Heating Mantles
ES-4100-3, ES-4110-3

Data Sheet

Operating Manual

Version 1.1EN dated 28.09.2015

Part number:

200.01.0120 200.01.0110

Saint Petersburg

2015

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1. General Instructions

The present Manual contains the data required for operating the three-place laboratory heating mantles of ES-41xx-3 series, hereinafter referred as the “heating mantle” or “device” or “instrument”. The manufacturer reserves the right to modify the design and circuitry of the measuring instrument, which do not affect the technical parameters, without correction of the operating documentation.

2. Purpose

The heating mantle is intended for heating liquids in round-bottomed flasks made of heat-resistant glass with the volume of 500 and 1,000 ml within the temperature range from the ambient one to 450°C.
The device involves the stabilisation of the heating power when the supplying voltage varied within the range ±10%.

Note: This heating mantle has no built-in or plugin temperature sensor and, respectively, possibility of maintaining the specified temperature. The regulator installed on the device control panel is intended for regulating the heating power and its scale is graduated in standard units making it possible to set the heating power value, which is reproducible within certain range depending on the stability of the supplying voltage. At an equal heating power, the actual temperature of the object being heated will depend on external conditions, for example, air temperature in the room and on the parameters of the object itself such as its size, conditions of heat exchange with the environment, phase state of the substance, etc. Thus, the scale of regulator of the heating power of the heating mantle makes it possible to select and further set approximately the equal values of the heating intensity and, respectively, temperature for identical objects. The actual temperature of the object shall be monitored by means of a thermometer located immediately in the object being heated.

3. Technical Specification

Model	Flask volume, ml	Maximum temperature of the heating element, °C	Power, W	Dimensions, W x D x H, mm	Weight, kg
ES-4100-3	500	450	3x220	670x400x140	11.6
ES-4110-3	1000		3x330	670x400x140	12.6

4. Operating Conditions

Ambient air temperature, °C .....+10 to +35
Relative air humidity, %..... up to 75
Supply voltage, V..... 220±10%
Power supply frequency, Hz ..... 50±2
Allowable time of continuous work, not more than, hours 8

5. Scope of Delivery

- Heating mantle ..... 1 pcs
- Mains cable ..... 1 pcs
- Data Sheet and Operating Manual ..... 1 pcs

Optionally, the scope of delivery shall comprise a complete set of supports and clamps (part number: 200.01.0130):

- Vertical tripod support ..... 2 pcs
- Horizontal support ..... 2 pcs
- Horizontal support fastener ..... 6 pcs
- Vertical support fastener ..... 4 pcs
- Large universal holder (clamp), grasp width up to 45 mm ..... 6 pcs

6. Safety Requirements

1. As regards the method of protection of a human against electric shock, the heating mantle corresponds to class I of GOST 12.2.007.0 standard. When operating the heating mantle, 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.
2. The persons allowed to operate the instrument shall have necessary qualification and be trained in the safety regulation as well as shall have studied the present operating manual for the instrument operation.
3. The device shall be connected to the earthing loop by means of a two-pole socket and plug with earthing contact. The electric resistance of the earthing loop shall not exceed 4 Ω. It is strictly prohibited to work with the unearthed instrument as well as use the water/gas-supply or sewerage networks, earthing connectors of lightning dischargers, etc. as earthing system.
4. Prior to connecting the instrument to the power mains, make sure that the power cord is free of mechanical damages.
5. When operating the instrument, avoid any contact with its heated parts. It is strictly prohibited to touch the heating element fabric when the heating mantle is connected to the electrical mains.
6. Special care should be taken when handling flammable liquids. Getting a flammable liquid onto the heating element can cause inflammation.

7. Construction of the Instrument

The heating mantle (Figure 1) consists of the body 1 accommodating three independent heating units each consisting of the heating element 2 and electronic voltage regulator making it possible to obtain high stability of the heating power when the main voltage varies within the range of ±10%.

The control panel of each unit 3 comprises the knob for switching on and stepless regulation of the heating power 5 and the heating indicator 4.

On the right-side wall of the device cabinet, there is a plug for connecting the mains cable with the built-in fuse block and on the periphery of the rear wall there are two catches for fastening the vertical supports of the optional complete set of support and clamps 6.
The heating element is woven of safe non-toxic fiberglass with interwoven nichrome wire that excludes its residual deformation and ensures the firm adherence to the vessel walls to minimize the heat losses and increase the energy efficiency of the device.
The heating mantle cabinet is made of cold-rolled steel and coated with Karumel powder paint having adhesion stability, and resistance to scratching and corrosion.

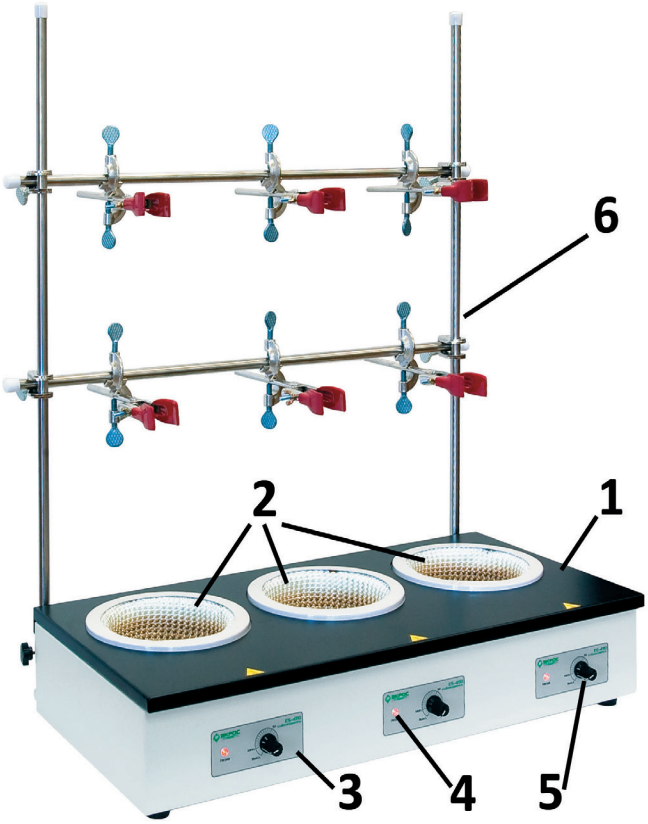


Figure 1

8. Working Procedure

1. Prior to starting the work with the heating mantle, make sure that the knob for stepless regulation of the heating power is set to the leftmost position.
2. Connect the device to the electric mains.
3. Switch the device on and set the required heating power by turning the knob 5 for regulating the heating power clockwise. The heating element has thermal inertia; therefore, the heating should be reduced by turning slightly the knob 5 counterclockwise before the required temperature is reached.

Attention!

1. Any direct contact of the heating element fabric with liquids is strictly prohibited. It leads to heating mantle failure not covered by the warranty. If any liquid gets into the heating mantle, disconnect immediately the latter from the electric mains and wait for sufficient time until the heating mantle dries out in natural way.
2. Never apply mechanical efforts capable of deforming the heating element.
3. Never use the heating mantle at the maximum temperature for more than 8 hours.

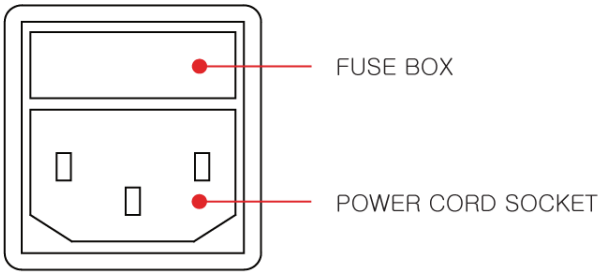
4. Never disassemble the heating mantle and/or modify its construction in any way.

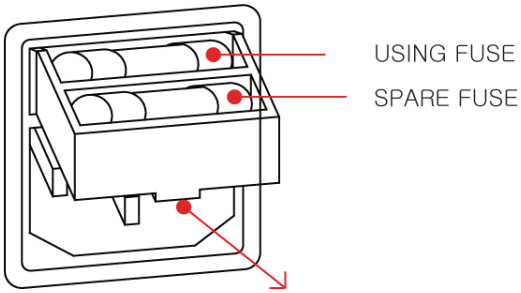
Remarks:

1. After operation of the heating mantle, the internal surface becomes spotty or its colour charges slightly. It is caused by burning of the heating element and does not affect the device operation.
2. Within the first 30 minutes of operation the heating mantle, smoke can appear that is caused by evaporation of silicone from the protective coating of the heating element and does not affect the instrument quality is any way.
3. A round-bottomed flask and the heating mantle shall fit together as to volume, otherwise the heating takes more time and power consumption increases. Choose the heating mantle model correctly.

9. Troubleshooting

If the device cannot be switched, check the presence of the main voltage, integrity of the main cable and intactness of the fuse.





In any other case of revealing a fault, contact the Service Department of the equipment supplier. Never disassemble the heating mantle or try to eliminate the fault by yourself.

10. Disposal

After expiration of its service life, the heating mantle causes no hazard for human life or health or for the environment and requires no special methods of disposal.
The disposal procedure shall be determined by the organisation operating the heating mantle.

11. Storage and Transportation Rules

Within the guaranteed storage life, the heating mantle shall be stored in the manufacturer's package at a temperature of +5 and +40◦C and relative humidity of 80%.
The unpacked heating mantle should be stored at ambient air temperature of +10 to +35◦C and relative humidity of 80%.
The instrument 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 compliance of the product with the characteristics stipulated in items 2 and 3 hereof provided the consumer adheres to the operation, transportation and storage conditions.

The guaranteed service life is 12 months from the date of shipment to the consumer as determined in the bill of lading or, in the absence of the latter, from the date of manufacture of the product.
The warranty maintenance shall be only performed by the manufacturer's authorised service centres.

13. Claims Information

In case of revealing any faults within the guaranteed service life or incompleteness when unpacking the product, the consumer shall send the claim report to the manufacturer's address:

Ecohim Co. Ltd.
22 17th Line, building I, Suite 406, Vasilyevsky Island, Saint Petersburg 199178.
Phone/fax: (812) 322-9600, 448-7610, 448-7600
E-mail: info@ecohim.ru, URL: www.ecohim.ru

The claim shall not be submitted:

- on expiration of the warranty period;
- if the consumer has broken the operation, storage and transportation rules provided in the operating documentation;
- in case of damage of the seals on the instrument cabinet.

14. Certificate of Acceptance

The heating mantle of ES-41xx-3 series, serial number **4K1__-3E_____** has been verified in accordance with the statutory requirements of national standards and current technical documentation, and recognised to be ready for service.

Date of manufacture _____

Stamp of the Technical Control Department

Inspector _____

Appendix 1 – Information on the Repairs Performed

Data of failure	Nature and causes of the failure	Note of the organisation having performed the repair	Remarks

Notes