1-CUBE

MASH BATH
Type: R4, R8, R12

USER'S GUIDE

Contents:

1. Mash Bath – range of the supply

Mash Bath ……….……............……......…1 pc

Metal beakers (volume 500 ml): type R8-8 pces, type R12-12 pces

Glass test tubes (volume 100 ml): type R8-8 pces, type R12-12 pces

Stirrers: type R8-8 pces, type R12-12 pces

Tank for distilled water……………….1 pc

2. Mash Bath - Installation - putting the device into operation and its maintenance

Mash Bath is determined only for work in laboratories which is the ordinary place for laboratory testing of malt. The Mash Bath must be located in the horizontal position (for proper operation of the apparatus). The mash bath will be connected to the cooling water distribution by expert company (**Warning!** Pressure of water must not exceed the limit value of 600kPa). The equipment will be connected to the inlet piping of the cooling water with the help of the hose reduction with orifice plate inside. The hose reduction with orifice plate is part of the Mash Bath basic package. It is forbidden to také the orifice plate out of the hose reduction. Hold the tube leading into the Mash Bath to prevent its rotation during tightining the hose reduction. There is the electromagnetic valve on the tube and this electromagnetic valve has to be in the vertical position. It is also reccommended to incorporate ball closing valve and filter into the cooling water circuit (in front of the Mash Bath). Connect the 3/4" discharge piping from the Mash Bath with the help of hose into the drain. Then plug in the Mash Bath with the help of a standardized single-phase plug into el.socket. Before plugging in the technician has to check the condition of the el.circuit that will be used for the Mash Bath operation. If the result of the el.circuit inspection is positive, the Mash Bath can be plugged in.

Plug wiring (front view):

L1-phase230 V, 50Hz

(black conductor)

protective earth conductor PE

(siskin-green conductor)

Neutral wire

(blue)
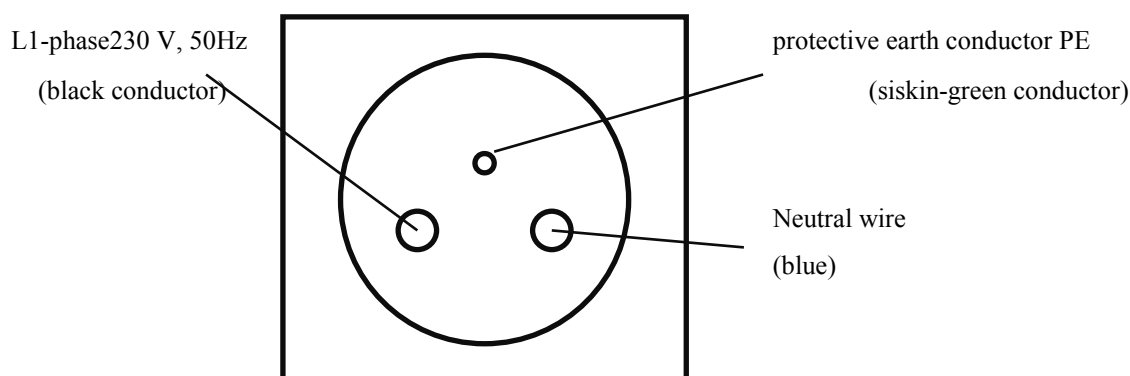
3. Safety recommendations

Mash Bath may be operated only by person who became completely acquainted with its function within the framework of the training, or who became thoroughly acquinted with the user's guide of this device. The Mash Bath must be plugged in with the help of a standardized plug into single-phase el.socket with 16A circuit breaker. Before plugging in the technician has to check the condition of the el.circuit that will be used for the Mash Bath operation. If the result of the el.circuit inspection is positive, the Mash Bath can be plugged in. In case of danger switch off the Main Switch and disconnect feed el.cord out of the socket. The stirrers must be switched off while any handling of the metal beakers as

well as the stirring airscrews. Switch off the Main Switch, disconnect feed el.cord out of the socket and contact the qualified service personnel who provides service for delivered device if any problem with any water leakage appears.
Warning! It is forbidden to handle the beakers at temperature higher than +40 degrees Celsius. It could cause staff injury. It is hazardous for anyone except for the producer and authorized service company to repair the apparatus.

4. Technical data:

Electric data:
- voltage systém TN-S 1+PE+N
- voltage 230V/50 Hz or 110V/60 Hz
- protection IP 20
- the equipment can be used in neutral medium
- the equipment output : type R8- P_i=2,1 kW, type R12- P_i=2,8 kW

- circuit breaker–type R8-12 A fusible cut out, type R12-16 A fusible cut out
- plugging in el. network: with the help of flexible cord LYS 3x1,5
-averaged plug and socket outlet protected with 16A circuit breaker

Sound level parameters:
- max sound pressure – 61 dB

Data represented on LCD display:
- type of method: HARTONG, CONGRESS, ASBC, THERMOSTAT, PROFILE
- instantaneous temperature of bath or suspension
- time since the begining of test
- communication of the equipment with the service

Adjustable data:
- choice of methods: Congress, Hartong 20, Hartong 45, Hartong 65, Hartong 80, ASBC, Thermostat, PROFILE, water filling, calibration
- mixer speed: 0, 100, 200 R.P.M. with the help of membrane keyboard and the mixer speed changeover switch
- temperature range: (15-90^{0}C) with the help of membrane keyboard and display
- time of the test duration

Accuracy:
- accuracy of temperature measurement: +-0,1^{0}C
- accuracy of temperature regulation: to 0,2^0 C

Signalization:
- acoustic and optical alarm

5. Operating instructions

First connect the equipment to the circuit of the cooling water. Switch on the Main Switch located on the front panel of the equipment. **NOTICE:** It is forbidden to use the Mash Bath without filling it with water. It could cause device destruction and staff injury. The way of filling the Mash Bath with water is described in one of next paragraphs.

Program is controlled with the help of 7 keys of the membrane keyboard which is located on the front panel of the equipment. The report about the operating condition can be observed on the 2 lines of the display.

Display and keyboard scheme:
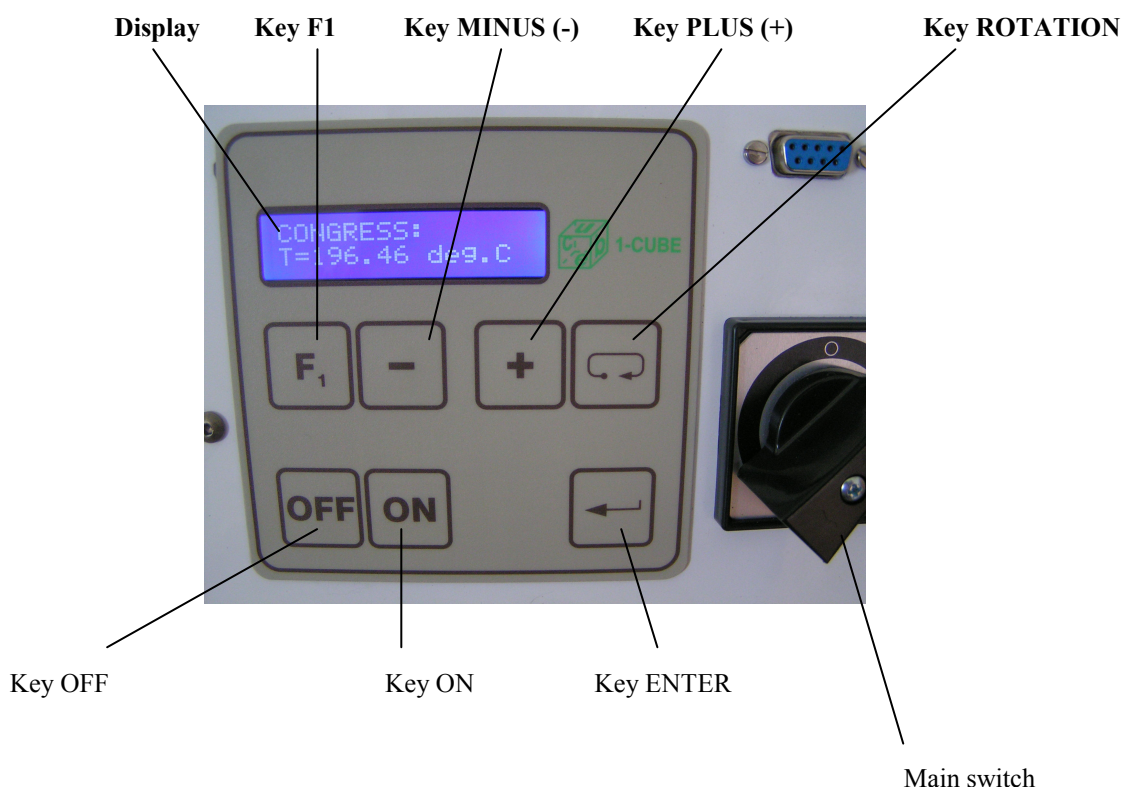
After switching on the equipment there is 1-CUBE name and the version of the controlling programme on the display, they disappear after a while and the first item (control algorithms CONGRESS) of the Main Menu appears on the display.

How to switch on the stirrers:

Before the switching on the stirrer adjust the required stirrer speed with the help of speed changeover switch located on the front panel of the gearbox. The positions of the speed changeover switch are marked HARTONG and CONGRESS. Method HARTONG - 200 speed per minute, method CONGRESS-- 100 speed per minute. **NOTICE: It is forbidden to change the speed when the stirrers work!**

Switch on mixing after the speed has been adjusted. Press the key F1 on the membrane keyboard to switch on or to switch off the mixing. The only task of the F1 key is switching on and switching off the stirrers.

Once the work with the equipment is finished switch off the Main Switch and close the cooling water supply (into the equipment) with the help of the closing valve.

The control is based on several interconnected menus. One can change the single items of the menus with the help of the key ROTATION. It is possible to rotate just in one direction. Any activity can be interrupted by pressing the key **OFF.**

Control algorithms

The following control algorithms CONGRESS, HARTONG, ASBC, PROFILE, THERMOSTAT, FILLING and CALIBRATION can be run with the Mash Bath. The control algorithms can be switched on after pressing the key ON and or switched off after pressing the key OFF. After expiry of the technological algorithm or of some certain action the acoustic signalization starts hooting. After pressing key ENTER the acoustic signalization stops hooting. After pressing key OFF the control technological algorithm may be completely interrupted and you are back in the Main Menu. During the process the following information are automatically displayed on the display.

1. line:

The required temperature is displayed.

2. line:

Information about time given in minutes and instantaneous real working temperature.

Electrical Energy Outage during the running of the control algorithm:
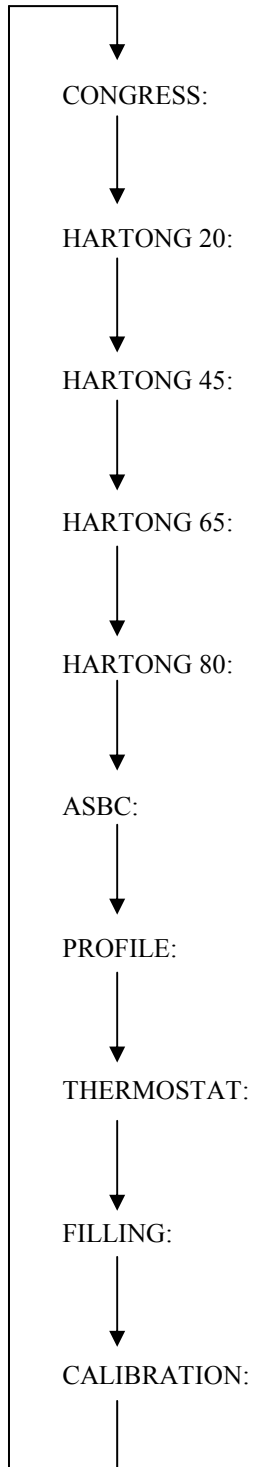After renewal of electric power supply the control algorithm goes on further whereas the runtime of electrical energy outage is added automatically (during the outage both time and temperature are measured, only the heating elements are not scanned).

Adjustment of the required temperature or time:

The required temperature or time in the methods (menu) THERMOSTAT and PROFILE are adjusted by pressing keys plus + (to increase the value) or minus – (to decrease the value). First the required value is changed of tenths of degree or 1 minute, after ten changes (ten presses of key) the required value is changed of degrees or 10 minutes, after ten following changes (ten presses of key) the required value is changed of 10 degrees or 100 minutes etc.

Scheme of menu

After switching on the equipment the first item (CONGRESS) of the menu appears on the display. One can change the single items of the menus with the help of the key ROTATION. Menu consists of the following items.

CONGRESS:

HARTONG 20:

HARTONG 45:

HARTONG 65:

HARTONG 80:

ASBC:

PROFILE:

THERMOSTAT:

FILLING:

CALIBRATION:

One can change the single items of the menus with the help of the key ROTATION and to start it with the help of the key ON.

Method Congress:

After choice of the item CONGRESS in the main menu with the help of the key ROTATION one can start the algorithm itself by pressing the key **ON**. After reaching the temperature 45 degrees Celsius the acoustic signalization starts hooting. After pressing key ENTER the acoustic signalization stops hooting and one can start the algorithm itself by pressing the key **ON,** after this step the time is automatically set to zero. While the technologic algorithm runs the defined instants are signalized by acoustic alarm. After pressing key ENTER the acoustic signalization is stopped. After the expiry of the prescribed technological algorithm the temperature is maintained at the value of 20.00^c C. The temperature is maintained till pressing the key **OFF** which definetely finishes the algorithm.

Method Hartong 20:

After choice of the item HARTONG 20 in the main menu with the help of the key ROTATION one can start the algorithm itself by pressing the key **ON**. After reaching the temperature 20 degrees Celsius the acoustic signalization starts hooting. After pressing key ENTER the acoustic signalization stops hooting and one can start the algorithm itself by pressing the key **ON,** after this step the time is automatically set to zero. While the technologic algorithm runs the defined instants are signalized by acoustic alarm. After pressing key ENTER the acoustic signalization is stopped. After the expiry of the prescribed technological algorithm the temperature is maintained at the value of 20.00^c C. The temperature is maintained till pressing the key **OFF** which definetely finishes the algorithm.

Method Hartong 45:

After choice of the item HARTONG 45 in the main menu with the help of the key ROTATION one can start the algorithm itself by pressing the key **ON**. After reaching the temperature 45 degrees Celsius the acoustic signalization starts hooting. After pressing key ENTER the acoustic signalization stops hooting and one can start the algorithm itself by pressing the key **ON,** after this step the time is automatically set to zero. While the technologic algorithm runs the defined instants are signalized by acoustic alarm. After pressing key ENTER the acoustic signalization is stopped. After the expiry of the prescribed technological algorithm the temperature is maintained at the value of 20.00^c C. The temperature is maintained till pressing the key **OFF** which definetely finishes the algorithm.

Method Hartong 65:

After choice of the item HARTONG 65 in the main menu with the help of the key ROTATION one can start the algorithm itself by pressing the key **ON**. After reaching the temperature 65 degrees Celsius the acoustic signalization starts hooting. After pressing key ENTER the acoustic signalization stops hooting and one can start the algorithm itself by pressing the key **ON,** after this step the time is automatically set to zero. While the technologic algorithm runs the defined instants are signalized by acoustic alarm. After pressing key ENTER the acoustic signalization is stopped. After the expiry of the prescribed technological algorithm the temperature is maintained at the value of 20.00^c C. The temperature is maintained till pressing the key **OFF** which definetely finishes the algorithm.

Method Hartong 80:

After choice of the item HARTONG 80 in the main menu with the help of the key ROTATION one can start the algorithm itself by pressing the key **ON**. After reaching the temperature 80 degrees Celsius the acoustic signalization starts hooting. After pressing key ENTER the acoustic signalization stops hooting and one can start the algorithm itself by pressing the key **ON,** after this step the time is automatically set to zero. While the technologic algorithm runs the defined instants are signalized by acoustic alarm. After pressing key ENTER the acoustic signalization is stopped. After the expiry of the prescribed technological algorithm the temperature is maintained at the value of 80.00°C (it is not cooled down anymore). The temperature is maintained till pressing the key **OFF** which definetely finishes the algorithm.

Method ASBC:

After choice of the item ASBC in the main menu with the help of the key ROTATION one can start the algorithm itself by pressing the key **ON**. After reaching the temperature 45 degrees Celsius the acoustic signalization starts hooting. After pressing key ENTER the acoustic signalization stops hooting and one can start the algorithm itself by pressing the key **ON,** after this step the time is automatically set to zero. While the technologic algorithm runs the defined instants are signalized by acoustic alarm. After pressing key ENTER the acoustic signalization is stopped. After the expiry of the prescribed technological algorithm the temperature is maintained at the value of 20.00°C. The temperature is maintained till pressing the key **OFF** which definetely finishes the algorithm.

Method PROFILE:

This algorithm allows adjusting any required time behaviour of temperatures. It is possible to adjust as many as 7 points defined with time and temperature coordinates. After choice of the item PROFILE in the main menu with the help of the key **ROTATION** one can start the algorithm itself by pressing the key **ON**.

After 1 sec the text: START ON:

OTHER PARAMETERS: appears on the display.

If there has been already set the temperature curve before, one can use it again (because it is saved in the internal memory) by holding the key ON at the time when the text: START ON:

OTHER PARAMETERS: appears on the display.

If there hasn't been set the temperature curve yet or it is necesary to set it in a different way, one waits about 1 sec till the text SET UP THE CURVE appears on the display.After that the text: time of point 1= appears on the first line and one sets the time in minutes on the second line. Time is set with the help of keys plus + (to increase the value) or minus – (to decrease the value) – see paragraph: Adjustment of the required temperature or time: in the chapter Control algorithms. After setting the time of point 1 press the key **OFF** and in that way time of point 1 is saved in the internal memory and after that the text: time of point 2= appears on the first line and one sets in the same way the time of point 2, the time of point 3, the time of point 4, the time of point 5, the time of point 6, the time of point 7. After setting the time of point 7 press the key **OFF** and the text: temp. of point 1= appears on the first line and one sets the temperature in °C. on the second line. Temperature is set with the help of keys plus + (to increase the value) or minus – (to decrease the value) – see paragraph: Adjustment of the required temperature or time: in the chapter Control algorithms. After setting the temperature of point 1 press the key **OFF** and in that way temperature of point 1 is saved in the internal memory and after that the text: temp. of point 2= appears on the first line and one sets in the same way the temperature of point 2, the temperature of point 3, the temperature of point 4, the temperature of point 5, the temperature of point 6, the temperature of point 7 and by pressing the key **OFF** the control of the adjusted curve starts running. There is displayed the required temperature on the first line of the display and the time runned off from the beginning of the test and real temperature on the second line of the display. The algorithm is stopped by pressing the key **OFF**.
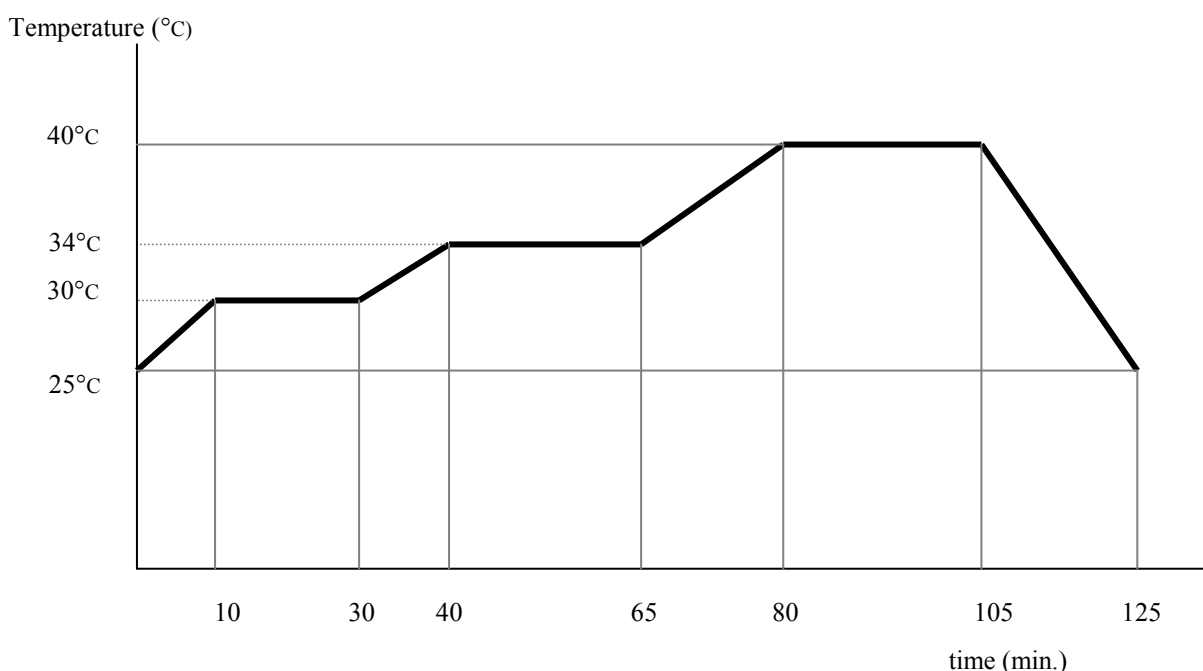
Example of curve adjustement according to graph:

time of point 1=10,   time of point 2=30, time of point 3=40,   time of point 4=65, time of point 5=80,   time of point 6=105, time of point 7=125,

temperature of point 1=30,   temperature of point 2=30,   temperature of point 3=34,   temperature of point 4=34, temperature of point 5=40, temperature of point 6=40, temperature of point 7=25,

Method Thermostat:

This algorithm allows to adjust any required temperature and the Mash Bath maintains the temperature for the required time. After choosing the item THERMOSTAT in the main menu with the help of the key **ROTATION** one can start the algorithm itself by pressing the key **ON**. The text: TEMP.CONTROL: appears on the first line of the display and one sets the temperature in °C. on the second line. Temperature is set with the help of keys plus + (to increase the value) or minus – (to decrease the value) – see paragraph: Adjustment of the required temperature or time: in the chapter Control algorithms. After setting the required temperature press the key **OFF** and in that way the temperature control starts running. There is displayed the required temperature on the first line of the display and the time runned off from the beginning of the test and real temperature on the second line of the display. The algorithm is stopped by pressing the key **OFF**.

Method Filling:

This method allows to fill the Mash Bath with water. After choosing the item WATER FILLING in the main menu with the help of the key **ROTATION** one can start the algorithm itself by pressing the key **ON**. The algorithm is stopped by pressing the key **OFF**.

Method Calibration:

It is necessary to check the measurement accuracy with the help of etalon once in quarter. If the temperature of the bath does not correspond to the temperature measured with the etalon it is necessary to recalibrate the temperature sensor. The temperature sensor is calibrated only if it is really necessary because the equipment is optimally calibrated by manufacturer.

Calibration Procedure:

It is necessary to calibrate two temperatures for the right measurement of the Mash Bath, the lower temperature (about 20 degrees Celsius) and the upper temperature (about 70 degrees Celsius).

Calibration of the lower temperature 20 degrees Celsius (point 1) :

First check if the temperature in bath is about 20 degrees Celsius and if it is not use the method Thermostat to reach it. Once temperature of 20 degrees Celsius is reached use the following procedure:

1) Press the key „Rotation" till you have the menu Calibration Menu on the display
2) Press the key „On" to activate the Calibration Menu
3) There is text „dig value of tem" on the first line and the value on the second line. Write down the digital value.
4) There is text „point 1 - digital" on the first line and the value on the second line. Overwrite the value with the help of keys + (increase) or – (decrease) to put the digital value that you have written down before. Press the key „OFF" to set the required value.
5) There is text „point 1 - temp" on the first line now and the value on the second line. Overwrite the value with the help of keys + (increase) or – (decrease) to put the value that you have measured before with the etalon in the water of the mash bath. Press the key „OFF" to set the required value.
6) There is text „point 2 - digital" on the first line now and the value on the second line. Do not set the point 2 at this moment therefore press the key „OFF".
7) There is text „point 2 - temp" on the first line now and the value on the second line. Do not set the point 2 at this moment therefore press the key „OFF".
8) There is text „filling hartong" on the first line now and the number corresponding to the filling period (in seconds) of the preheated distilled water from the tank into the beakers on the second line. The refilled water quantity is given by a set time.After setting of the required time period press the key „OFF".
9) There is text „filling congress" on the first line now and the number corresponding to the filling period (in seconds) of the preheated distilled water from the tank into the beakers on the second line. The refilled water quantity is given by a set time. After setting of the required time period press the key „OFF".
10) There is text „if 1 then alarm" on the first line now and the number on the second line. If this number is set to 1 then the acoustic alarm is set off in the moment of refilling of the preheated distilled water from the tank into the beakers. The refilled water quantity is given by a set time. If this number is different to 1 then the acoustic alarm is not set off.

   The lower temperature (point 1) is calibrated now

Calibration of the upper temperature 70 degrees Celsius (point 2) :

First check if the temperature in bath is about 70 degrees Celsius and if it is not use the method Thermostat to reach it. Once temperature of 70 degrees Celsius is reached use the following procedure:

1) Press the key „Rotation" till you have the menu Calibration Menu on the display
2) Press the key „On" to activate the Calibration Menu
3) There is text „dig value of tem" on the first line and the value on the second line. Write down the digital value.
4) There is text „point 1 - digital" on the first line and the value on the second line. Do not set the point 1 at this moment therefore press the key „OFF".
5) There is text „point 1 - temp" on the first line now and the value on the second line. Do not set the point 1 at this moment therefore press the key „OFF".
6) There is text „point 2 - digital" on the first line now and the value on the second line. Overwrite the value with the help of keys + (increase) or – (decrease) to put the digital value that you have written down before. Press the key „OFF" to set the required value.
7) There is text „point 2 - temp" on the first line now and the value on the second line. Overwrite the value with the help of keys + (increase) or – (decrease) to put the value lower for about 1,5-2 degrees Celsius than the one that you have measured before with the etalon in the water of the mash bath (owing to thermal losses the temperature in the baths with the mash is for about 1,5-2 degrees Celsius lower than the temperature in the bath of the mash equipment itself). Press the key „OFF" to set the required value.
8) There is text „filling hartong" on the first line now and the number corresponding to the filling period (in seconds) of the preheated distilled water from the tank into the beakers on the second line. The refilled water quantity is given by a set time. After setting of the required time period press the key „OFF".
9) There is text „filling congress" on the first line now and the number corresponding to the filling period (in seconds) of the preheated distilled water from the tank into the beakers on the second line. The refilled water quantity is given by a set time. After setting of the required time period press the key „OFF".
10) There is text „if 1 then alarm" on the first line now and the number on the second line. If this number is set to 1 then the acoustic alarm is set off in the moment of refilling of the preheated distilled water from the tank into the beakers. The refilled water quantity is given by a set time. If this number is different to 1 then the acoustic alarm is not set off.

The upper temperature (point 2) and temperature sensor are calibrated now.

6. Filling the Mash Bath with water

There is electromagnetic valve located on the inlet piping – the electromagnetic valve is closed during the stillstand (without supply voltage) and it prevents filling the Mash Bath with water. The valve opens when it is necessary to cool down the water bath of the Mash Bath (for example method CONGRESS – cooling down from temperature 70°C to temperature 20°C or single methods of the method HARTONG). The water is refilled systematically and it is not necessary to refill it if it is not discharged by yourself with the help of the discharge valve (which is not reccommended). Once the Mash Bath is installed, it is necessary to fill it with water (before the first use). The method WATER FILLLING is used for filling the Mash Bath with water. Press the key „Rotation" till you have the method WATER FILLING on the display and press the key „On" to start the filling . Press the key „OFF" to stop it.

NOTE: There is a level sensor in the Mash Bath that controls the level in the water bath and does not allow start any method (start the heating) if there is no water in the bath. The text ADD WATER appears on the display in such case.

# 7. Automatic distilled water refilling into the beakers

The distilled water is pre-heated in the inside reservoir incorporated in the Mash Bath. The inside reservoir has to be refilled with the distilled water every time before initiation of any method with the automatic pre-programmed distilled water refilling into the beakers. The distilled water is refilled from the tank (1) which is included in the delivery. Place the tank with the distilled water on the Mash Bath gear-box and interconnect (follow the picture below) the ball cock on the tank (2) with the ball cock on Mash Bath (5) with the help of the supplied hose (3).

Attention: Before refilling switch on the Mash Bath with the main switch – that opens automatically air valve. If the Mash Bath is not switched on, the distilled water will spray during refilling from the inlet jets (4). Once the Mash Bath is switched on open the inlet ball cocks on the tank (2) and Mash Bath (5) and refill the distilled water to reach the same

level as the level of level meter guideline (6) – see the pic below. When the level is reached shut both of the cocks (2) and (5). Now the Mash Bath is ready to be refilled automatically with the distilled water in time and quantities given by the chosen method. The distilled water is refilled into the beakers from the inlet jets (4). One can uptilt the jets to put in and out the mash beakers. Do not forget to tilt the jets (4) after putting the beakers in. In the opposite case the distilled will spray out of the beakers in front of the Mash Bath!

IMPORTANT NOTICE: Refill the tank (1) only with the clean distilled water and keep the tank clean to avoid the inlet jets (4) obstruction and unequal refilling!

NOTE: It is possible to use the Mash Bath without automatic distilled water refilling. In such case the distilled is preheated in the supplied glass test tubes and at the particular moment (when the acoustic signalization starts hooting) has to be poured into the beakers manually. In this case the inside reservoir with the distilled water has to be empty (it mustn't be refilled from the tank(1))
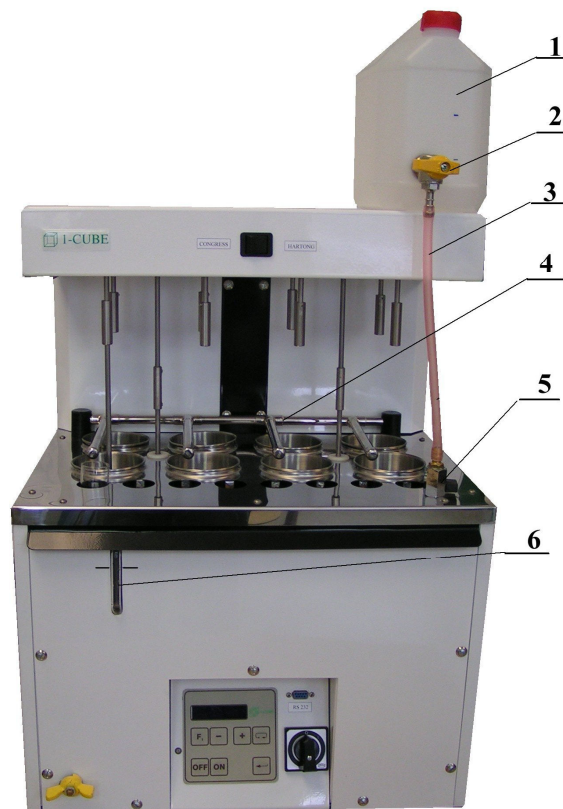
Explanation:

    1   - tank

    2   - ball cock on the tank

    3   - hose

    4   - inlet jets

    5   - ball cock on the Mash Bath

    6   - guideline

8. Monitoring RS232

This option allows recording of temperature curves for all methods. With THERMOSTAT method, you will be able to define your own temperature profiles, with unlimited (nearly) number of points. First switch off the Mash Bath and connect the supplied serial communication cable on it and on PC. If your PC doesn't have a serial port, use the USB adapter supplied. The first time you'll plug the adapter, the USB driver will be installed automatically. Please wait until installation is finished and reboot your computer if asked.

Warning: the software provided will only run on Windows XP, VISTA, 7, 8 (32 and 64 bits) computers with .NET framework 4 installed. You can download it for free here: **http://www.microsoft.com/net/download**

Install the MashBathControl software by copying *MashBathControl.exe*, *MashBathControl.exe.config* and *DynamicDataDisplay.dll* files from the installation CD-ROM to the folder of your choice on your PC.

To launch the software, double-clic on *MashBathControl.exe*. The following window will show up :
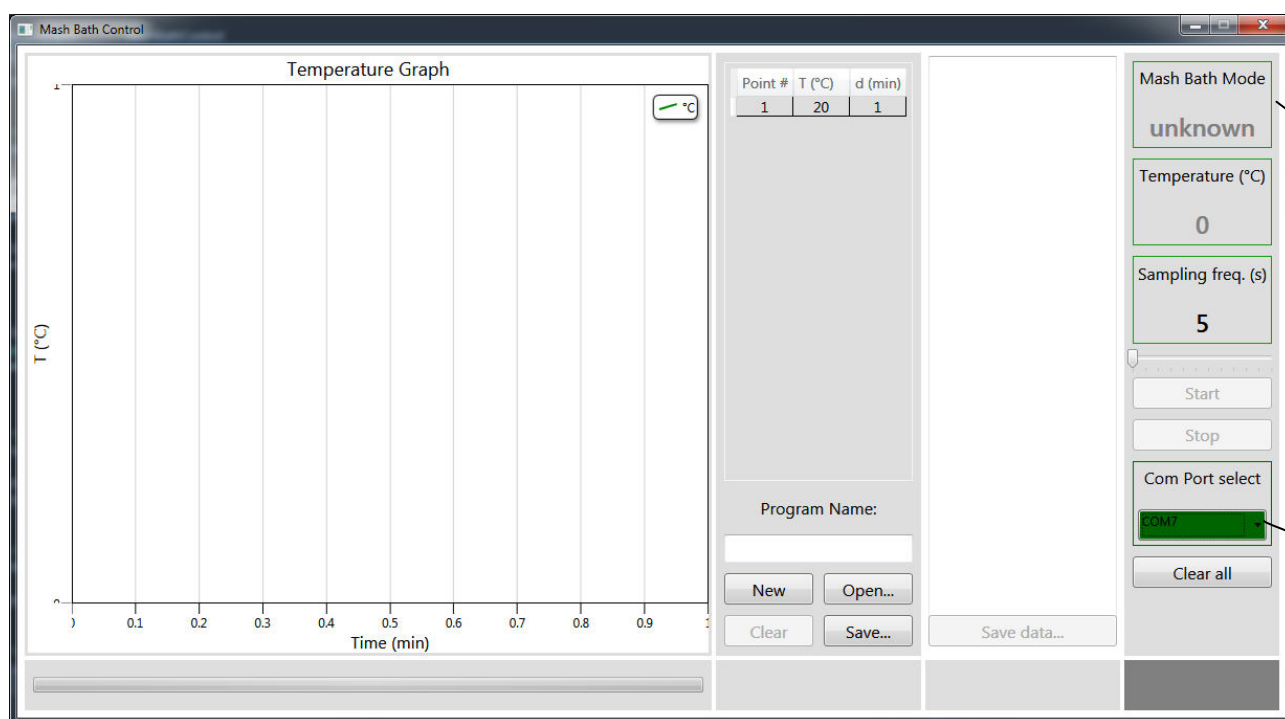

First, you have to select the communication port utilized for communication. Default port configured in the software is COM1. You can change it in the Com Port Select frame, which contains the list of all serial communication ports found on your system. Usually, built-in serial port will be Com1 or Com2, and virtual ones created by USB adapter will be higher numbers (e.g. COM6, COM8, …). The best way to check if you've selected the right port is to start any method on the mash bath, so it will start to send data. When the right port is selected, the application will show the name of the method running in the top-right frame: Math Bath Mode. The actual temperature in the bath is also displayed. The software will memorize the last Com port selected when exiting, and it will be automatically selected the next time you launch it.

When communication is OK, you will have two possibilities according to the method you will run. If you are going to run CONGRESS, HARTONG, ASBC, or PROFILE, the software will enable only recording of the temperature curve when the method is running (Monitoring). For example, to record the CONGRESS method curve, first select the CONGRESS method on the display of the mash bath then depress the ON key. The display will show the required temperature, time and real temperature. In the main window of the software, Mash Bath Method should be CONGRESS. The Start button is enabled and you just have to click on it to start recoding. The curve should start to be plotted on the

left part of the window and temperature values with time should be displayed in the text frame at the frequency defined in the Sampling Freq. frame on the right. The frequency can be adjusted with the slider from 5 to 60 seconds by 5 s steps.

You can stop recording whenever you want by clicking on the Stop button. The graph will stay and you can save it as picture by right-clicking on the graph. At any time, you can zoom in or out and span the graph if you want to display or save only a particular portion of the curve. If you want to come back to automatic sizing of the graph, right-click on it then choose Fit to screen or use the Home key. The temperature values and the time in the text frame can also be saved as a text file which can later be imported in a spreadsheet like Excel (use ',' as data separator). To achieve this, click on the Save data button at the bottom of the text frame.

You can clear all recorded values by clicking on the Clear all button. Everything will be erased, and you will be able to start recording a new graph with new values. Be sure you have saved previously recorded data if you wanted to keep them.
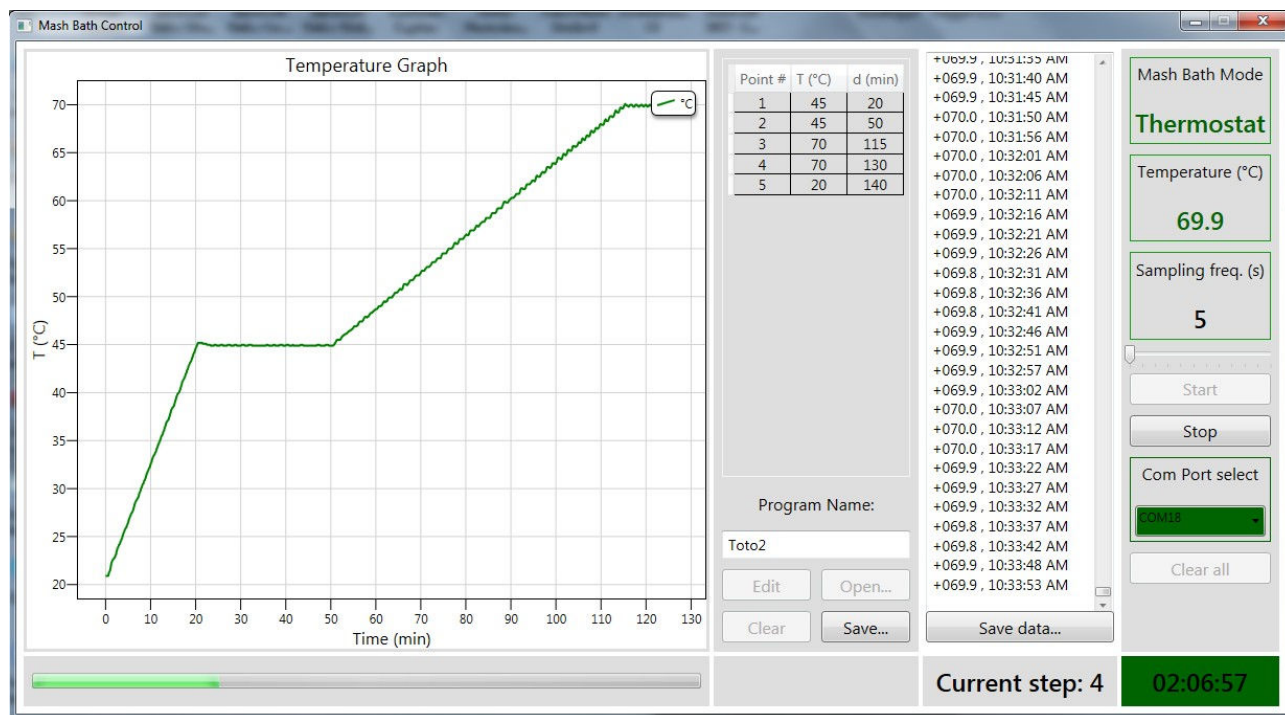
In order to be able to define and to run your own temperature profile, the mash bath must be set on the THERMOSTAT method.

To create a profile, click on the new button in the frame with the data grid. Now you can give a name to your profile and adjust values in the grid. The grid has 3 columns, the first one; 'Point #' is the number of the point, starting from 1 with 1 increment step. It is automatically renumbered, so you don't have to type in values here. The second column is for temperature values, and must be $5 \leq T \leq 95°C$ with one decimal. (e.g. **63.5**). The last column contains values for elapsed time in whole minutes. You have to keep in mind that this is an absolute value, from the beginning of the process. If you try to type in a value lower than the previous one (in the previous row), an error message will be displayed and you will not be able to launch your program. The software will also check if the heating rate asked is not over 2°C/min, which is the maximum the mash bath can accomplish. You can modify the values in the grid by double-clicking in cells. Use the Delete key if you want to delete a row. You can also clear the grid with the Clear button. When you're finished with creating your program, click on the Save button to save it in a file. You can create as many programs as you want and reload them with the Open button in just a few clicks.

Running your own program is very easy, create or open a program as described before, then start the THERMOSTAT method on the mash bath and click the Start button. The software will send the requested temperatures to the mash bath according to your program, and graph and temperature values will be recorded as in monitoring mode for other methods. On the lower part of the window, a progress bar will indicate the position in the total process, the number of the point reached is displayed and the elapsed time. When the program is finished, Finished will be written and at the same time a sound will be emitted.

9. Maintenance

Throughout the Mash Bath operation the scale can be sedimented on the walls of the vessel and the heating elements. It is important to remove these sediments and to clean the vessel. Pour the water with either the acetic acid or citric acid into the bath and use for example the HARTONG 65 method to hold the temperature of 65 degrees Celsius for one hour in the bath. Then disconnect feed el.cord out of the socket, suck the sediments with the help of a hose and clean the vessel.

Oil the plastic bearings of the stirrers every 6 months. It is necesary to disconnect feed el.cord of the Mash Bath out of the socket and remove the upper cover of the gear-box to oil the upper bearings. Then it is possible to oil all the upper bearings and part of the lower ones. The remaining lower bearings can be oiled from outside by underwing injection of oil between the stirrer and the plastic bearing.

10. Important warnings:

If the Mash Bath is transported at temperature below freezing point, it is necesary to leave the instrument for about 2 hours at room temperature before you start to work with it.

Do not switch on algorithms HARTONG, CONGRESS and the heating elements when the Mash Bath is not filled with water. It could cause device destruction and staff injury. Always fill the Mash Bath with water before you start work.

Let the Mash Bath rest at room temperature for 5 hours before switching on if the equipment has been transported at freezing point.

Single electric elements of the Mash Bath are protected with tube fusible cut-out that are located on the common panel together with microcomputer inside the Mash Bath. The fuses are located on the back panel of the Mash Bath. It is forbidden to replace the fuse by fuse with different value than the value indicated on the equipment.

Service:
For service contact the manufacturer: 1-CUBE, Hamry 3567, 580 01 Havl.Brod, Czech Rep.
                                          tel. 00 420- 569 433 620
                                          fax.00 420-569 422 144
                                          1-cube@1-cube.com

NOTICE: It is forbidden for anyone except for the manufacturer or authorized company to repair the apparatus.

At the end of the apparatus life we recommend that it is according to corresponding waste categorization.

Take the metallic parts made of iron, brass, plastic elements and packing material to the separated collection as a secondary raw material. You can also order the apparatus liquidation at the above mentioned company that ensures the liquidation of the waste according to Waste Act.

11. The Movie- Instruction

The Movie- Instruction for installation and first water filling of Mash Bath (for all Types):
http://www. youtube.com/watch?v=MGt6onynUJI

The Movie- Instruction for distilled water infilling (only for Mash Bath Type Automatic....):
http://www.youtube.com/watch?v=PpbaM52jd4w