

Microplate thermostatic shaker DTS-4



User manual

ELMI Ltd.
21-133 Aizkraukles Str.
Riga, LV-1006, Latvia
T.: +371 67558743
T.: +371 67551934
E: info@elmi-tech.com
W: www.elmi-tech.com



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Dear users!

DTS-4 microplate thermostatic shaker is a simple and reliable device. We ask you to consider technical requirement for exploitation to provide the use of the equipment without problems for a long period of time.

General information

DTS shaker is designed to perform the mixing up of components in the micro titer plates at the desired temperature.

The hermetic thermostatic container of the digital thermostatic shaker is equipped with a bi-directional heating system with heaters in the platform and in the lead heating the whole volume uniformly. This ensures independence from the room temperature, excellent temperature uniformity across the plates and eliminates any condensation, giving only the best results even if micro-volumes of samples are used. Electronic system controls all parameters and displays them on LCD display.

Technical specifications

Number of the operating micro plates	4
Accuracy of the temperature, °C	0.1
Sizes of the micro plates, mm	86x128x20
Range of the temperature, °C	+3° from room temp. to +60
Step-type behaviour, C	0.1
Time controller, min.	1 minute - 99:59 minutes - continuous mode
Step-type behavior, sec.	1
Time needed for the platform to reach desired temperature, min.	
At room temp 20°C:	
37°C	not more than 15 minutes
60°C	not more than 45 minutes
Speed of rotation, RPM	100-1300
Step-type behavior, RPM	1
Amplitude of platform rotation, mm	2
Type of rotation:	orbital
Environmental temperature, °C	from 10 up to 45
Relative moisture of atmosphere (at the temperature of 20°C), %	not more than 80
Voltage and frequency:	220V - 50Hz
Power consumption, W	not more than 140
Size of the device (length x width x height), mm	370x335x120
Weight, kg	9

Delivery package

Item	Quantity
Shaker DTS-4	1
AC cord.....	1
User manual	1
Packaging	1

General safety

- Use only as directed in the operating instructions provided.
- The unit should not be used if it has encountered a physical shock or has been dropped.
- The unit must be stored and transported in a horizontal position (see package label).
- After transport or storage allow the unit to dry out (2-3 hours) before connecting to mains power.
- Use only original accessories provided by the manufacturer and ordered specifically for this model.

Electrical safety

- Connect to the mains only with a voltage corresponding to that on the serial number label.
- Ensure that the switch and plug are easily accessible during use.
- Do not plug the unit into the main outlet without grounding, and do not use extension lead without grounding.
- Before moving the unit, disconnect it from the mains. To turn off the unit, disconnect the power plug from the mains outlet.
- It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilt on or inside the equipment. If liquid is split inside the unit, disconnect it from the mains and have it checked by a competent person.

During operation

- Do not block the platform movement.
- Do not leave the operating unit unattended.
- Do not operate the unit in environments with aggressive or explosive chemical mixtures.
- Do not operate the unit if it is faulty or been incorrectly installed.
- For indoor use only.
- Before using any cleaning or decontamination method except those recommended by the manufacturer, check with the manufacturer that the proposed method will not damage the equipment.
- Do not make modifications to the unit.

Biological safety

- It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilt on or inside the equipment.

Preparation to use

- Unpack the device. Please keep the packaging material for transportation or storage purposes.
- If the machine was stored at a temperature below 0°C, make sure that it is kept at room temperature for at least two hours before turning it on.
- Place the shaker onto a level, horizontal surface.
- Examine the power cord and appearance of device for damage.
- Connect the power cord to the device and insert in to the socket corresponding to the pin of the power cord and press network switch at (I) symbol. Display will light up on the control panel.
- Check the platform. Try rotating it by hand. There should be no noise or obstacles to smooth running.
- Check the surrounding of device. Safety distance of 30cm must be observed around the device during operation.
- Check for other signs of damage or malfunction.

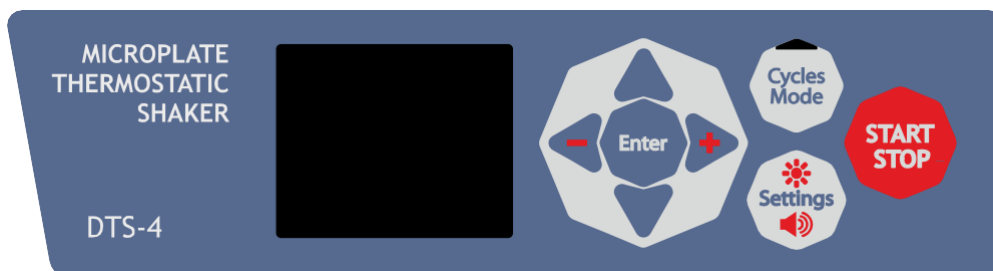
ATTENTION! If there is any apparent damage or malfunction, DO NOT TURN ON the shaker without consulting a specialist.

The device



- 1 - Network switch
- 2 - Power plug
- 3 - Lid
- 4 - Casing
- 5 - Control panel

Control description



Up and down navigation keys



Start stop key



Left, right navigation keys /
increasing, decreasing parameter value keys



Setting key to manage the interface of device

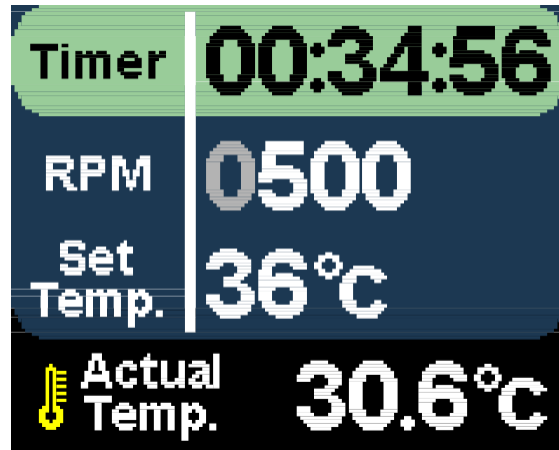


Entering and exiting key in programming mode
to set the step parameter



Entering and exiting key cycle mode

Main menu



Set the desired working mode parameters: time, RPM and temperature using the navigation keys on the control panel. To launch the operation, press start key.

Actual temperature is displayed on the bottom line of the main menu display. Last minute on the timer is counted in seconds, if you wish to enable nonstop operation set the maximum time value, a corresponding symbol will be shown on the display.

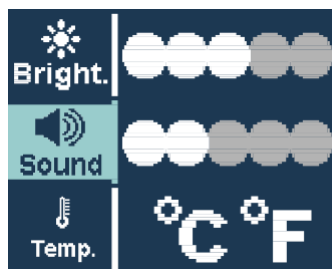
mode parameters:

TIMER: 1 minute - 99:59 minutes - continuous mode. PRM:

OFF - 100 - 1300.

Temperature: OFF - room temperature +3° up to 60°C.

Interface adjustment menu



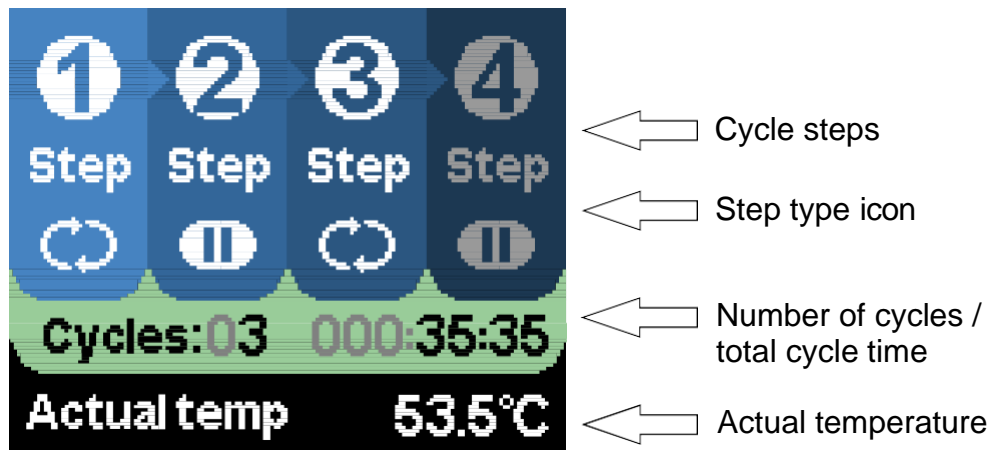
In the interface menu you can adjust the display brightness, sound volume, and select the temperature measurement scale: Celsius or Fahrenheit.

All settings are made using the navigation keys. To enter and exit the menu use the "SETTINGS" key.

Cycles menu

You can create a cycle program using the cycle menu. Combine the various shaker working modes in multiple steps. To enter or exit cycles mode press the cycles mode button. A light indicator will light up when entered.

Creating cycle



All settings are made using the navigation keys. Enter and exit the steps of cycle using the "ENTER" key.




Create a custom cycle by adding up to four steps and a number of repeat cycles as required. You can set the number of repeat cycles on the bottom line of the programming menu.

Ranges are from 1 to 99, or continuous mode.

Total cycle time is show next to the number of cycles menu.

If you wish for the device to maintain the set temperature after the end of cycle - do not disable the last step (no operation).

You can assign the desired operating mode to the cycle step:

-  1) Orbital rotation mode
-  2) Pause operation
-  3) No operation



Orbital rotation

Orbital rotation mode - classic platform motion mode with adjustable speed, time and temperature parameters.

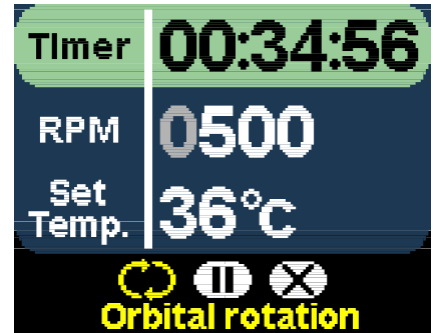
mode parameters:

Timer: 1 minute - 99:59 minutes - continuous mode.

RPM: 100 - 1300

Temperature: room temp.+3° - 60°C

If cycle program ends with this step the device will keep maintaining set temperature after end of cycle.



Paused operation

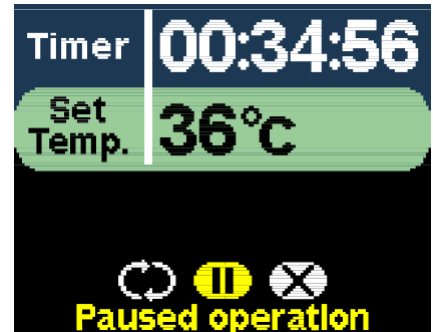
Paused operation - platform motion disabled mode with heater and timer working. Adjustable time and the temperature.

mode parameters:

Timer: 1 minute - 99:59 minutes - continuous mode.

Temperature: room temp.+3° - 60°C

If cycle program ends with this step the device will keep maintaining set temperature after end of cycle.



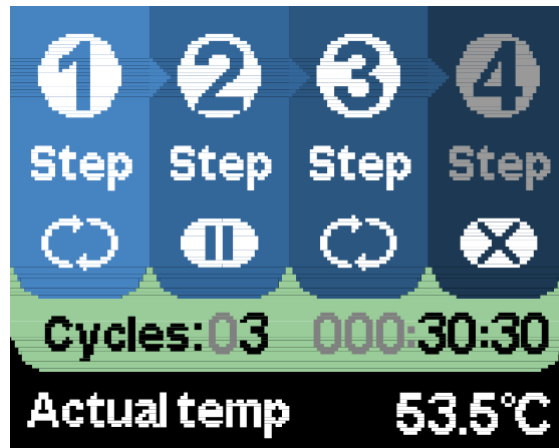
No operation

In order to shorten cycle and to disable step select no operation mode.

If cycle program ends with this step the device will start cooling down after end of cycle.



Example of custom cycle



Enter the Cycle programming menu

- 1 Select the 1st step and press “ENTER” key.
 - 1.1 In the step menu’s bottom line, select orbital rotation mode; set the time for 5 minutes, RPM to 500, temp. to 53.5°C and press “ENTER”.
- 2 Select the 2nd step and press “ENTER” key.
 - 2.1 Go to the step menu’s bottom line and select the paused operation mode; set the time to 10 seconds, temperature to 53.3°C and press “ENTER” key.
- 3 Select the 3rd step and press “ENTER” key.
 - 3.1 Go to the step menu’s bottom line and select orbital rotation mode; set the time to 5 minutes, RPM to 1000, temp. to 53.3°C and press “ENTER”.
- 4 Select the 4th step and press “ENTER” key.
 - 4.1 Go to the step menu’s bottom line and select the “NO OPERATION” mode and press “ENTER”.
- 5 Go to the program menu bottom line and set the cycle value to 3.

The program is ready! Press start button to run the program.

NOTE! Since the last step of cycle is disabled the device will not maintain set platform temperature after cycle ends and will start cooling down.

Disinfection and cleaning

Shaker must be cleaned once a week to avoid corrosion and changes to material. Disconnect the device from mains power supply and clean it separately. The platform, accessories and exterior of the shaker should be cleaned with a moist cloth. Only use neutral agents to clean these parts. To disinfect, use an alcohol-based disinfectant (70% isopropanol/water mixture). If corrosive, toxic or radioactive liquids or pathogenic bacteria are spilled on the platform, shaker must be decontaminated thoroughly.

Transportation and storage

To ensure safety during transportation, the equipment should be packed in the original manufacturer's packaging or similar packaging substitute.

Equipment can be transported in any kind of closed transport; make sure that equipment is tightly fixed and transported accordingly to transportation regulations. Equipment should be stored in original manufacturers packaging in dry room with humidity not more than 80% and temperature range of +10°C up to +40°C. It is not recommended to store the equipment more than 36 month.

Warranty statements

- Warranty applies to 24-month period from the date of purchasing.
- Malfunctions that occur due to a fault of the manufacturer, during warranty period, are repaired free of charge.
- Warranty is not valid in the following cases:
 - If the serial number label of the manufacturer is damaged.
 - If damage occurs as a result of incorrect operation, transportation or storage.
- These documents are necessary if applying for warranty repair:
 - User manual with serial number of the machine.
 - Officially signed report, describing the reasons and circumstances of the equipment malfunctions.
- Warranty repair can be performed only if the equipment is delivered in the original manufacturers packaging or equally safe packaging.
- Before returning for warranty repair ensure that the device is fully cleaned, decontaminated and does not present any kind of health risk to our staff.
- If the above warranty requirements are not met, repair charges are applied to the customer.
- For all further questions concerning usage and maintenance, please contact the manufacturer or product vendor.

Certificate of approval

Shaker DTS-4 N _____ has been inspected for the technical conditions and meets all regulations necessary for this class of device.

Quality control person _____
(name) (signature)

Date of manufacture _____.

Place for stamp.

Certificate of sale

Organization _____.

Address _____.

Phone _____.

Vendor _____
(name) (signature)

Date of sale _____.

Manufacturers' address.
21-133 Aizkraukles Str., Riga LV-1006
Tel: (+371) 6755 8743
Tel: (+371) 6755 1934
E-mail: info@elmi-tech.com
WWW: www.elmi-tech.com



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