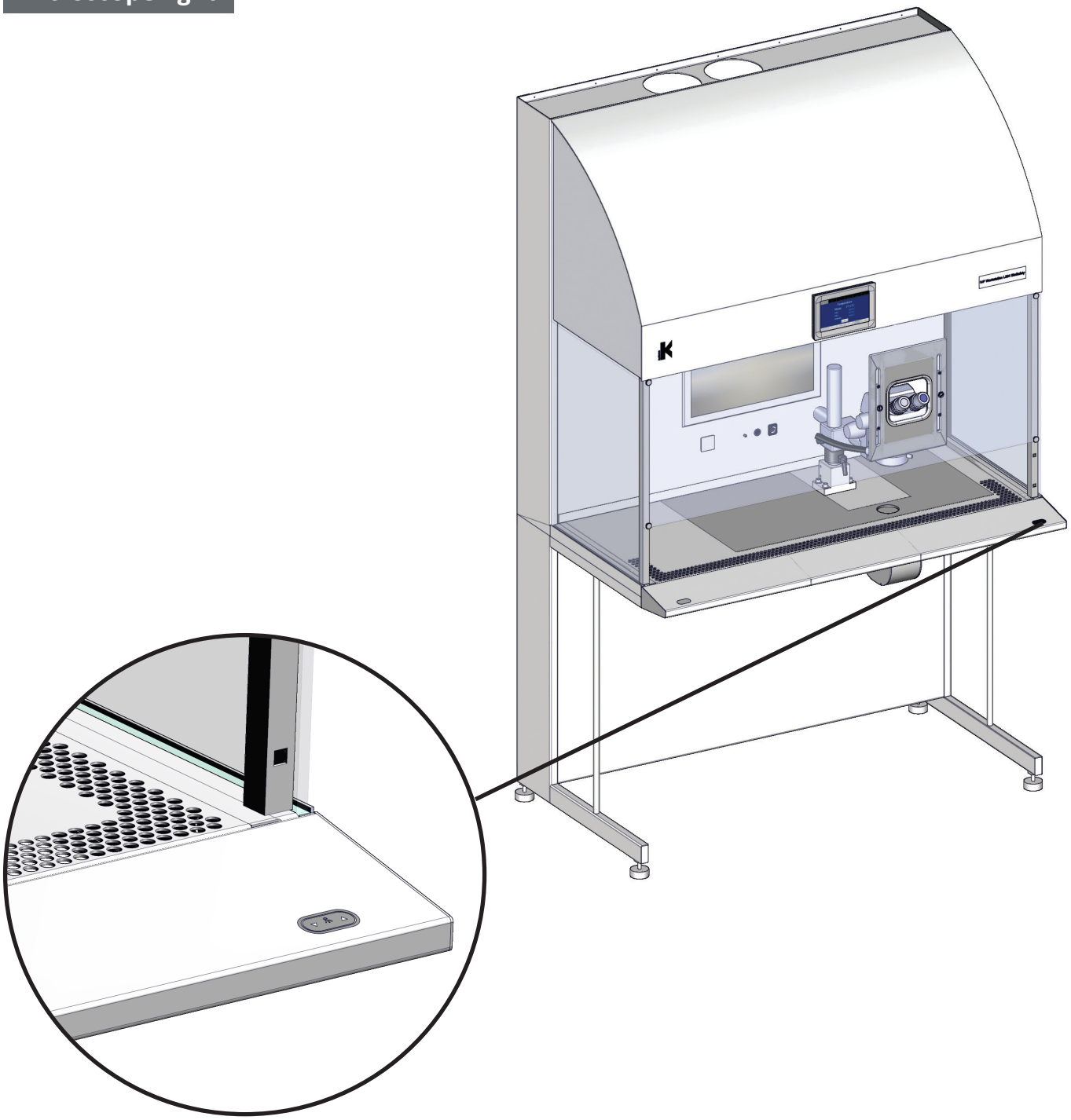
The alarm box shows information about the current alarm. Press **Mute** 1 to turn off the audio alarm's sound.

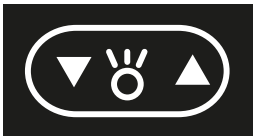
In case of a hardware error a message and an error code will be shown.

The unit is equipped with an external alarm connector, which can be connected to a monitoring device. The connector can be connected to either a voltage source or a current source.

For more information about alarms, see the chapter **Troubleshooting**.
For more information about the external alarm connector, see the chapter **Technical data.**

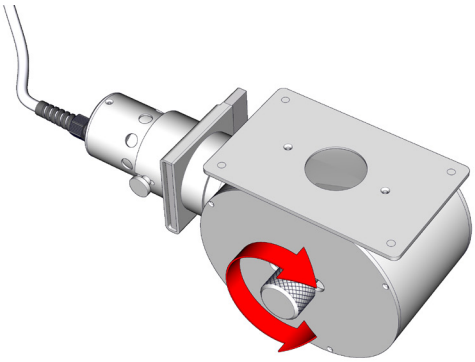
Microscope light

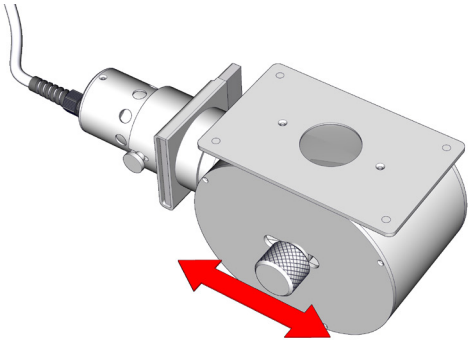


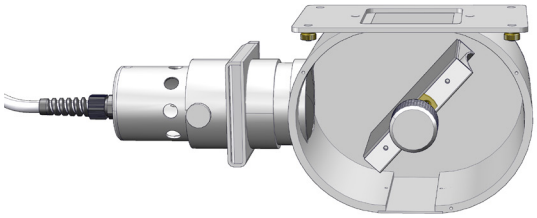
Microscope light		
	Turn on	▼ or ▲
	Increase light	▲
	Decrease light	▼
	Switch off	▼ and ▲

Microscope light

The microscope light units are equipped with an adjustable dual-sided mirror with a plane side and a concave side. The plane mirror is often used for high magnifications, and the concave mirror is used for lower magnifications. Turn the mirror knob 180° to switch between the two mirrors. Position the mirror almost vertical to use **dark field illumination**.

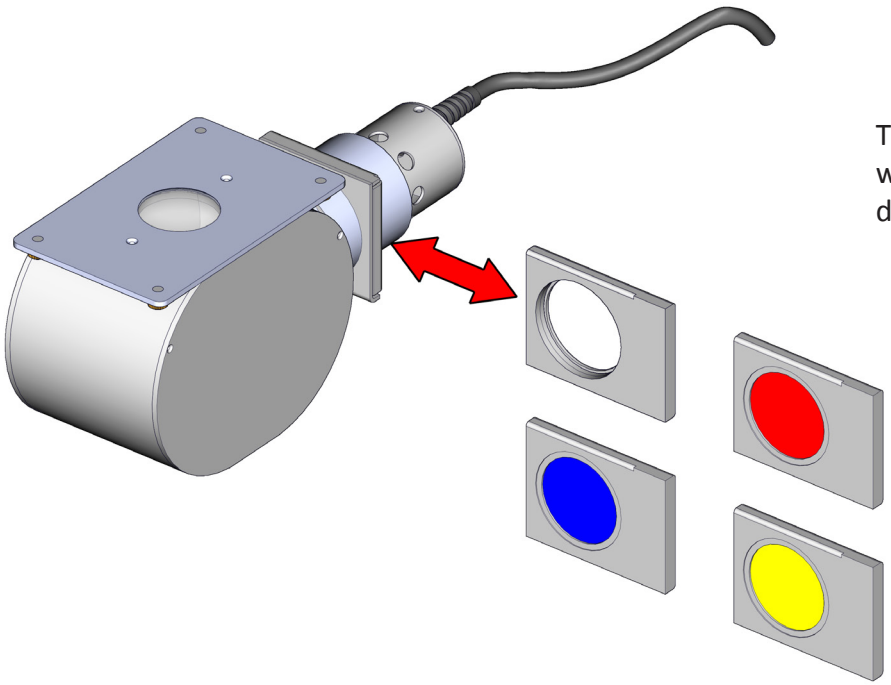






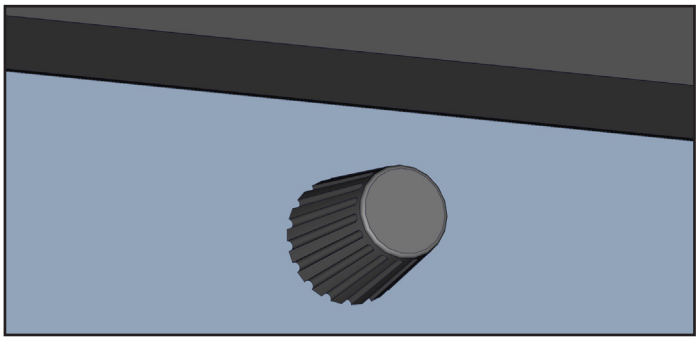
The mirror knob can be turned and moved horisontally to adjust the light.

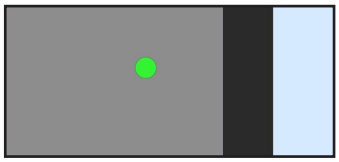
Filters



The filter holder can be equipped with colored filters for creating different light effects.

Monitor



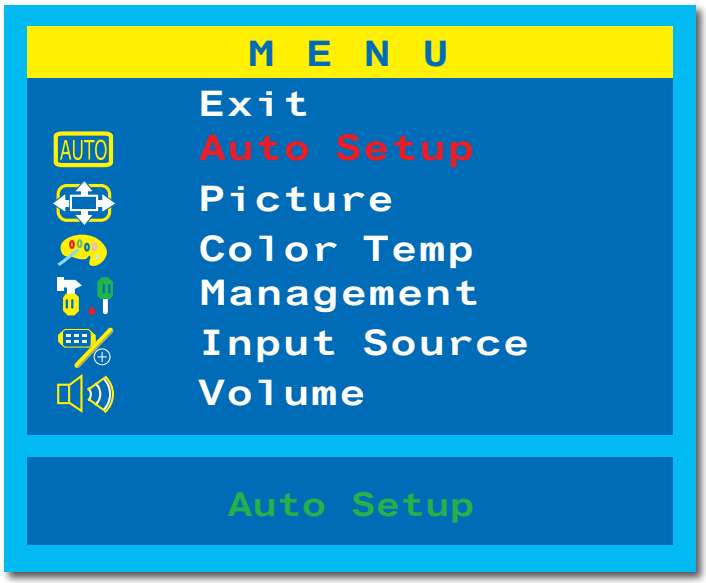


Power on.

Power off.

Turn on: Press the control dial under the monitor.
Turn off: Press and hold the control dial for at least 1 second.

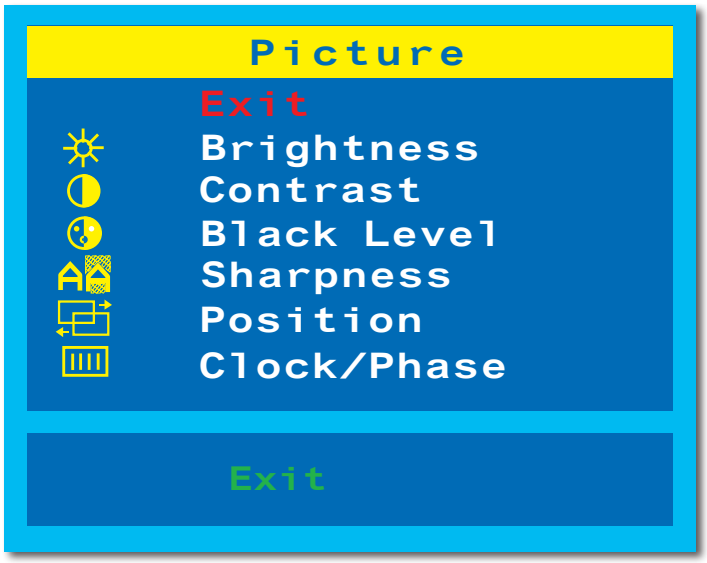
On-screen display (OSD) menu



Press the control dial to open the monitor menu. Rotate it to move to the desired menu item. Press the dial to open the selected menu.
Press the dial again to confirm selections and adjustments.

Select **Auto Setup** to make automatic adjustment of the monitor's settings. This will optimize the settings for general use.

Picture



The picture can be adjusted using the submenus under **Picture**. The selected submenu item can be adjusted from 0 to 100 by rotating the control dial clockwise (+) or counterclockwise (-) .

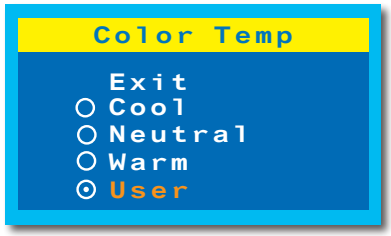
Position

With **Position** you can adjust the pictures position by rotating the control dial.

Clock and phase

Clock adjusts the horizontal sampling rate, to equal the video source value, giving a steadier image.
Phase adjusts the crispness and focus of the image.

Color temperature



Color Temp allows you to choose between different preset color temperatures.

User allows you to adjust the colors individually.

Management

The **Management** menu allows you to control the language and the position of the OSD.

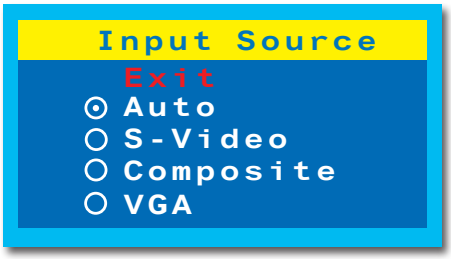
OSD Display

Adjust the position of the OSD on the screen with **OSD Display**.

Language

In the **Language** menu you can select various OSD languages.

Input source



In the **Input Source** menu you can select various inputs.

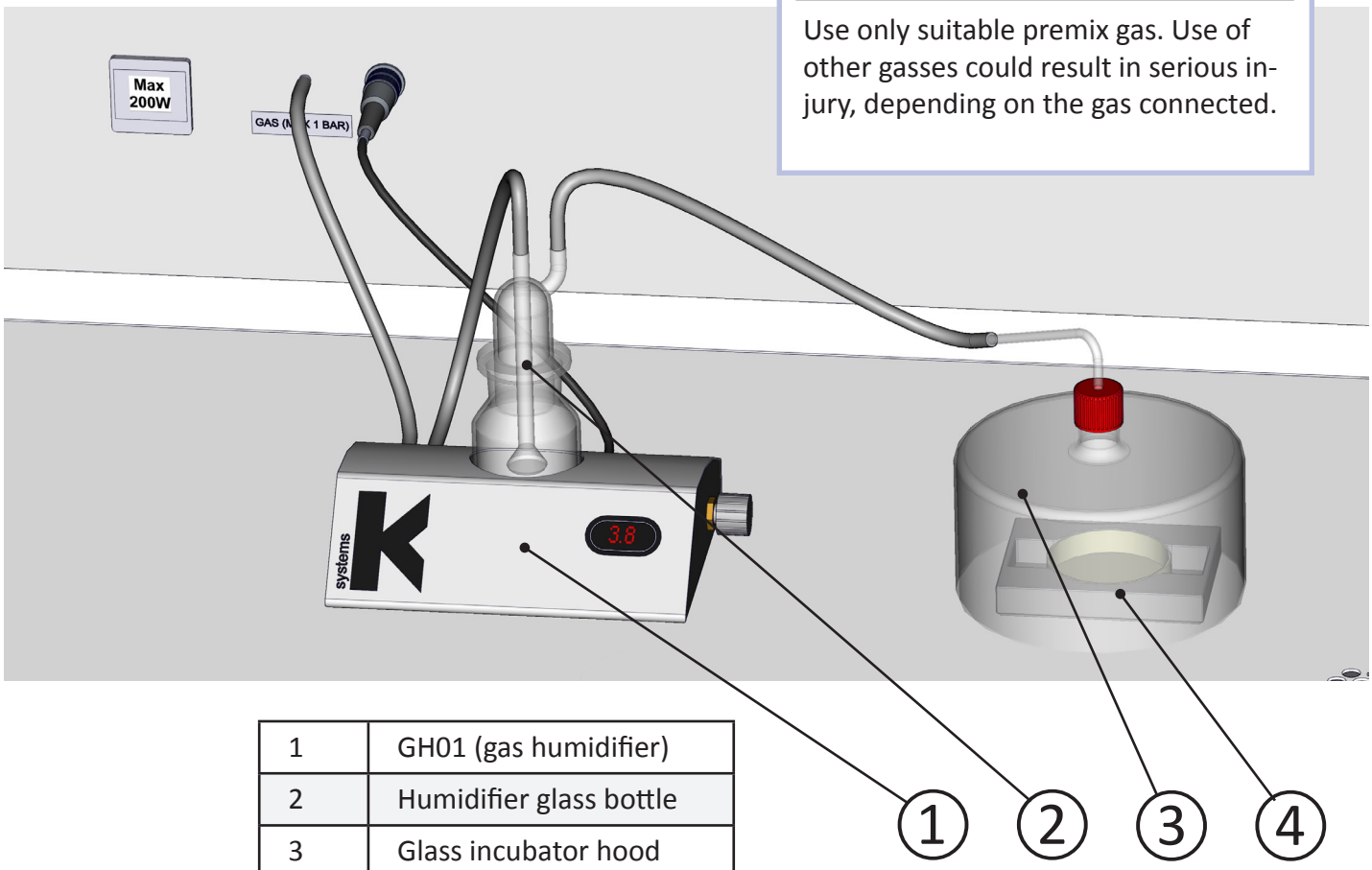
Recall

Select **Recall** to reset all parameters to their factory defaults.

Gas humidifier system GH01

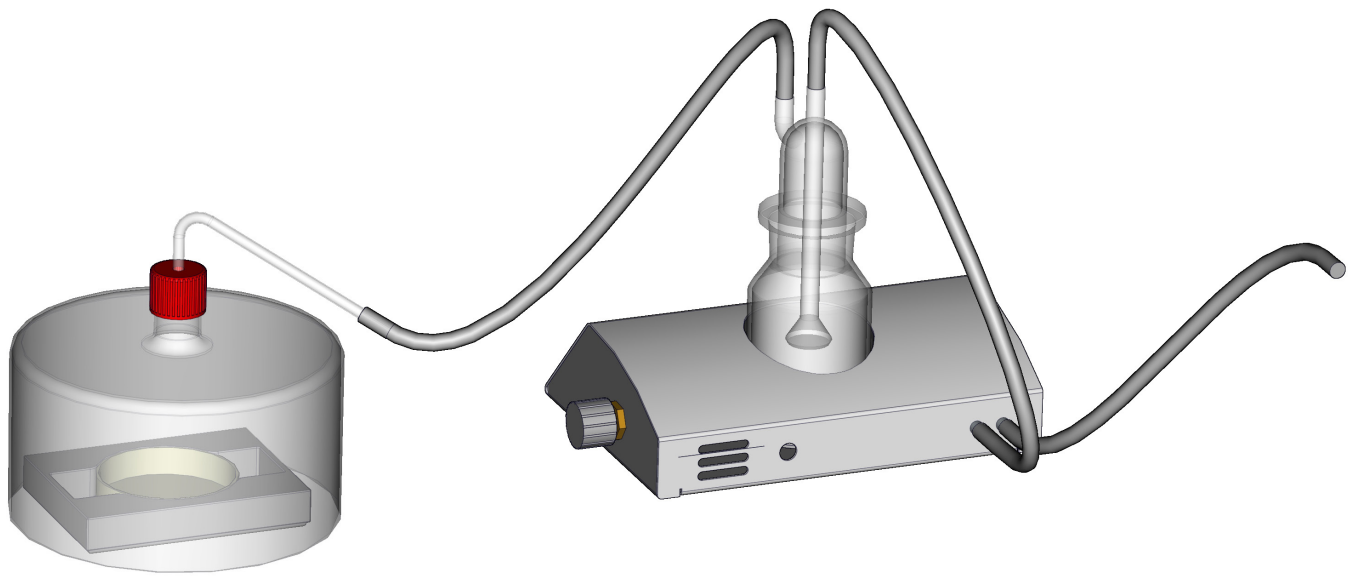
WARNING

Use only suitable premix gas. Use of other gasses could result in serious injury, depending on the gas connected.

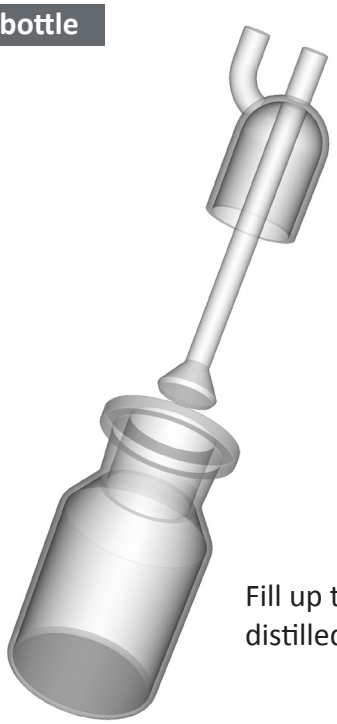


1	GH01 (gas humidifier)
2	Humidifier glass bottle
3	Glass incubator hood
4	Warming block

The GH01 is a standalone unit for warming and humidifying a continuous CO_2 flow.
The unit is used for media flushing or to keep cells and specimens, that are placed under an incubator hood, in a stable PH and osmolarity environment. The GH01 is equipped with a digital flow meter.



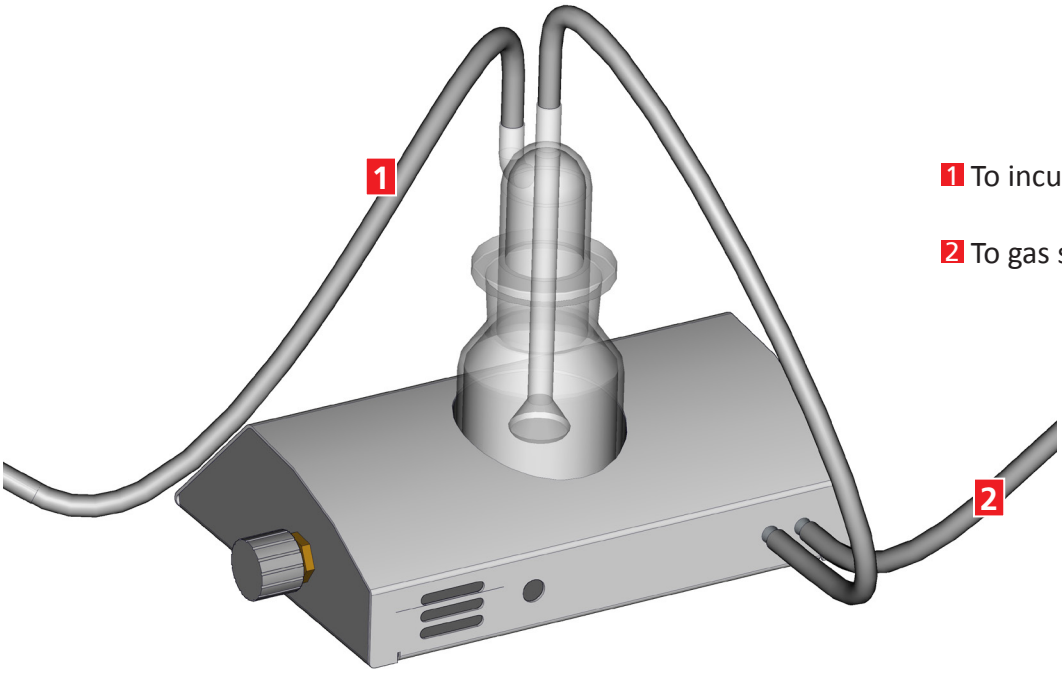
Glass bottle



Fill up the bottle with distilled water.

Place the diffuser in the bottle.

Tube connections



1 To incubator hood

2 To gas supply

3 Workstation gas supply

4 Workstation power connector (14 V AC)

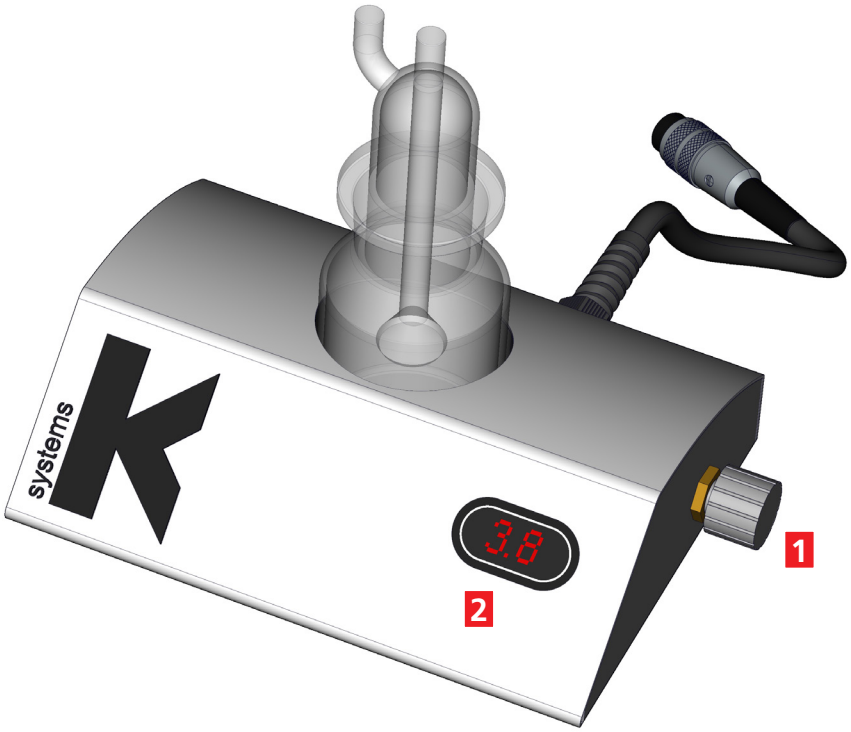
Warming

Warming up from 20 to 40, 0° C takes less than 20 minutes, depending on the bottle's initial temperature. The gas in the incubation hood will be about 37° C due to heat loss in the silicone tubes.

Condensation

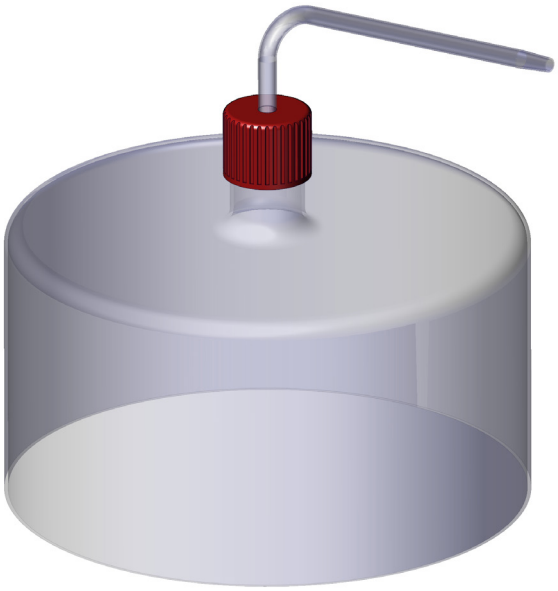
Condensation will occur in the silicone tubes because of the heat difference. Make sure that the tubes are drained at intervals so that water doesn´t drip on the specimens in the hood.
Draining is done by removing the tube and letting the water drip out or by blowing it dry with clean air.

Gas flow adjustment



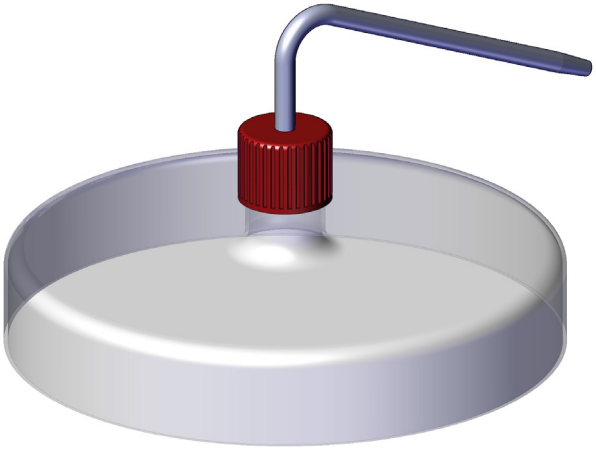
Adjust the gas flow rate by turning the flow control knob 1.
The flow rate is visible in the display 2.
It's adjustable between 0 – 50 litres per hour

Glass incubator hoods



G01
Ø 140 mm, height 75 mm

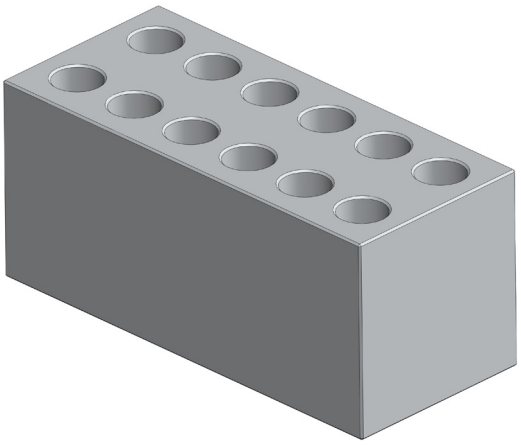
G02
Ø 130 mm, height 130 mm



G03
Ø 140 mm, height 25 mm

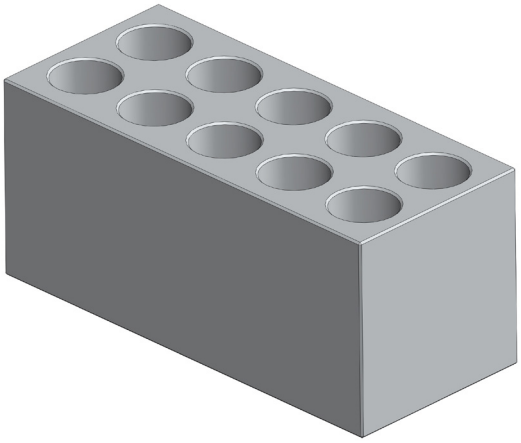
Warming blocks for tubes

B01
Ø 17mm



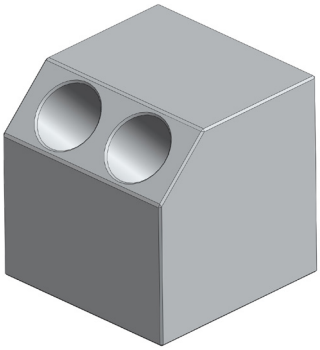
B06
Ø 12mm

B03
Ø 12mm



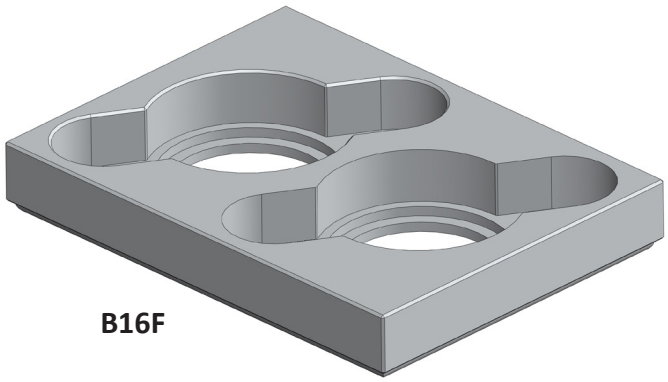
B08
Ø 17mm

B04
Ø 23.5mm

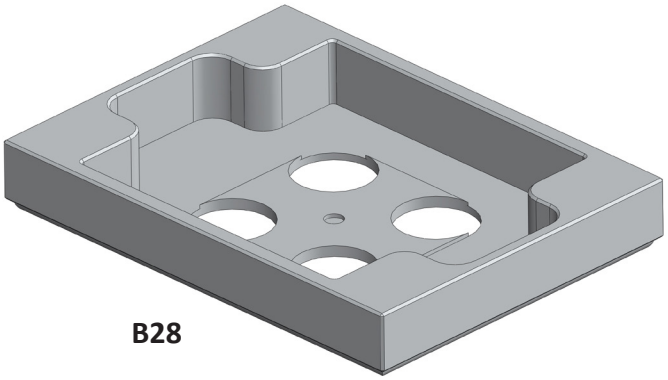


B09
Ø 17mm

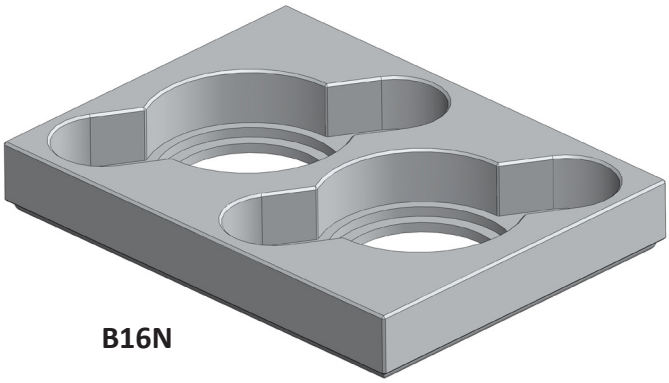
Warming blocks for culture dishes



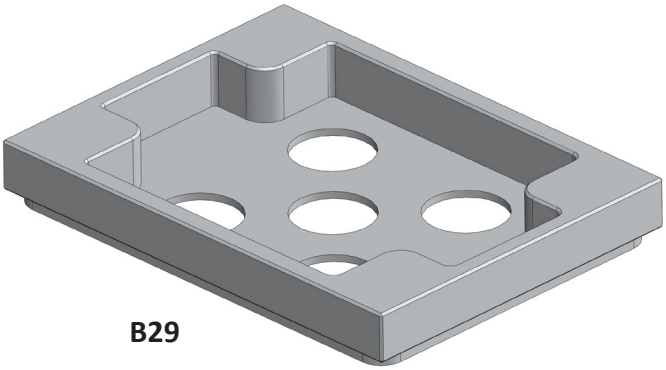
B16F



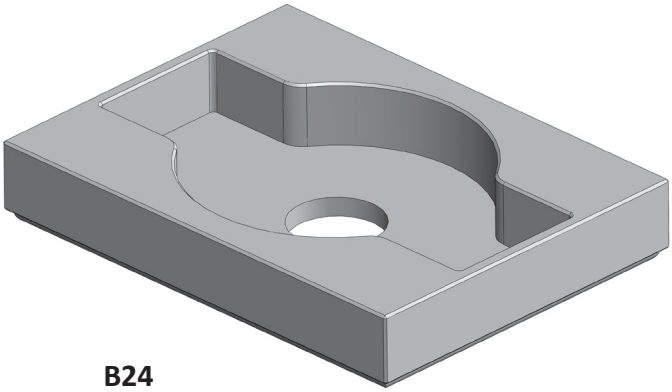
B28



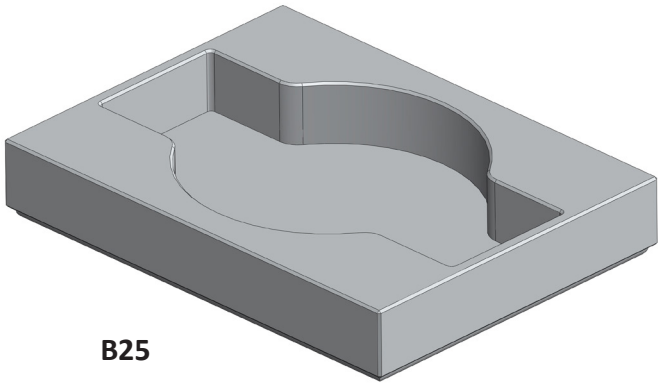
B16N



B29

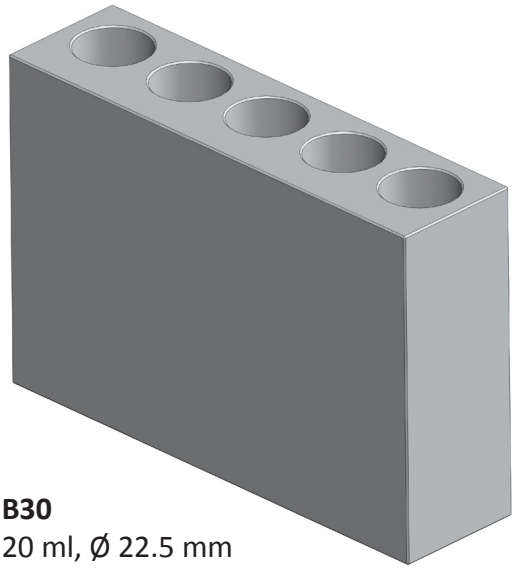


B24

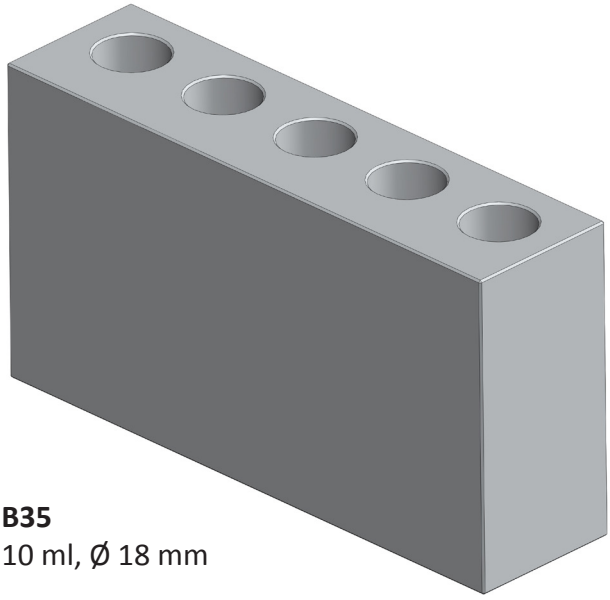


B25

Warming blocks for syringes

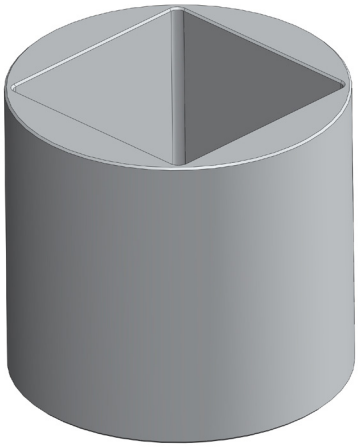


B30
20 ml, Ø 22.5 mm

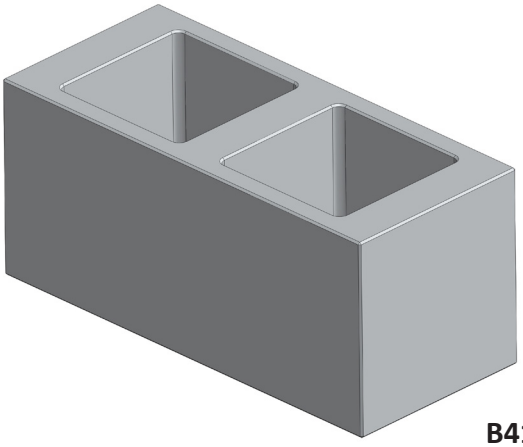


B35
10 ml, Ø 18 mm

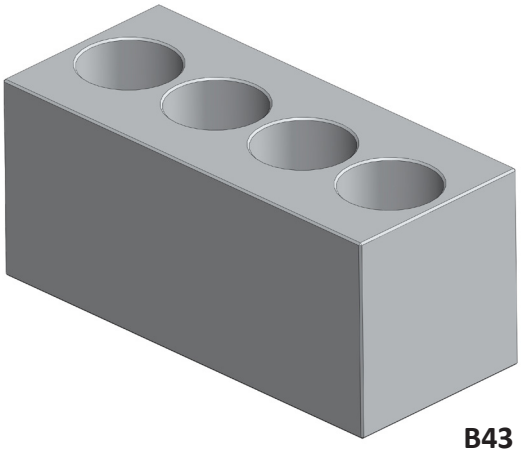
Warming blocks for media flasks



B40
125 ml



B41
2 x 60 ml



B43
4 x 10 ml

Maintenance

Daily maintenance

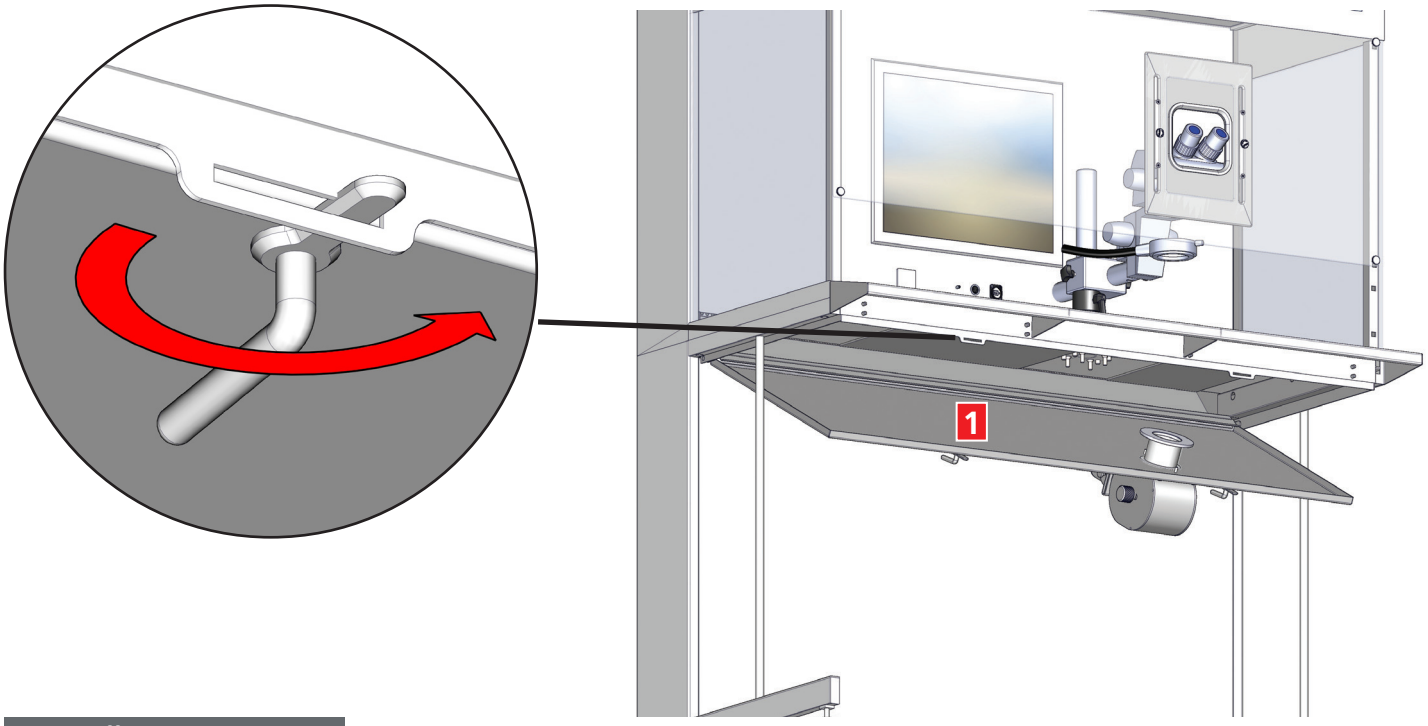
- Unplug the power cord.
- Clean all surfaces using 70% ethanol or similar on a clean cloth or lint free paper towel.
- Do not use water.

DANGER

Ethanol is highly flammable.
Keep away from open flames.
Unplug all electrical equipment.
Use only in a well-ventilated room.

Weekly maintenance

- Wipe the exterior with a mild detergent of house-hold type.
- Antistatic spray can be used for cleaning the front window.
- Clean the tray. Open the lid 1 for access.



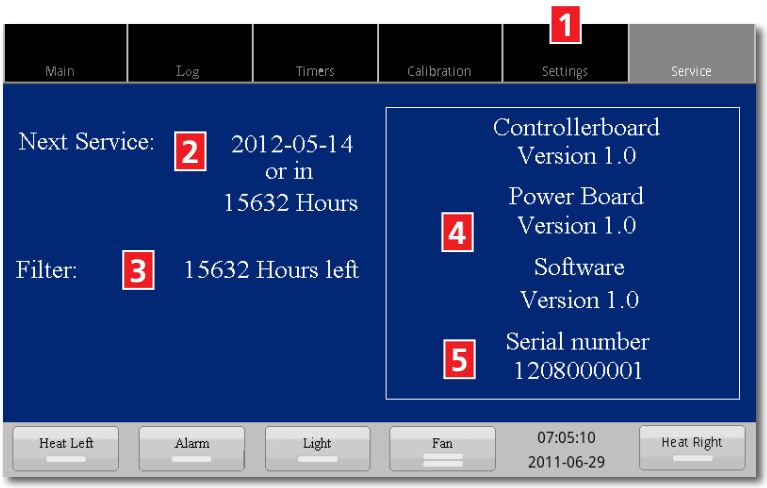
Annually maintenance

The HEPA filter and airflow should be tested after 17,000 hour of operation or once per year. (Whatever comes first). K-Systems recommends that testing should be be carried out by trained personnel. (i.e. a service technician authorized by K-Systems) using specialized testing equipment.

Additional maintenance

The HEPA filters should be replaced for every four year. K-Systems recommend that replacing should be carried out by trained personnel using specialized tools.

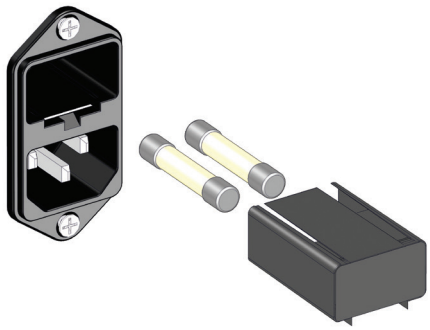
Service information



The **Service** tab 1 provides service information.

2 Hours to next service.
3 Hours to next filter change.
4 Version information.
6 Serial number.

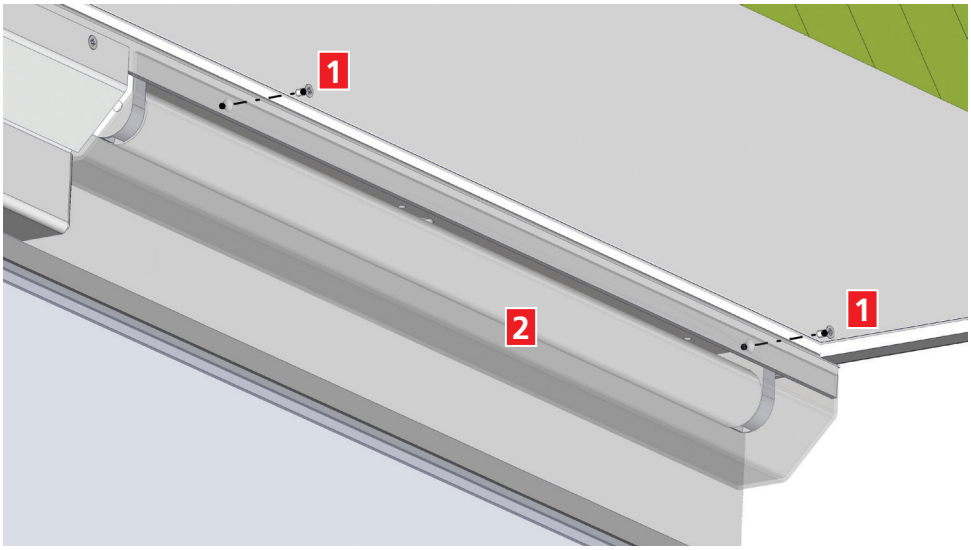
Fuses



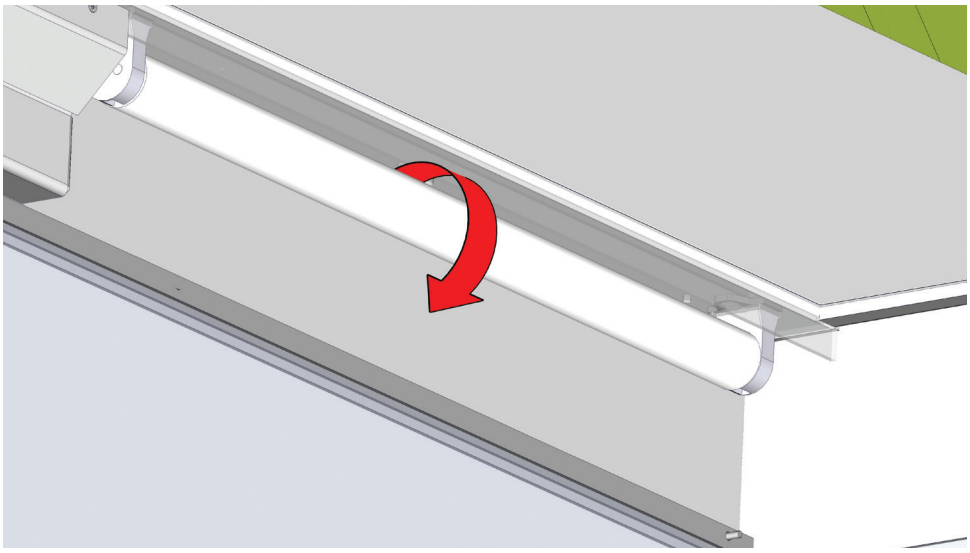
You can gain access to the fuse for the mains by using a screwdriver to pry open the fuse compartment lid.

You can gain access to the fuse at the unit's backside by unscrewing the fuse holder top.

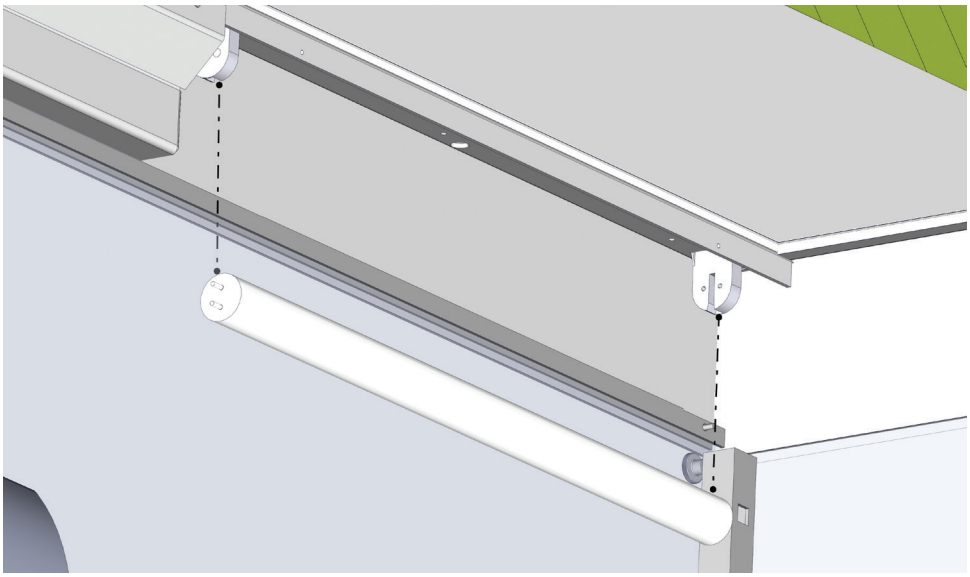
Replacing interior light



1 Remove the screws 1 holding the lamp cover 2.



2 Turn the fluorescent tube 90°.



3 Pull the tube gently down. Replacement is the reverse of removal.

Troubleshooting

Alarms			
Symptom	**Cause**	**Action**	**See chapter**
Alarm	The airflow is to low	Check HEPA filter and replace if necessary Check that both fans are running	Maintenance
	Airflow is blocked	Remove objects and tools from workspace	
	The temperature is more than 0.5 °C off	Calibrate the temperature	Use
	Hardware error	Contact K-SYSTEMS distributor for details.	

Heating system			
Symptom	**Cause**	**Action**	**See chapter**
No heat	The heat is turned off	Turn on the heat	Use
Alarm	The temperature is more than 0.5 °C off	Check fuse for the heating system Check temperature setpoint	Service
Low heat	Set point is to low	Raise the set point	Use
No heat	Blown fuse	Check fuse for heating system	Service

Laminar flow			
Symptom	**Cause**	**Action**	**See chapter**
Alarm	Too low or high airflow	Check HEPA filter and replace if necessary Defective airflow sensor	Maintenance
One or more fans not running	Blown fuse	Replace fuse	Service

Microscope light			
Symptom	**Cause**	**Action**	**See chapter**
No light	Light is turned off	Turn on the light	Microscope light units
	Defective light bulb	Replace bulb	Maintenance
	Blown fuse	Replace fuse	Maintenance
	Defective electrical connections	Contact K-SYSTEMS	

Monitor			
Symptom	**Cause**	**Action**	**See chapter**
No image	Monitor is turned off	Turn on the monitor	Monitor
	Brightness is too low	Adjust the brightness	
	Blown fuse	Replace fuse	
	Defective electrical connections	Check video connector	
	Wrong input selected	Select signal input	

Touch screen			
Symptom	**Cause**	**Action**	**See chapter**
No image	Blown fuse	Replace fuse	Service
No touch screen response	SW stopped	Restart unit	
Hardware error			Contact K-Systems

Gas humidifier system GH01			
Symptom	**Cause**	**Action**	**See chapter**
No heating	No mains supply	Check the lead is connected to the outlet in the inner wall of the workstation	Gas humidifier system GH01
Display remains off but heated area is functional.	Defective display PCB	Contact distributor or K-Systems	
There are normal gas flow and bubbles in the bottle but display shows 00.	Defective airflow sensor.	Contact distributor or K-Systems	

Technical data

Workstation unit specifications	
	L234
Overall dimensions, (W x D x H)	1246x735x2020 mm - (49x29x80”)
Weight	250 kg
Table plate	1225x490mm - (48 x 19”)
Height from floor to table top	835mm - 860mm
Height from table plate to filter	700mm
Warmed surface	Optional. Left and right side
AluHeat Technology	Electrical controlled heating system with edge enhancement
Temperature range	Ambient to 42.9 °C / 109.22 °F
User interface	Touch screen
User interface functions	Digital temperature readout, datalogger, temperature setpoint, calibration, warning for next service
Connections	Main switch, mains, gas, Ethernet, alarm
Laminar flow	Vertical
Heating rate	1 °C ± 0.5 °C / minute
Alarms	Visual alarm for out of range temperature and air velocity.
Exhaust Filter (HEPA)	H14, 75PA, 99.995% T.EN 1822, 610 x 305 x 117 mm
Main HEPA Filter	Classification H-14 with resistance of 130 Pa and an efficiency of MPPS of 99.995%. Grid on the inlet. Distribution cloth on the outlet. Dimensions: 1214x464x69 mm.
Sound Level	57 ± 2 dB(A)
IP class	IP30
Interior light	T8 15W cool white
Air flow	In conformity with EN 12469 (0.25 to 0.5 m/sec)
Rated pollution degree	2

Power specifications 220 – 240 VAC	
	L234
Max consumption	850 VA
Voltage	1/N/PE AC, 220 - 240VAC Class 1 type B
Frequency	50/60 Hz
Current	3.7 A
MAINS supply voltage fluctuations	Up to +/-10 % of the nominal voltage
Overvoltage category	Transient overvoltage II

Power specifications 110 – 120 VAC	
	L234
Max consumption	850 VA
Voltage	1/N/PE AC, 110 - 120VAC Class 1 type B
Frequency	50/60 Hz
Current	7.4 A

Fuses 230V	
Mains connection	T5.0AH/250V
Aux, light	T5.0AH/250V
Controller	T10.0AH/250V
Left table	T10.0AH/250V
Fans	T4.0AH/250V
Aux, Monitor	T1.0AH/250V
Right table	T10.0AH/250V
Outlets	T1.0AH/250V

Fuses 115V	
Mains connection	T10.0AH/250V
Aux, light	T5.0AH/250V
Controller	T10.0AH/250V
Left table	T10.0AH/250V
Fans	T4.0AH/250V
Aux, Monitor	T1.0AH/250V
Right table	T10.0AH/250V
Outlets	T2.0AH/250V

Monitor	
Panel size and type	19" TFT ActiveMatrix LCD, antiglare, hard (2H) coated
Resolution	SXGA 1280 x 1024 (optimum), UXGA 1600 x 1200 (maximum)
Contrast ratio	500:1 (Typical)
Brightness	250 cd/m^2 (Typical)
Display colors	16.7 million True Color
Consumption	On: < 40W, Standby: < 5W
Voltage	Input: 100~240VAC, Output: 12VDC
Frequency	50/60 Hz
Current	Input: 1.5 A, Output: 5A

Materials	
Front and side windows	Polycarbonate/Glass
Workstation body	Mild Steel Plate EN 10130, DC01 (FePO1) Aluminum AW-1050
Corrosion protection	60 µm polyester coating pretreated to corrosion class 1
Stand	Mild Steel Tube EN 10219-1 Stainless Steel Tube ST1203, ISO 127/DIN 2462
AluHeat Technology	Aluminum heat zone with copper element
Tabletop	Stainless steel - AISI 304

Ambient conditions	
Working temperature and humidity	20 – 30 °C. Less than 75% RH (non-condensing)
Storage temperature and humidity	5 – 55 °C. Less than 95% RH (non-condensing)
Transport temperature and humidity	5 – 55 °C. Less than 95% RH (non-condensing)

Gas humidifier system GH01	
Power consumption	30 W
Heating	20 W
Temperature preset	40° C
Temperature accuracy	± 0,8° C
Flow meter	Digital LED display
Warmed surface	Ø 54 mm
Material	Stainless steel
Weight (without bottle)	920 g
Overall dimensions	174 x 123 x 54 mm

Spare parts	
Windows	52199, 1 x Front window with cut out for microscope (for 4-foot model / 120 cm)
Light sources	59063, 2 x Fluorescent light tube T8 (for 4-foot models)
Cables	52758 Main cable - Schuko type 52773 Main cable - US type 53886 Main cable - UK type 52775 Special main cable, different than Type B (US), Type C (Schuko compatible), Type G (UK)

Disposal

The unit contains reusable materials. All components (with the exception of the HEPA filter) can be discarded after having been cleaned and disinfected.
Please note that the HEPA filters must be discarded in accordance with the applicable national regulations for special solid waste.

Recyclable components

Component	Material
Table plate	Stainless steel
Exterior housing	Steel – painted
Interior housing	Aluminium – painted
Device back panel	Aluminium – painted
Printed circuit board	Enclosed electronic components mounted on a PCB board
Front window(s)	Polycarbonate windows, w. UV protection.
Light source	Aluminum , anodized

⚠ CAUTION

Contamination Hazard

Since this device might have been used for processing and treating infectious substances, it might be contaminated. Prior to disposal, the whole device (including light source) must be disinfected.

Warranty and product liability

Product liability
Because Kivex Biotec Ltd, K-SYSTEMS (here after called "The manufacturer") has no control or influence over the conditions under which this device is used, over its method of use or administration, or over handling of the product after it leaves its possession, the manufacturer takes no responsibility for the results, use and/or performance of the product. The manufacturer expects that use of the product will be confined to trained and expert users.

In no event shall the manufacturer be liable for any direct or indirect damages including incidental, consequential or special damages, arising out of or in connection with the use or performance of the product.

If the manufacturer provides you with technical documentation, this does not authorize you to perform repairs, adjustments or alterations on the device or accessories.

No representative of the manufacturer and no vendor of the product is authorized to change any of the foregoing terms and conditions, and the purchaser accepts the product subject to all terms and conditions herein, subject always to any contrary provisions which are necessarily implied by stature or law notwithstanding the within terms and conditions.

Limited Warranty & Replacement
The manufacturer warrants to the purchasers of all devices and products manufactured by the manufacturer, that the product was prepared and tested in accordance with good manufacturing practices and guidelines and are in compliance to the CE norms issued by the competent authority.

The decision whether to provide any remedy or whether to refund any portion of the purchase price shall be at the discretion of the manufacturer. Before returning a product for any reason, please contact your nearest distributor for assistance and instructions.

This limited warranty does not apply to products subjected to abnormal use or conditions, improper storage, damaged by accident, misuse or abuse, improper line voltage, products whose serial number has been altered, to products not shipped in accordance with the recommendations of the manufacturer, and/or to products altered or serviced by anyone other than the manufacturers authorized distributors. Distributors are responsible for the labor and travel costs during this period.

This limited warranty is exclusive and in lieu of all other warranties whether written, oral, expressed or implied. In particular, the manufacturer does not warrant that the product is suitable for the needs of the purchaser and there are no warranties given as to merchantability or fitness for a particular purpose other than
the one specified in the manufacturer's documentation that accompanies every specific product. The manufacturer assumes that the Purchaser is experienced in the use of this device and is able to judge from his/her own expertise the suitability or unsuitability of the product for the intended use.

The manufacturer reserves the right to change or discontinue this product without prior notice.