

User Manual

Calibration Bath
OBM

SAMPLE



Kambič

WARRANTY

Kambic d.o.o. guarantees that the product delivered has been thoroughly tested to ensure that it meets its published specifications. The warranty is valid only if the product has been installed and used in accordance to the instructions supplied by Kambic d.o.o.

Kambic d.o.o. shall in no event be liable for incidental or consequential damages, including without limitations, lost profits, loss of income, loss of business opportunities, loss of use, and other related exposures, caused by incorrect use of product.

Warranty is valid for **13 months** from date of shipping and includes spare parts and labor.

Type:	OBM
Serial number:	
Date of shipping:	
Signature/stamp:	

Manufacturer:

Kambic d.o.o.

Metliska cesta 16
8333 Semic
Slovenia

Tel: +386 7 35 65 220

Fax: +386 7 35 65 232

Email: info@kambicmetrology.com

Web: www.kambicmetrology.com

Thank you for your trust and for buying this device. We hope it will successfully serve the purpose for many years.

**CAREFULLY READ THESE INSTRUCTIONS
BEFORE USING THE DEVICE!**



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1. WARNINGS AND SAFETY PRECAUTIONS

Always keep this manual in close reach for reference. This product should only be used and operated by skilled and trained personnel familiar with technical capabilities and potential safety hazards.

Always follow and obey the national regulations related to technology and labor laws.

To avoid injuries and equipment damage study and follow the safety instructions and warnings.

Legal:

The content of the manual is subject to change without notice.

Understanding and following this operating manual is first step to hazard-free and safe use of the equipment.

This user manual can not reach out to all application that might even develop in the future. If you find information unclear or you are not sure about safe use of the product in your specific case, do not hesitate to contact your dealer or us via info@kambic.com for further information or opinions.

In no event shall Kambic d.o.o. be held liable for any damages, direct or incidental related to the use of this product and manual.

Product can be equipped with variety of accessories and options. This warning list might include elements that are applicable only with certain models and accessories.



READ ALL INSTRUCTIONS BEFORE USE!

Reduce the possibility of injury and failure.



WARNING

Before you perform any kind of maintenance, disconnect all electrical power to the unit! DO NOT operate this unite without a properly grounded, properly polarized power cord. DO NOT connect this unite to a non-grounded, non-polarized outlet.



DANGER

Appliance must not be installed in a room where the possibility of explosive atmosphere is present!



DANGER OF BREAKDOWN

Service only allowed to authorized personnel!

**WARNING**

Never use with toxic, corrosive, flammable or organic materials unless special precautions are in place to prevent injury to personnel or damage to equipment.

**WARNING**

Never operate the appliance with the housing removed!

**RISK OF FAILURE**

Due to exceptional volumes of fluid expansion at elevated temperatures, regularly check the fluid level in the bath!

**DANGER**

Temperature fluid expansion may cause overspill!
Adjust fluid level!

**RISK OF FAILURE**

Do not use rubber cap at elevated temperatures

**DANGER OF BURNS**

Use safety gloves when operating with high/low temperatures!

**ELECTRIC HAZARD**

Do not operate the equipment in wet and condensing environment!

**STABILITY HAZARD**

Do not load or affect product stability with heavy loads or climbing the product!

**RISK OF FAILURE**

Ensure correct flow. Insufficient flow will result poor stability and uniformity.
Check stir magnet-bar position and rotation to ensure stirring / flow.



2. INTRODUCTIONS

Calibration bath OBM was developed and manufactured specifically for the calibration of temperature instruments, probes and liquid thermometers at temperatures from 35°C to 220°C. Fluid calibration baths ensure high temperature stability and uniformity across working volume.

To ensure such specifications all calibration baths of our brand are designed with a special double cylinder construction with uniform vertical flow in the working volume.

Of course, the construction is not enough that is why we are using high capacity microprocessor controllers and different levels of heating.

Control panel with display is used to set the individual temperatures. All controllers are also equipped with communication modules, so the appliance can be operated and controlled via a PC.

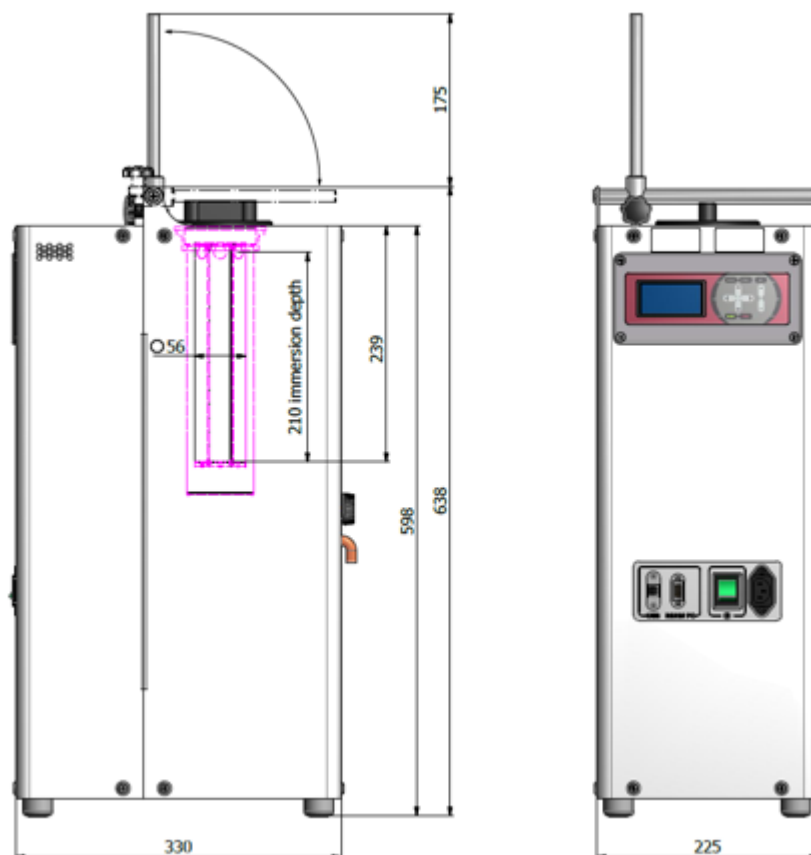
Bath top, bath bottom and working chamber is completely made of stainless steel AISI 304, which guarantees easy maintenance and long life time. Exterior housing is made of aluminum sheets coated with high quality varnish.

**WARNING**

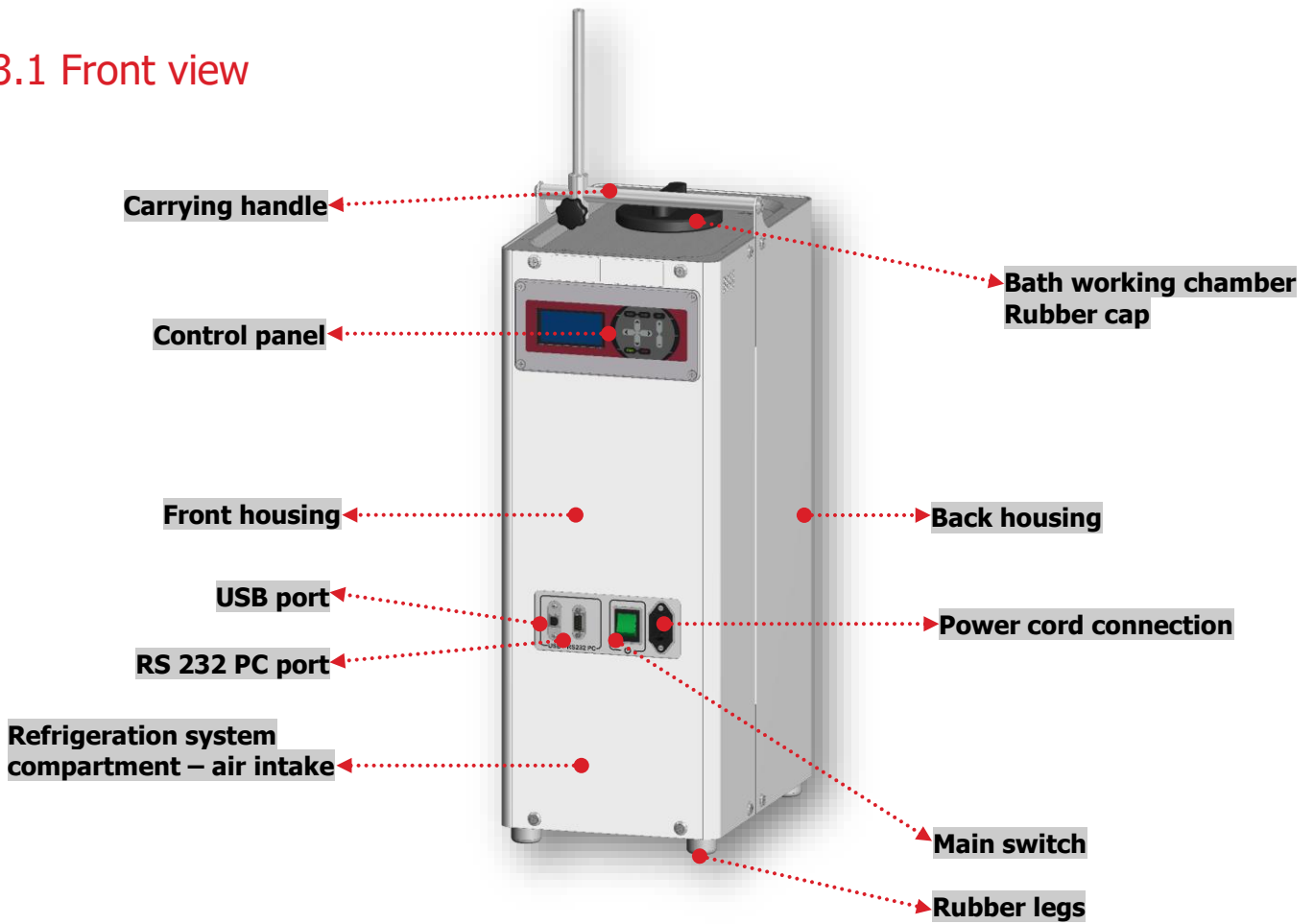
Temperature range must be limited / adjusted to reflect the properties of the selected fluid!

3. TECHNICAL DATA

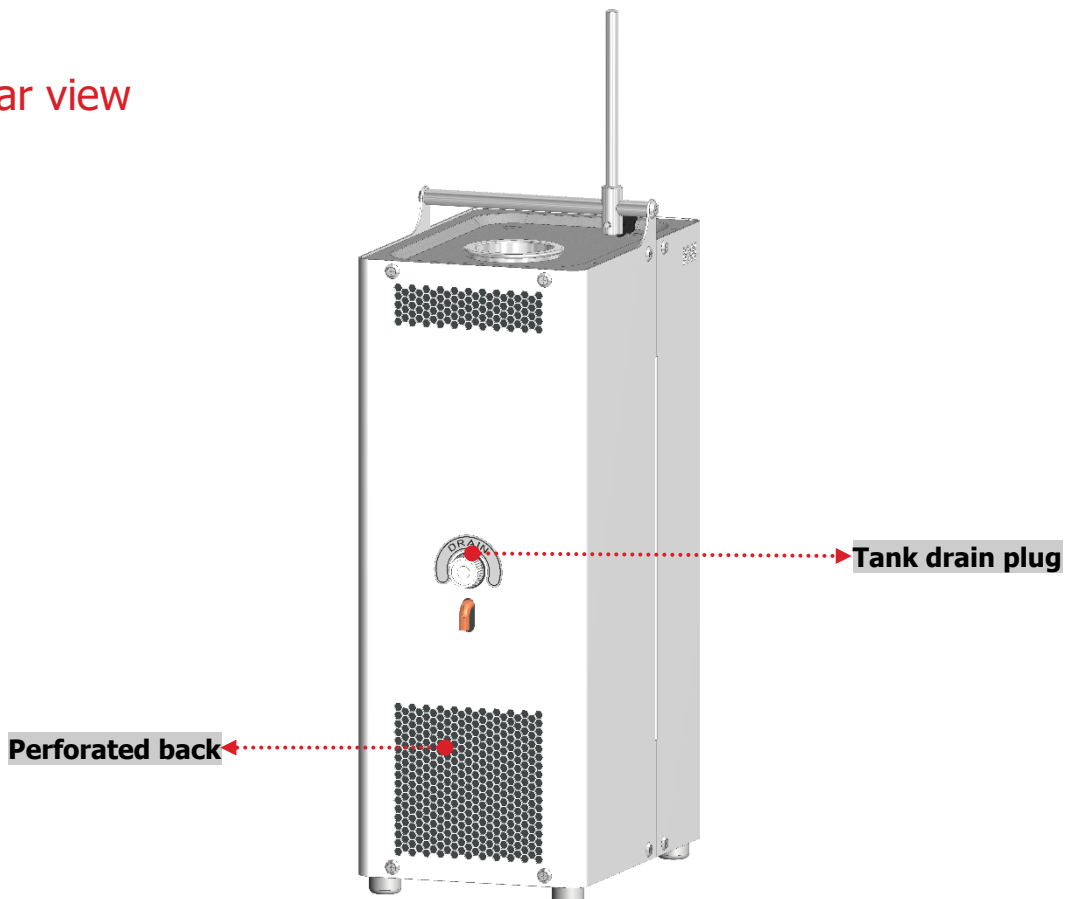
	OBM
Width	225 mm
Height	638mm
Depth	330 mm
Working chamber dimensions	$\phi 50 \times 210$ mm
Volume	~ 1 L
Temperature range	+ 35 °C ...+ 220 °C
Temperature Stability	from ± 0.005 °C to ± 0.05 °C
Temperature homogeneity	Better than ± 0.05 °C
Display resolution	0.001 °C
Set-up resolution	0,01 °C
Control	MPC – PID
Power supply ($\pm 10\%$)	230 V / 50 Hz
Wattage	300 W
Communication port RS 232	Built-in
Temperature probe	PT 100
Construction materials	SS vessel, exterior housing & cover
Width	225 mm



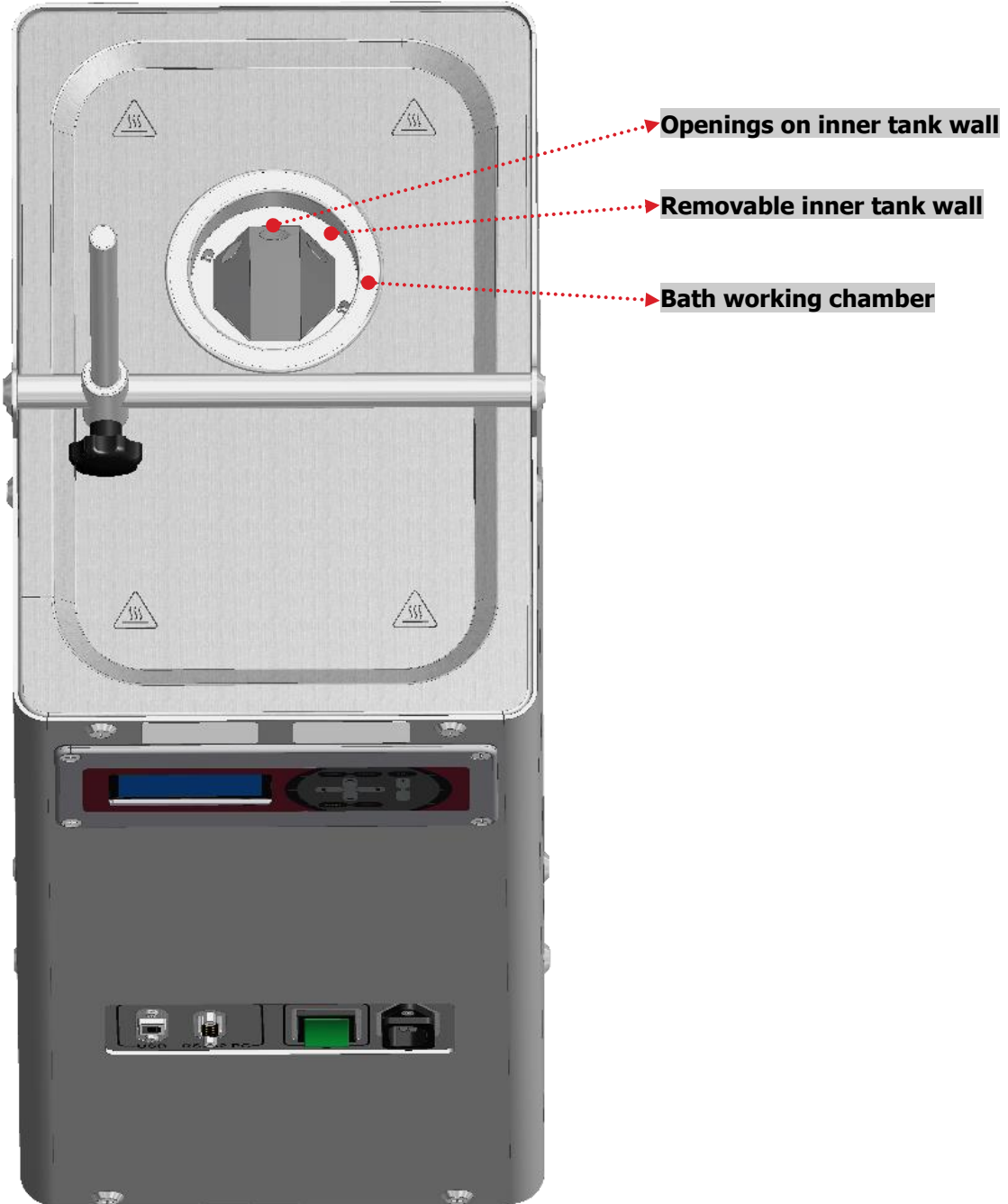
3.1 Front view



3.2 Rear view



3.2 Rear view

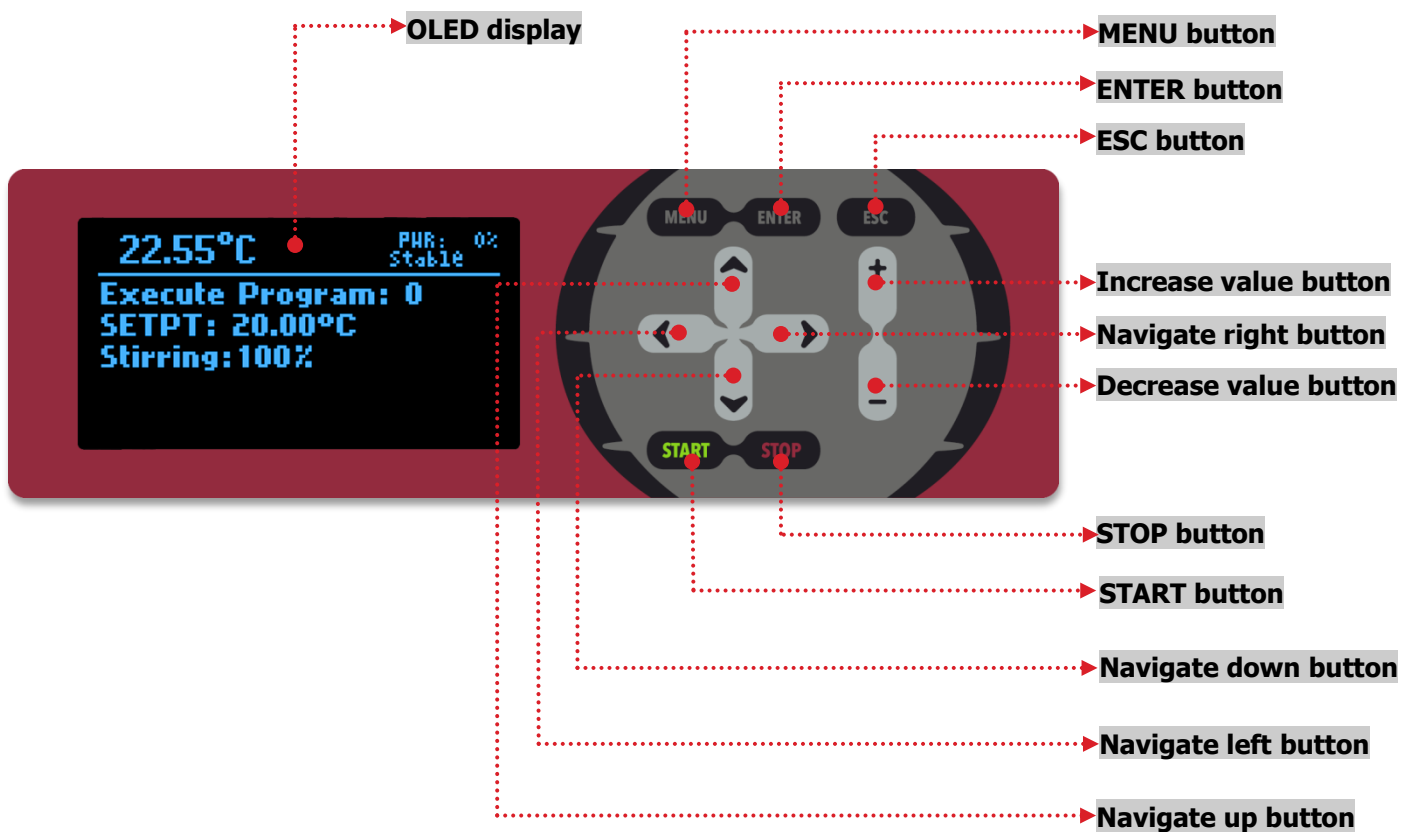


4. INSTRUCTIONS FOR USE

4.1 Basic setup

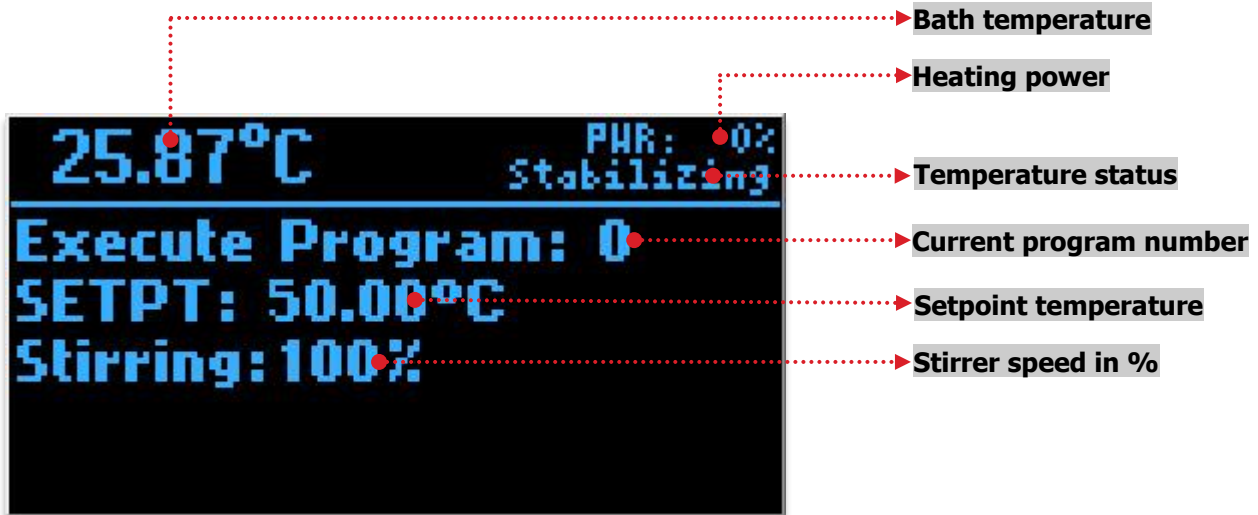
- Step 1:** Remove rubber cap and fill the bath with appropriate fluid (up to 80%)
- Step 2:** Connect the power cord into the power supply 230V±10%; 50Hz
- Step 3:** Put the main switch in position 1 (on the back of the device)
- Step 4:** Press **START** button and in **Program Start Menu** select the desired program. After selection press **ENTER** button to start cycle
- Step 5:** Check the fluid level and add if necessary
- Step 6:** Press **STOP** button to stop the cycle

4.2 Control panel with OLED display and keyboard



4.2.1 Main screen (running)

Main screen while cycle is running:



4.2.2 Main screen (not running)

After **STOP** button is pressed you see this screen:

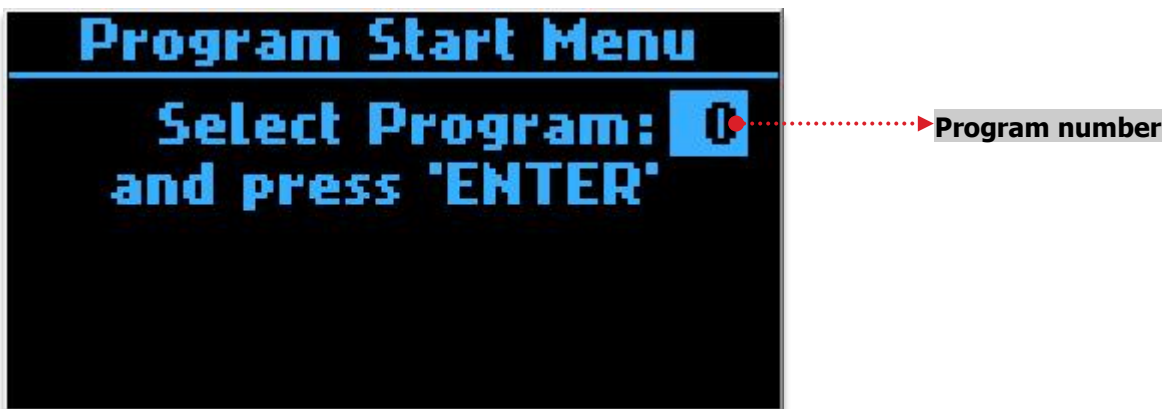


4.2.3 Program selection and start

The bath must be in Main screen (not running):



Press **START** button to enter Program Start Menu:

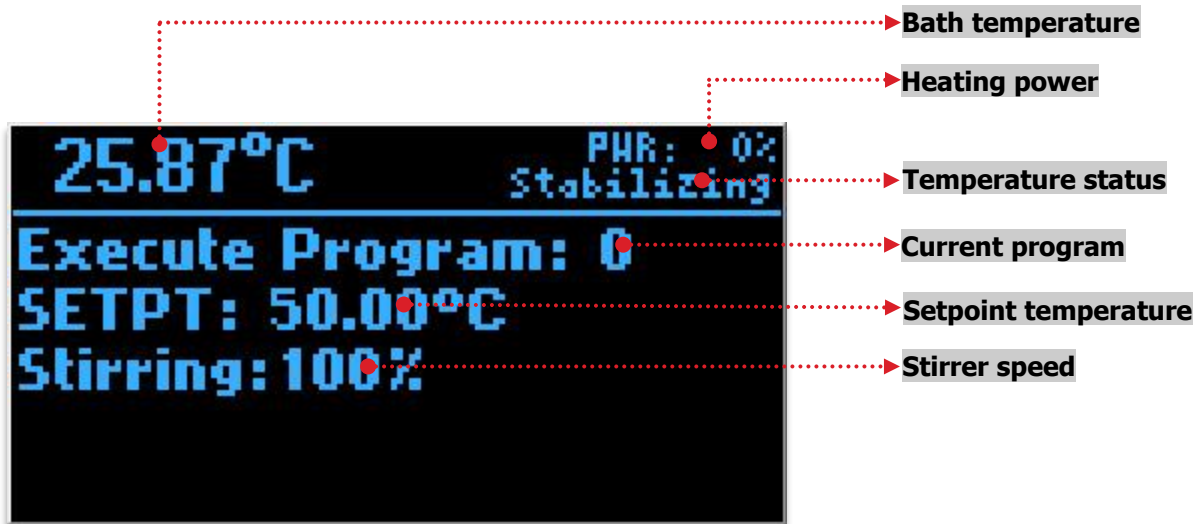


With **+** and **-** buttons select desired program. Select from 0 to 10. Program 0 is reserved for manual program and 1 to 10 is automatic program.

After selection press **ENTER** or **START** button to start the cycle.

To skip start press **ESC** or **STOP** button to go back to Main screen.

When cycle has started you see this screen for manual program :



Bath temperature: current measured bath temperature is 19.85°C

Heating power: current heater duty cycle 14% (from 0% to 100%)

Temperature status: **Stabilizing** = temperature is stabilizing and it is not yet in setpoint tolerances
Stable = temperature is stable and it is in setpoint tolerances

Current program: the current running program number is 0 (0 - manual program, 1÷10 for automatic program)

Setpoint temperature: current setpoint temperature 50.00°C (setpoint range from 35.00°C to 220.00°C)

Stirrer speed: the set speed for stirrer is 100% (set range from 30% to 100%)

**WARNING**

When operating at higher temperatures set the stirring speed at 80%!

When cycle has started you see this screen for automatic program :



Bath temperature: current measured bath temperature is 26.31°C

Heating power: current heater duty cycle 0% (from 0% to 100%)

Temperature status: **Stabilizing** = temperature is stabilizing and it is not yet in setpoint tolerances
Stable = temperature is stable and it is in setpoint tolerances

Current program: the current running program number is 2 (0 - manual program, 1÷10 for automatic program)

Setpoint temperature: current setpoint temperature 50.00°C (setpoint range from 35.00°C to 220.00°C)

Stirrer speed: the set speed for stirrer is 100% (set range from 30% to 100%)

Step dwell time: remaining time of temperature stability for current step is 0:30:00 = 30 minutes (in hh:mm:ss format). Set range from 00:01 to 24:00 (in hh:mm format). For endless dwell time set program to 00:00.

Step information: 1/ 1 (current temperature step / all temperature steps in program). Maximum number of temperature steps is 10.

When cycle has finished you see confirmation screen:





4.2.4 Menu and navigation

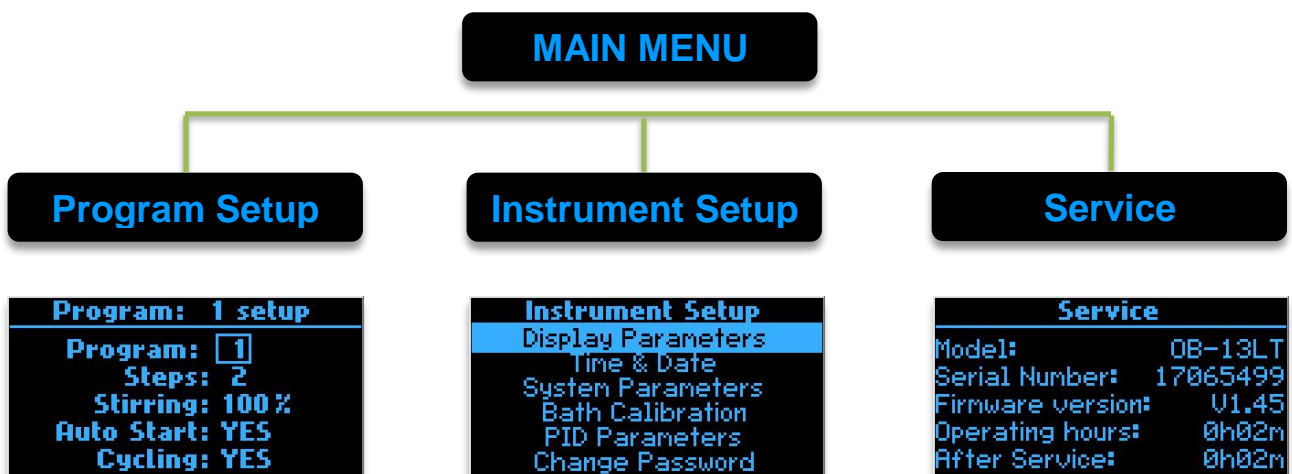
Press **MENU** button to enter **MAIN MENU**:






The Main Menu includes three submenus: **Program Setup**, **Instrument Setup** and **Service**:



Use navigation buttons  and  to select and then press **ENTER** button to enter selected submenu.



Press **ESC** button to go back one level.





4.3 Program Setup

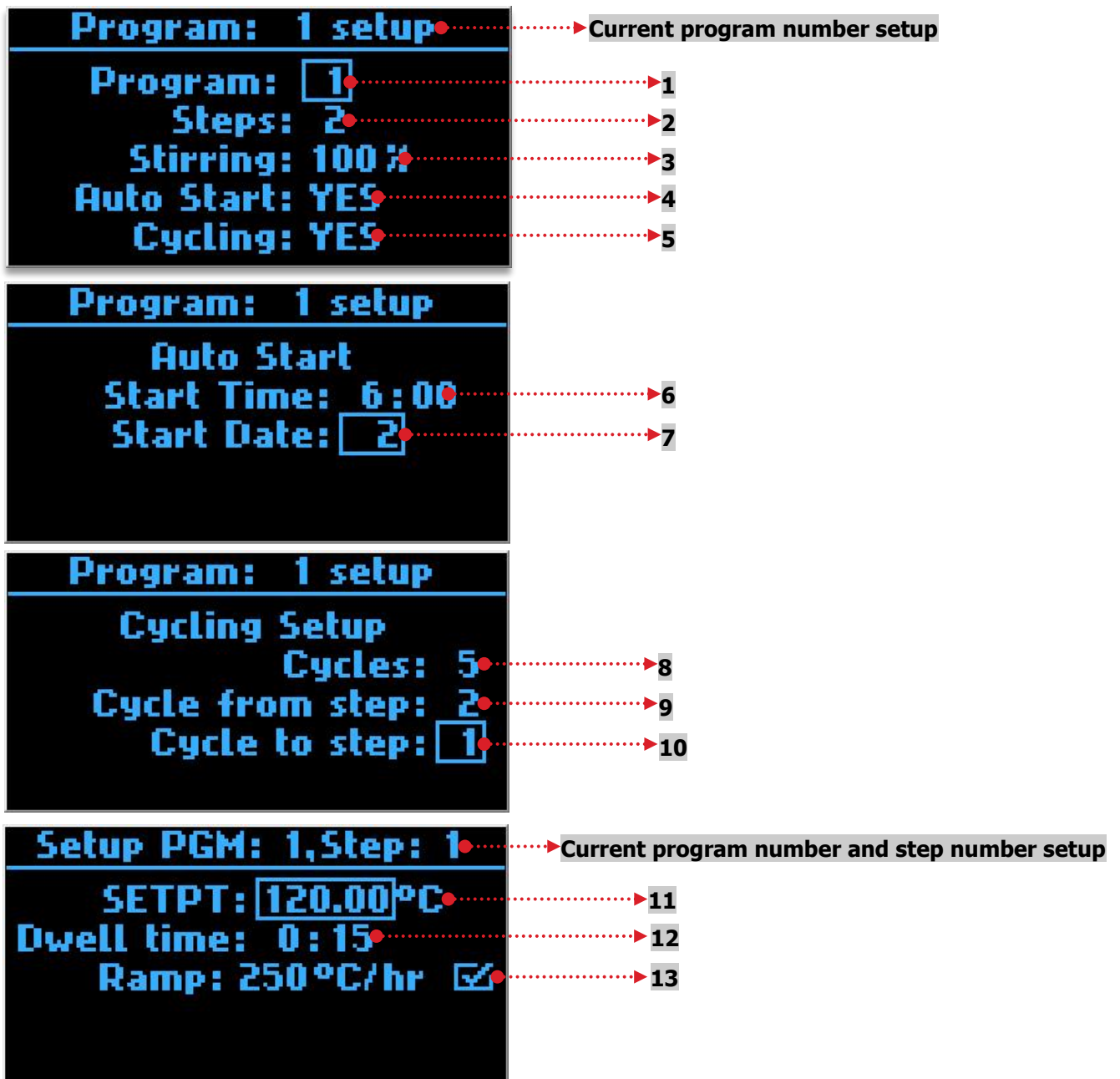
Use navigation buttons  and  to select parameter and then press  button to edit parameter.

With  and  buttons change value of parameter.

To move cursor left and right use  and  button.

Press  button to confirm or  button cancel changes.

After edit press  button to go back to **MAIN MENU**.



The following table summarizes the callouts shown in the screenshots:

Screenshot	Callout Number	Parameter
Screenshot 1: Program: 1 setup	1	Program: 1
	2	Steps: 2
	3	Stirring: 100%
	4	Auto Start: YES
	5	Cycling: YES
Screenshot 2: Auto Start	6	Start Time: 6:00
	7	Start Date: 2
Screenshot 3: Cycling Setup	8	Cycles: 5
	9	Cycle from step: 2
	10	Cycle to step: 1
Screenshot 4: Setup PGM: 1, Step: 1	11	SETPT: 120.00°C
	12	Dwell time: 0:15
	13	Ramp: 250°C/hr [checked]

1. **Program:** choose desired program number to edit settings (0 - manual program, 1÷10 for automatic program).
2. **Steps:** choose the required number of temperature steps (set range from 1 to 10).
3. **Stirring:** choose speed for stirrer for fluid mixing (set range from 30% to 100%)

Fluid mixing speed




After changing this parameter wait for a few minutes for the system to stabilize!!!
Never change for more than a few % at a time!



4. **Auto Start:** controller has option to set automatic start at certain hour and date (select YES or NO). If you would like to start the program right after pressing the start button the auto start should be set to NO.
5. **Cycling:** here you activate or deactivate cycling of steps (select YES or NO). If you would like to work without cycling of steps then select NO.
6. **Start Time:** set the time for delayed automatic start (set range from 00:00 to 23:59 in hh:mm format).
7. **Start Date:** set the date for delayed automatic start (set range ALL and 1 to 31). The number is day in month. If you set to ALL then all days in month are selected.
8. **Cycles:** set how many times the cycling of steps is repeated (set range from 1 to 99).
9. **Cycle from step:** set the step number from which the cycling will start (set range from 1 to maximum 10 if we have 10 temperature steps). **Cycling from step** number must always be bigger than **Cycling to step** number!
10. **Cycle to step:** set the step number to which the cycling will go (set range from 1 to maximum 10 if we have 10 temperature steps) **Cycling to step** number must always be smaller than **Cycling from step** number!



Example: "number of temperature steps" is set to 5, cycling of steps is set to 3, "cycle from step" is 5, "cycle to step" is set to 1. So the program shall do 5 steps and then repeat them for 3 times. Together we have $5 + 3 \times 5 = 20$. We have 20 steps to execute.



11. **SETPT:** set the setpoint temperature for current step (set range from 35.00°C to 220.00°C)
12. **Dwell time:** set the duration time of temperature stability for current step (set range from 00:01 to 24:00 in hh:mm format). For endless dwell time set time to 00:00. The countdown will start only when temperature is within allowed tolerances from set values!
13. **Ramp:** set the speed how fast the temperature in bath changes (set range from 1°C/hr to 250°C/hr (°C degrees per hour)). To activate speed ramp set mark in rectangle.


4.4 Instrument Setup

Use navigation buttons  and  to select parameter and then press  button to edit parameter.

With  and  buttons change value of parameter.

To move cursor left and right use  and  button.

Press  button to confirm or  button cancel changes.

Press  button to go back one level.



4.4.1 Display Parameters

Show display language – or select display language if there is more languages installed:



4.4.2 Time and Date

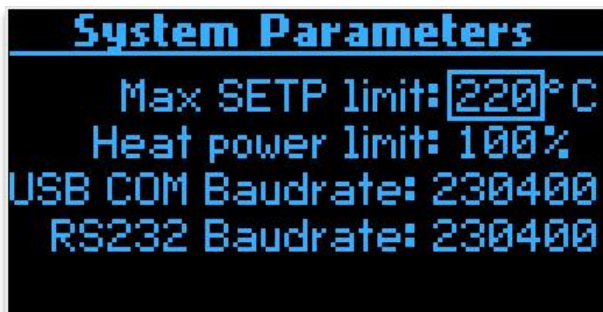
Set time and date:



Time format: hh:mm:ss
Date format: yyyy.mm.dd

4.4.3 System Parameters

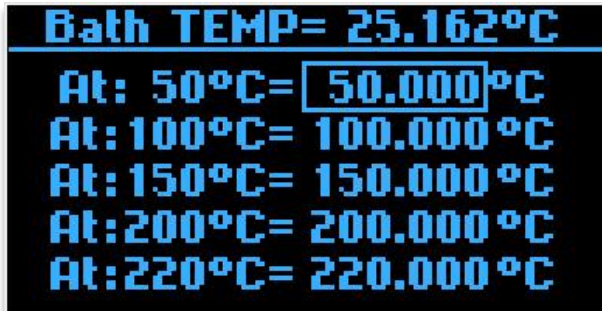
Setup system parameters. To change parameter you must first enter password:



Default values	
Max SETP limit:	220°C
Heat power limit:	100%
USB COM Baudrate:	230400
RS232 Baudrate:	230400

4.4.4 Bath Calibration

Setup bath temperature PT100 probe corrections. To change parameter you must first enter password:



Default values	
At: 50°C	49.600°C
At: 100°C	99.500°C
At: 150°C	149.500°C
At: 200°C	199.500°C
At: 220°C	219.500°C

4.4.5 PID parameters

Setup bath PID parameters. To change parameter you must first enter password:



Default values	
PID Pb:	2.35°C
PID Ti:	180sec
PID Td:	15



WARNING

Changing the PID parameters can seriously affect temperature control, stability, stabilization time,...

This should only be done by skilled professional staff!!!

4.4.6 Change Password

For password setup first enter old password:



The factory default password is 1000.

Now you can enter now password:



Confirmation screen for password has changed:



4.5 Service

When you enter Service screen you see information of bath model, bath serial number, firmware version, operating hours and after service hours:



```
Service
-----
Model:                OBM
Serial Number:       17065495
Firmware version:    U1.45
Operating hours:     24h19m
After Service:       24h19m
```

5. SERVICE AND MAINTENANCE

**WARNING**

Before any service or cleaning be sure to disconnect the power supply cable from the power supply!

Maintenance and service within the warranty period may only be performed by the authorized service person.

Please advise Kambic in before alternation & modification. It is not allowed to change or rebuild any part of the construction without producer's written permit.

All spare parts are in stock in the producer's magazine. It is only allowed to use the original spare parts.

Maintenance and service within the warranty period may only be done by the producer's service department or authorized service.

With proper care the instrument should require very little maintenance. Keep the interior and the exterior clean. The bath should be cleaned regularly to prevent a buildup of oil or dust. For cleaning use some soft cleaning detergents and soft cloth.

Periodically check the fluid level in the bath to ensure that the level has not dropped. A drop in the fluid level affects the stability and dramatically the uniformity of the bath. Changes in fluid level are dependent upon several factors most often it is the volumetric expansion of the fluid!

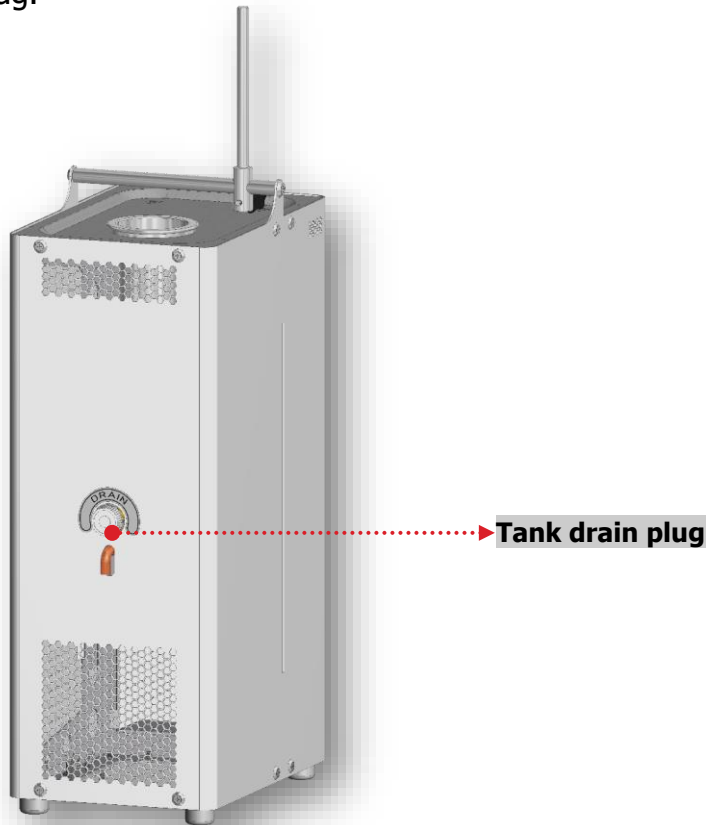
Heat transfer medium lifetime is dependent upon the type of medium and the environment. The fluid should be checked at least every month. Once some fluids have become compromised, the break down can occur rapidly. Particular attention should be paid to the viscosity of the fluid. A significant change in the viscosity can indicate that the fluid is contaminated, being used outside of its temperature limits, contains ice particles, or is close to a chemical breakdown.

In the event of failure, call the service;

Please find contacts on page 1 or on our web site: www.kambicmetrology.com

5.1 Draining the Bath

All our calibration baths are designed and equipped with tank drain plug for draining of the bath fluid. The location of the drain plug is at back of the bath. After drain screw back the plug.



6. REQUIRES SPACE AND CONECTIONS

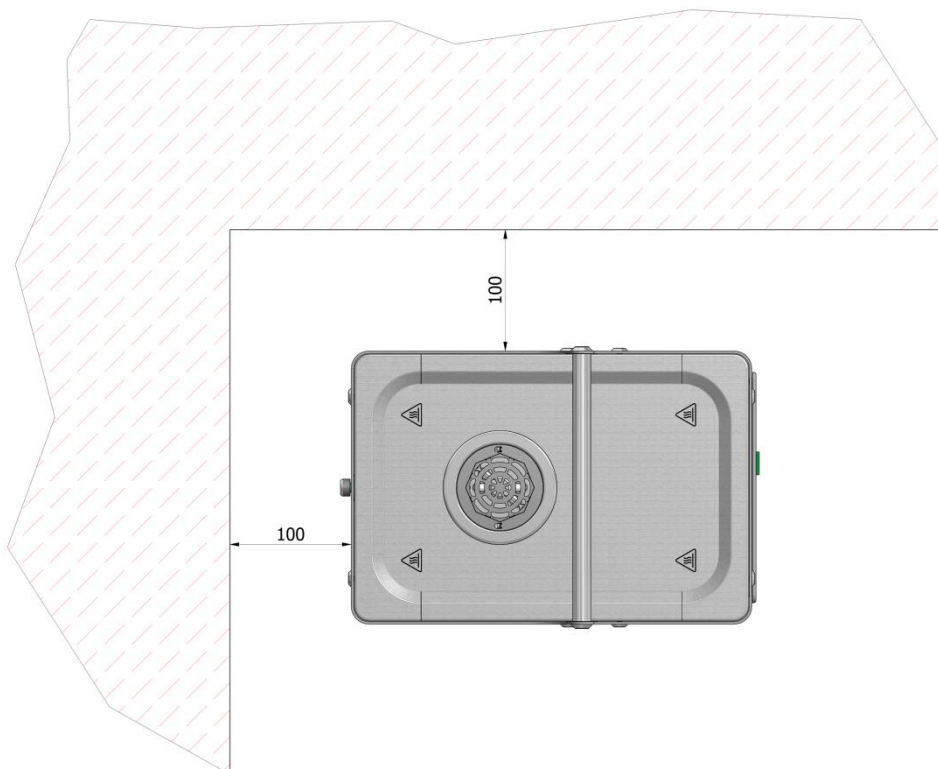
The appliance must be installed at least 100 mm away from the nearest wall. It must also be in a dry and well ventilated room.

Additional space or relocation of the apparatus may be necessary when carrying out any maintenance or servicing.

The user must provide electrical connection: 230V±10% / 50Hz.

Environmental and operational conditions

Temperature	+15°C ...+25°C
Relative humidity	from 15 % to 75 %



7. SAFE USE AND SAFETY ELEMENTS

It is not allowed to heat-up any material which could form explosive atmosphere.
Do not store any fluids on top of the housing!

Microprocessor controller has a special safety system which turns heaters off if temperature rises for more than 5 °C above set temperature.

According to the large temperature range and possibilities of usage of different fluids, there is a chance of fluid volume expansion at higher temperatures. Fill the bath with appropriate fluid. To avoid unlikable leakage do not overfill the bath.

The operator should also make sure that the bath contains enough fluid at all times. The minimum fluid level is when bottom openings on inner tank wall are flooded during the operation.

The appliance may only be used by trained personnel with enough practical experience regarding heating – cooling and temperature controlled appliances.

Each user is responsible for correct and safe use.

When indicating an error, press "STOP" and switch the main switch in the OFF position immediately. Contact the producer or service.

8. DISMANTLING AND DISPOSAL



This symbol means do not dispose of your product with your other household waste. Instead, you should protect human health and the environment by handing over your waste equipment to a designated collection point for the recycling of waste electrical and electronic equipment. For more information please contact your local waste disposal service.

9. ABBRIVATIONS

TEMP	chamber temperature
SETPT	set temperature
PWR	heating power
PID	proportional–integral–derivative (control loop)
LED	light-emitting diode
RS 232	standard communication interface
USB	Universal Serial Bus

10. TROUBLESHOOTING

Fluid drip from bath

- ➔ check fluid level

Low temperature stability & uniformity

- ➔ check fluid level and fluid flow
- ➔ check stirring operating
- ➔ check fluid viscosity
- ➔ check temperature sensor

Increased noise

- ➔ check stirring
- ➔ check fluid

Not able to reach high temperature

- ➔ check the max. power on heater limit setting

Not able to reach low temperatures

- ➔ check stirring
- ➔ check fluid flow

Probe error

- ➔ check probe connections and cable
- ➔ replace probe

Controller malfunction

- ➔ call service

11. ATTACHMENTS

11.1 Wiring diagram

11.2 Declarations

11.3 RS232 Communication protocol