



Dry Block Heaters (Solid-State Thermostats)

PE-4010, PE-4020, PE-4030, PE-4050

Data Sheet Operating Manual

Version 1.0EN dated 29.09.2015

Part numbers:

1.75.50.0090



1.75.50.0110



1.75.50.0100



1.75.50.0093



Saint Petersburg
2015

1. General Instructions

- 1.1. The present Data Sheet combined with the Operating Manual describes the characteristics and procedure of work with the laboratory dry block heaters of PE-40x0 series (hereinafter referred to as the dry block heater).
- 1.2. Prior to operation of the dry block heater, read carefully the sections "Technical Specification", "Working Procedure" and "Safety Requirements".
- 1.3. Due to continuous improvement of the products the construction of the product can be subjected to modifications not worsening its characteristics, which are not reflected in the Data Sheet.

2. Purpose

- 2.1. The dry block heater is intended for heating the samples in reaction vessels in fixed temperature regime under laboratory conditions.
- 2.2. The following functions are implemented in the device:
 - Setting and indication of the specified heating temperature;
 - Maintenance of the specified temperature with the required accuracy;
 - Indication of the current heating temperature;
 - Setting the timer for switching on the heating after expiration of the specified time (delayed start);
 - Setting the timer for switching off the heating after expiration of the specified time;
 - Saving the current temperature and timer settings in the non-volatile memory;
 - Audible and visible signalling of the completion of the heating cycle;
 - Safety functions;
 - Socket for mounting the control thermometer;
 - Possibility of replacement of the aluminium block for another configuration of vessels.

3. Technical Specification

- 3.1. Working temperature range, °C.....from ambient + 10 to 180
- 3.2. Temperature setting discreteness, °C.....0.1
- 3.3. Temperature maintenance accuracy, °C±0.2
- 3.4. Temperature gradient within the block volume, °C.....±0.2
- 3.5. Timer interval setting range (switch-controlled):
 - from 1 s to 99 min 59 s, the discreteness is 1 s
 - from 1 min to 99 hours 59 min, the discreteness is 1 min (factory setting)
 - from 1 hour to 99 days 23 hours, the discreteness is 1 hour.

- 3.6. Supply voltage, V 220
 3.7. Black material aluminium
 3.8. Block socket material polished stainless steel
 3.9. Cabinet material cold-rolled steel with powder painting
 3.10. Dimensions of the socket for mounting a thermometer, mm Ø9.5x30
 3.11. The power consumption and weight-size parameters are given in Table 1.
 3.12. The parameters of the mounting sockets are given in Table 2.

Table 1

Model	PE-4010	PE-4020	PE-4030	PE-4050
Power consumption, W	350		250	
Overall dimensions (W x D x H), mm	220x275x160		220x275x125	
Weight/kg	4.5		3.9	

Table 2

Model	PE-4010	PE-4020	PE-4030	PE-4050
Vessel type	10 ml centrifugal test tube	20 ml test tube	Serum vial FO-10	10 ml photometric vial for determining the COD
Number of sockets	22	14	14	24
Socket dimensions, mm	Ø18x85	Ø21.5x85	Ø23x45	Ø17x45

4. Operating conditions

- 4.1. Ambient air temperature, °C +10 to +35
 4.2. Relative air humidity, % up to 80
 4.3. Supply voltage, V 220±20
 4.4. Power supply frequency, Hz 48÷62
 4.5. Allowable time of continuous work, hours 2,399

5. Scope of delivery

- 5.1. Dry block heater 1 pc
 5.2. Removable handle for moving the block 1 pc
 5.3. Mains cable 1 pc
 5.4. Data Sheet and Operating Manual 1 pc

6. Device

The dry block heater (Figure 1) is constructed in a single cabinet 1 made of cold-rolled steel and coated with powder paint resistant to mechanical and chemical attacks. The control panel 2 is located in the front part of the cabinet. In the top part of the cabinet, there is a socket 3 for mounting an aluminium block 4, into the holes of which the vessels with temperature-controlled samples are placed.

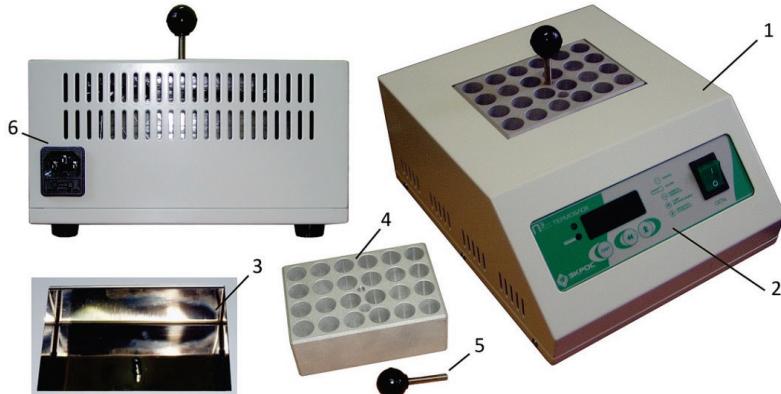


Figure 1 – Dry block heater

Main components: 1 – cabinet; 2 – control panel; 3 – socket for mounting the aluminium block; 4 – aluminium block; 5 – knob for moving the block; 6 – power receptacle with the fuse unit

The removable handle 5 serves to mount the aluminium block into the socket and to remove it from there. On the rear wall of the cabinet, there is a receptacle for connecting the mains cable with the fuse unit 6. The 4 rubber feet are fitted on the cabinet bottom.

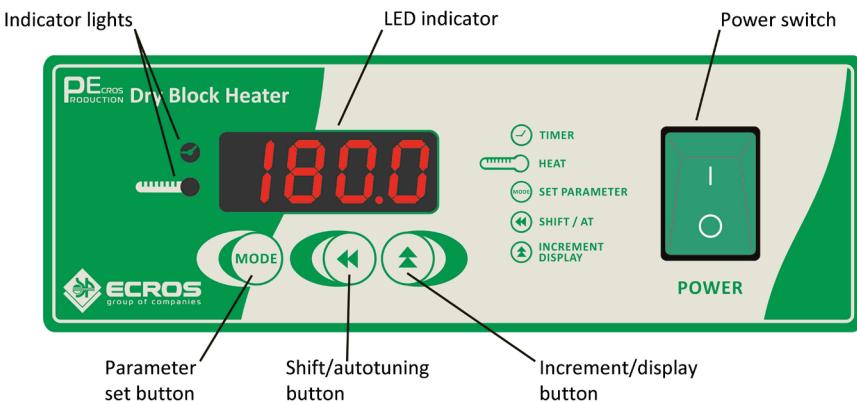
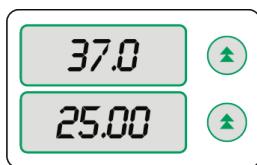


Figure 2 – Control panel

6.1. Controls

All the controls and indication elements are located on the control panel (Figure 2).



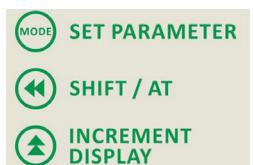
Digital LED indicator indicates the current block temperature during the operation. It can be switched to indicating the current timer setting by pressing the “Increment/Display” button.



Timer: the lamp blinks or is illuminated, if the countdown timer is switched on.

- The lamp blinks until the specified temperature value is reached.
- The lamp is illuminated when the time is counted down.

Heat: the lamp blinks when the heating element is switched on.



Parameter set: press this button to change the specified temperature and time values.

Hold down the button for 20 seconds to go to the viewing mode and changing the controller parameters.

(Note: All the regulator parameters are set before shipment; never change them without understanding clearly the value of each parameter)

In this mode, press this button to go to the next parameter.

Shift/autotuning: press this button to move the cursor to one position to the left when editing the numerical values.

Autotuning function: hold down this button for 5 seconds to start the process of autotuning of the temperature controller.

(Note: the instrument is shipped with already performed autotuning procedure.)

Increment/display: increases the current value when setting the temperature and time set on the timer.

In the working mode, it toggles the display indication between the current temperature value and time set on the timer.



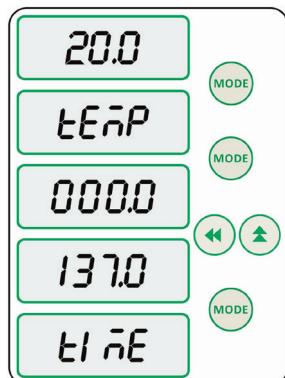
Power switch serves for switching the dry block heater on and off.

7. Working Procedure

7.1. Pre-Operation

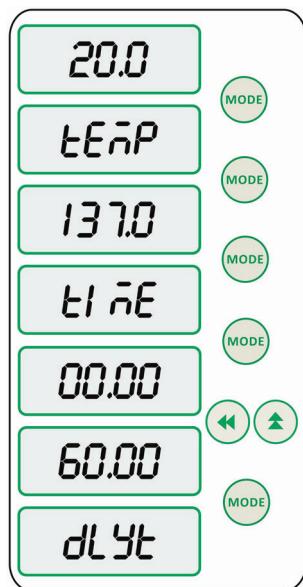
1. Make sure that the voltage parameters of your mains correspond to those specified on the nameplate of the dry block heater.
2. Place the dry block heater on a flat level surface.
3. Insert the aluminium unit into the socket. Screw out the handle for moving the block.
4. Connect the power cord to the instrument and electric mains.
5. Place the working samples to the mounting sockets.
6. If necessary, set the control thermometer into the respective socket.

7.2. Setting the Temperature



1. In the working mode (the current temperature value is displayed), press the **(MODE)** button.
 2. The **tEñP** lettering is displayed.
 3. Press the **(MODE)** button once again.
 4. The set temperature will be displayed.
 5. Set the required value of the working temperature using the **◀** and **▶** buttons.
 6. Press the **(MODE)** button to go to the timer setting mode.
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7. To skip the timer setting and return to the working mode, press the **(MODE)** button four times more. The controller will begin to maintain the newly specified working temperature.

7.3. Setting the Working Timer

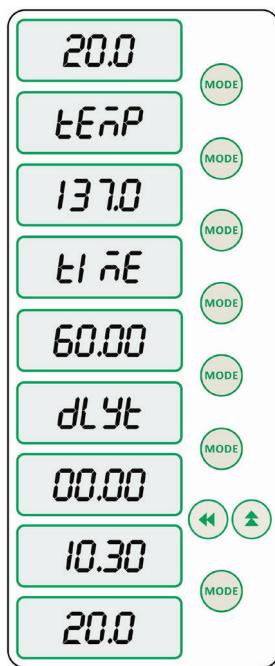


1. Press the **(MODE)** button three times to set the working timer.
 2. The **tIME** lettering is displayed.
 3. Press the **(MODE)** button once again.
 4. The specified time (for example, **00.00**) is displayed.
 5. Set the new time on the timer using the **◀** and **▶** buttons.
 6. The default time scale is **HH:MM**.
 7. To set the continuous running, the time shall be set to **00.00**.
 8. In this scale, the time can be set within the range from 1 minute to 99 hours 59 minutes.
 9. Press the **(MODE)** button to go to the delayed start timer setting mode.
10. To skip the delayed start timer setting and return to the working mode, press the **(MODE)** button two times more. The controller will start to work according to the timer.

Note: The time scale of the timer is set by means of the respective controller parameter (see item 8, page 9, parameter **MODE1**) to one of the following ranges:

- 1) **MM:SS** 99 min 59 s
- 2) **HH:MM** 99 hours 59 min
- 3) **DD:HH** 99 days 23 hours

7.4. Setting the Delayed Start Timer



11. Press the button five times to set the delayed start timer.
12. The **dLYt** lettering is displayed.
13. Press the button once again.
14. The specified time (for example, **00:00**) is displayed.
15. Set the new time on the delayed start timer using the and buttons.
16. The default time scale is HH:MM.
17. To switch off the delayed start timer, set the time value to 00.00.
18. In this scale, the time can be set within the range from 1 minute to 99 hours 59 minutes.
19. Press the button to go to the delayed start timer countdown mode.

Note: the specified delayed start time is not saved when the power supply is switched off.

7.5. Switching the Heating On and Off

Once the heating temperature and working timer time have been set, the heating starts automatically in accordance with the setting of the delayed start timer. On completion of the heating in accordance with the heating timer setting, the heating is stopped, the intermittent audible alarm is heard and the **End** lettering and current temperature setting are displayed alternately. To repeat the heating cycle, press the button.

7.6. Automatic Tuning of the Controller

Should the temperature maintenance accuracy be insufficient, it is recommended to perform the procedure of automatic tuning of the regulator.

Attention! During this procedure, considerable overtemperatures will occur.

To start the procedure, press the button and hold it down for 6 seconds.

During the procedure, the **AT** lettering and current temperature value blink on the display alternately. On completion, the lettering stops blinking and new settings will be accepted.

To interrupt the procedure before its completion, press  button once again and hold it down for 6 seconds.

8. Controller Parameters

8.1. Parameter set 1

To go to the mode of viewing and editing of this group of parameters, hold down the  button for 5 seconds.

To change the values of the parameters, use the  and  buttons.

To go to the next parameter, press the  button.

To exit the mode of viewing and editing of the parameters, press the  button and hold it down for 5 seconds.

Display indication	Parameter description	Range	Factory setting	Set by the user
ALH	Upper alarm limit	00.0÷99.9°C	0.2	
ALL	Lower alarm limit	00.0÷99.9°C	3.0	
HYS	Hysteresis	00.0÷99.9°C	0.2	
BEEP	Buzzer time	0÷9,999 s	30	
RDJ	Temperature calibration	-99.9÷299.9°C	0	
LOC	Locking the keys, data and parameters	0000÷1,111	0000	

8.2. Parameter set 2

To go to the mode of viewing and editing of this group of parameters, hold down the  button for 30 seconds.

After the first 5 seconds, the **ALH** lettering will appear on the display; continue holding down the button for 25 seconds more.

To change the values of the parameters, use the  and  buttons.

To go to the next parameter, press the  button.

To exit the mode of viewing and editing of the parameters, press the  button and hold it down for 5 seconds.

Display indication	Parameter description	Range	Factory setting	Set by the user
RMT	Upper limit of the temperature setting	-99.9÷299.9°C	181	Do not alter
ACTP	Timer activation temperature (the parameter can be only altered, if the value N2 of the parameter Mode0 is equal to 1) The timer begins the countdown, if $(T_{current} - T_{set}) > ACTP$	-00.0÷99.9°C	0	
PRO	Period: (interval of giving the control signal)	1÷99 s	1	Do not alter
P	Proportional component	0÷6,999	obtained during the autotuning	Do not alter
I	Integral component	0÷6,999	obtained during the autotuning	Do not alter
A	Anti-integrand component	0÷6,999	obtained during the autotuning	Do not alter
D	Differential component	0÷6,999	obtained during the autotuning	Do not alter
MODE0	Working mode control 0 N3 0 = KS, JIS Pt 100 1 = DIN Pt 100 N2 0 = ALH (relative) 1 = AALH (abs.) N1 0 = ALL (relative) 1 = AALL (abs.) NO 0 = 000 °C 1 = with decimals (000.0 °C)	N3 N2 N1 NO 0 0 0 0 1 1 1 1	0001	Do not alter
MODE1	Working mode control 1 N3 0 = PID-controller 1 = Positional controller N2 0 = Timer OFF 1 = Timer ON N1 0 = Timer MM:SS 1 = Timer HH:MM	N3 N2 N1 NO 0 0 0 0 1 1 1 1	0111	

	2 = Timer DD:HH NO 0 = Restoration on switching on disabled 1 = Restoration on switching on enabled			
MODE2	Working mode control 2 Not enabled	N3 N2 N1 NO 0 0 0 0 1 1 1 1	0000	Do not alter
DRAW	Fix the drift of the temperature indications within the specified value The temperature drift takes place for various reasons during the operation. To exclude the temperature drift, set the value DRAW to fix the temperature within these limits.		0.5	
LBAT	Not enabled		0000	

Remarks:

- 1) **RNT**: upper limit of the specified temperature. The user cannot set the temperature exceeding this value. Factory setting: 181. Do not alter this value.
- 2) **RDJ**: Corrective adjustment of the temperature indications. Sometimes the real temperature value slightly differs from that indicated on the display. In this case, the indicated value can be corrected using a verified thermometer.

Examples:

Indication of the verified thermometer	Display indication	Necessary value RDJ
138.0°C	137.0°C	1.0
136.0°C	137.0°C	-1.0

9. Troubleshooting

Trouble	Possible cause	Remedy
When switching on the power supply, the display is not illuminated	Fuse blown Faulty power cord No mains voltage	Replace the fuse Replace the power cord Contact the technical service department
The display shows the symbols "uuuu" and the audible signal is heard	Overtemperature exceeding 180°C	Contact the service department
The display shows the symbols "nnnn"	The temperature circuit is broken	Contact the service department

10. Safety Requirements

Prior to connecting the device to the power mains, make sure that the power cord and other components is free of mechanical damages.

As regards the method of protection of a human against electric shock, the dry block heater corresponds to class I to GOST 12.2.007.0 standard.

When operating the dry block heater, the "Rules for Operation of Customers' Electrical Installations" and "Safety Rules for Operation of Customers' Electrical Installations" approved by the State Power Supply Inspectorate (Gosenergonadzor) shall be observed and the requirements of GOST 12.2.007.0 standard shall be met.

The persons allowed to operate the dry block heater shall have necessary qualification and be trained in the safety regulation as well as shall have studied the present Operating Manual.

11. Storage and Transportation Rules

Within the guaranteed storage life, the instrument shall be stored in the manufacturer's package at a temperature of +5 and +40°C and relative humidity of 80%. The unpacked instrument should be stored at ambient air temperature of +10 to +35°C and relative humidity of 80%.

The dry block heater may be transported by any transportation mode in roofed vehicles within the temperature range of -40 to +50°C and relative humidity of not more than 95%.

12. Warranty

The manufacturer guarantees the operability of the instrument provided the transportation, storage and operation conditions are met.

The warranty period is 1 year from the date of sale of the product as determined by the date of the bill of lading. Within this period, the supplier undertakes to repair the defective parts or replace them with new ones free of charge.

The warranty rights of the consumer are recognised within the specified period provided the consumer meets all the requirements for transportation, storage and operation of the product.

Should any faults of the dry block heater be detected, the report with indication of the faults and contact telephones of the user should be drawn up. This report shall be sent to the manufacturer's address:

Ecohim Co. Ltd.
22 17th Line, building I, Suite 406, Vasilyevsky Island, Saint Petersburg 199178.
Phone: (812) 448-76-10, fax: (812) 448-76-00
E-mail: info@ecohim.ru URL: www.ecohim.ru

13. Certificate of Acceptance

PE-40_0 dry block heater, serial No. **4K0_P_____** has been verified for compliance with the requirements of the technical documentation and recognised to be suitable for operation.

Date of manufacture _____

Stamp of the Technical Control
Department

Inspector _____