Solid state thermostat with a built-in timer TT-2-«Thermit»

intended for scientific and clinical diagnostic research
TS 9452-004-46482062-2002

User manual
LTOK 170602.00.PS

«DNA-Technology, Research & Production» LLC
Protvino

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1. Intended use

The device is a solid-state thermostat with a built-in timer, which is intended for scientific and clinical diagnostic studies, including PCR diagnostics.

2. Technical specification

Number of tubes («Eppendorf» type)	**1,5 ml – 40 pcs.** **0,5 ml – 28 pcs.**
Temperature range	**from ambient temperature up to 99°C**
Timer scale	**from 1 up to 99 minutes**
Temperature accuracy	**± 1,0°C**
Temperature step	**1,0°C**
Power consumption from local mains 220 V: **initial heating** **at temperature holding**	 **no more 200 W** **no more 40 W**
Device dimensions (WxDxH)	**260x130x80 mm**
Weight	**2 kg**

3. Package contents

1	**Solid-state thermostat**	**1 pc.**
2	**Instruction for use**	**1 pc.**
3	**Power cord**	**1 pc.**

4. Design and principle of the device operation

4.1. Principle of the device operation

The device operation consists in the maintenance of constant temperature of the tubes with samples placed in the thermal block.

Heating of the thermal block is carried out by ceramic heating elements, cooling – by built-in vent. The process is controlled by microprocessor.

The thermostat has a built-in timer with alarm, that provides a signal after a program is completed.

4.2. Device design

The device is constructed as a single module, inserted in plastic case.

The front panel contains the following Buttons:

- **power-switch button with light indication of power-on mode (right);**
- **7 segment display and buttons for device operation and setting (left);**
- **LED for indication of general status of the timer (top left).**

Rear side of the thermostat has a standard connector for three-wire power cord.

5. General operation instructions

5.1. Unpacking

Unpack the device. In case of transportation or storage in cold conditions for a long time, wait for 2 hours before switching-on the device to heat it up to room temperature.

5.2. Device installation

Operation of the device is accompanied by the release of heat. Do not install the device near heaters or under direct solar rays, as well as do not impede the natural ventilation of the device by blocking up the space around it.

6. Safety measures

The thermostat power cord has a European type plug with third ground connection contact. Before connecting the device to electricity supply, please make sure that a power socket has necessary grounding.

Avoid contact of the device's body with any kind of liquids.

Attention: touching the device during operation may result in burns

7. Practical information

− If possible, install the tubes in the block symmetrically.
− if the device is used several times during the day, you can keep it power-on and leave it in the working mode for the whole period of work.

8. Maintenance operations

Keep wells of the block clean. In case of intensive usage, wipe wells with a cotton swab soaked in ethanol at least once in a month. Do not use metal objects for this purpose.

9. Storage and transportation

Store and transport the device at ambient temperatures between -20°C and +60°C and maximum relative humidity of 80%.

Dust, vapors of acids and alkalis, aggressive gases and other harmful impurity causing corrosion should be avoided during storage.

10.1. Device operation

The device operation is carried out with three buttons and 7-segment display.

After turning on the device, the built-in microprocessor heats the block to the idle temperature and maintains it infinitely. 7 segment display alternatively shows the setpoint value (number without a decimal point) and the temperature value of the block (with a decimal point), rounded to the nearest whole.

Temperature is expressed in degrees centigrade.

Buttons' functions are changeable and used as follows:

1. **Up button (vertical arrow pointing up):**
    a) **increases the set temperature of the block in temperature input mode. This mode is activated automatically after the device is switched on and maintained until it is changed.**
    b) **in the "timer" mode, it allows increasing the timer time.**
2. **Down button (vertical arrow pointing down) is similar to the up button, but is intended to decrease the values described in item 1.**
3. **Timer button (located next to the alarm clock image) is used to switch the device to the "timer" mode. The temperature settling (or initial heating) of the block is still carried out in this mode. However, the display shows the set timer time (in minutes). This value can be changed using the "up" and "down" buttons**

In 2 seconds after the last touch of any of these buttons, the device will automatically return to the temperature input (and display) mode.

After that the built-in timer starts to count time, set by the user. The red LED, located next to the alarm clock, turns on to indicate the timer mode. Upon reaching the set time, the device alarms during 1 minute or until "timer" button is pressed. The alarm is accompanied by a flashing red LED. It turns off after alarm stops.

If the timer has been already started and the timer button is pressed again, there are the following options:
1 − to get information about time until the beeping;
2 − to get information about the set time;
3 − turn off the timer;
4 − change the timer setting and restart it with a new setting.

The first three options can be obtained by sequentially pressing the "timer" button with a time interval no more than 2 seconds (options are provided sequentially-cyclically).

Herewith:

1. **The time until alarm is displayed with a decimal point, rounded to the nearest whole minute.**
   If the value is displayed for more than 2 seconds, the device turns to the "temperature" mode, and the timer stays activated.

2. **The set time is shown on display without a decimal point.**
   If the set time is displayed for more than 2 seconds, the device turns to the "temperature" mode, and the timer starts counting from the beginning.

3. **Zero on the display - the ability to disable the timer.**
   If zero is displayed for more than 2 seconds, the device turns to the "temperature" mode, and the timer (and LED) turns off. However, the last value of the timer setting is saved and can be used for subsequent starts of the timer.

10.2. Device start

After fulfillment the section 5 of this manual, the device should be connected to a 220V electricity line using a standard power cord. The switch, located on the right of the front panel, is turned on ("I"). LED inside the switch is on, which indicates the correct connection of the power cord to the device.

The device's display shows the value of the matrix temperature in ° C and the set temperature in ° C alternately.

The initial heating is started and the matrix's temperature is maintained in accordance with the preset temperature profile.

11. Example of the device setting

For example, the following parameters should be set:

Temperature – 74°C

After turning on the device, display shows the following data:

20./64 **(alternately)**

It means that the matrix temperature is 20 ° C, and the set temperature is 64 ° C.

Press the "up" button and hold it until 64 changes to 74.

The thermostat setting is complete. The new value of the temperature is saved in the internal memory and can be used for heating and maintaining the matrix temperature.

For more information and technical support, please send an e-mail to hotline@dna-technology.ru

12. Packing certificate

Solid state thermostat TT-2-«Thermit»

Serial number _____ manufactured by DNA-Technology, Research & Production, LLC has been packed in accordance with the TS 9452-004-464820-62-2002 requirements.

Packaging date "……"……., 202….

The packaging is done by _____ (signature)

The packed product is accepted by _____ (signature)

L.S.

Note. The form should be completed by the factory that packed the product.

13. Acceptance certificate

Solid state thermostat TT-2-«Thermit»
Serial number _____ manufactured by DNA-Technology, Research & Production, LLC complies with TS 9452-004-464820-62-2002 and has been qualified for operations.

Date of issue "……"……,202….

L.S.

Signatures of officers responsible for the acceptance

_____

14. Information on the content of precious metals

The device does not contain precious metals.

15. Manufacturer warranty

The manufacturer guarantees proper operation of the device and its conformity to TS 9452-004-464820-62-2002 while meeting the requirements of this Operations Manual.

The warranty period is 24 months from the date of sale.

Warranty repair is acceptable upon providing the warranty repair card along with the filled claim report.

CARD No. 1 to be filled in by the manufacturer

For warranty repair (maintenance) of Solid state thermostat TT-2-«Thermit»

..... Manufactured by.....
(Serial No. of the device) (Date)

Representative of the manufacturer's quality control department.....

(QCD stamp)

Date of sale DNA-Technology LLC, Moscow
(Manufacturer's name)

«.....».....20..... Manufacturer's stamp.....
(Date) (Signature)

Buyer details.....
....
(Signature)

CARD No. 2 to be filled in by the manufacturer

For warranty repair (maintenance) of Solid state thermostat TT-2-«Thermit»

..... Manufactured by.....
(Serial No. of the device) (Date)

Representative of the manufacturer's quality control department.....

(QCD stamp)

Date of sale DNA-Technology LLC, Moscow
(Manufacturer's name)

«.....».....20..... Manufacturer's stamp.....
(Date) (Signature)

Buyer details.....
....
(Signature)

Reverse of CARD No. 1 ***to be filled in by a service center***

Serial number of the device …….

Repair content.....
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Date .....

Serviceman.....Owner.....
(Signature) (Signature)

Reverse of CARD No. 2 ***to be filled in by a service center***

Serial number of the device …….

Repair content.....
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.....

Date .....

Serviceman.....Owner.....
(Signature) (Signature)

List of claims and instrument disinfection procedure

Serial number of device: _____

Detailed description of the defect: _____
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Means used for disinfection: _____
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Procedure of the devicet disinfection: _____
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_____
_____
_____

Full name: _____
Position: _____
Company: _____
Signature:
_____
Date: _____

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