ES-4610, ES-4620
Drying Ovens

Data Sheet
Operating Manual

Version 1.0EN dated 20.10.2015

Part numbers:

1.21.40.10 1.21.40.20

Saint Petersburg
2015

1. General

The present data sheet combined with the technical description and operating manual is intended for familiarising the user with the construction and rules of operation of ES-4610, ES-4620 drying ovens.
Due to continuous improvement of the devices, minor modifications not worsening the technical specification of the products can be made to the design.

2. Purpose

2.1. The drying oven is to be used for drying, firing, melting, curing and sterilisation of various articles, treatment of tools and samples as well as performance of laboratory investigations of every sort and kind in the laboratories of industrial enterprises, research establishments and medical institutions, colleges, universities, etc.

3. Operating conditions

3.1. Ambient air temperature, °C ..... +5 to +40
3.2. Relative air humidity, % ..... up to 85
3.3. Supply voltage, V ..... 220±22
3.4. Power supply frequency, Hz ..... 50±1

Attention! This equipment is not intended for handling flammable, explosive, poisonous and corrosive substances as well as in the atmosphere of them.

4. Technical Specification

Parameter	**ES-4610**	**ES-4620**
Working temperature range, °C	from ambient +10 to +300	
Temperature non-uniformity throughout the volume, °C	±5	
Temperature setting discreteness, °C	±0.1	
Chamber volume, l	50	30
Standard/maximum number of shelves, pcs	2/5	2/5
Power consumption, W	1100	850
Supply voltage, V	220 V, 50 Hz	
Internal dimensions, mm	420x340x350	345x270x320
External dimensions, mm	720x590x520	620x530x490
Weight, kg	36	32
Average service life, years	7	

5. Scope of delivery

The scope of delivery of the standard equipment includes:

- Drying oven ..... 1 pc.

- Shelf made of stainless steel ..... 2 pcs.
- Mains cable ..... 1 pc.
- Spare fuse 250 V, 5/10 A ..... 2 pcs.
- Data Sheet and Operating Manual ..... 1 pc.

The additional accessories are delivered to separate order.

6. Construction and Principle of Operation

The drying oven consists of the outside case, working chamber with the ventilation passage and air duct and electronics module.

Figure 1

The outside case is made of high-quality cold-rolled steel and coated with powder paint resistant to mechanical and chemical attacks. The space between the case and the working chamber is filled with highly efficient heat insulator. The ventilation passage damper is located on the roof of the case.

The working chamber is a structure made of stainless steel, the side walls of which are provided with five pairs of holes for the guides for setting the shelves at the required height.

The door is provided with a seal made of heat-resistant silicon rubber and adjustable catch ensuring the reliable sealing. The window at the door is made from triple heat-resistant glass.

The control unit is located in a separate compartment in the left part of the oven.

The front panel (Figure 1) comprises the control panel of the temperature controller, the main switch and the air dumper.

The system for maintaining the constant temperature of the oven consists of the motor with axial fan, electric heater, system of air ducts and temperature controller. When this system is switched on, the motor rotates the fan, which provides for ascent of heated air from the electric heater located at the bottom of the oven through the air duct into the working chamber, where the samples being dried are located. Having passed through the working chamber, the air is sucked by the fan again. Such circulation continues until the specified temperature is reached.

The temperature controller is a multifunction device performing the main temperature-regulating functions as well as a number of auxiliary functions. This product is equipped with a temperature controller implementing the PID control.

7. Working Procedure

1. Place the objects to be dried into the drying oven and close the door tightly. Power on the instrument by means of the power switch.

   Attention! To ensure the free air inflow between the objects being dried in the chamber, the shelves should be arranged in well-balanced manner and loaded to not more than 2/3 of their capacity.

2. Set the necessary working mode of the drying oven (in accordance with the description of the work with the temperature controller). The heating to the set temperature will be started; on completion of the heating, the heating indicator will go out. The temperature will be stabilised completely within extra 60 minutes.

   Attention! Never switch off the fan when the temperature is rising, otherwise the service life of the heating element will be shortened.

3. The drying mode shall be chosen depending on the moisture content in the object to be dried. If the working samples are too moist, open completely the vent damper.

4. If the dried objects are not to be removed from the oven right after completion of the drying process, close the vent damper. Otherwise switch off the power, open the chamber door and remove immediately the samples. Be careful to avoid burns.

8. Safety Requirements

1. As regards the method of protection of a human against electric shock, the device corresponds to class I of GOST 12.2.007.0 standard. When operating the device, the “Rules for Operation of Customers' Electrical Installations” and “Safety Rules for Operation of Cus-

tomers' 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 device shall have necessary qualification and be trained in the safety regulation as well as shall have studied the present document.
3. Prior to connecting the device to the power mains, make sure that the power cord is free of mechanical damages.
4. The oven 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 device.
5. The drying oven shall be installed in a well-ventilated room, and no combustible or explosive substances shall be located near it.
6. The drying oven is not provided with an explosion prevention device; therefore never place flammable or explosive substances into it.
7. Too many objects in the drying chamber are not allowed. The object shall be arranged at small distance from one another to ensure good circulation of hot air in the chamber.
8. The drying oven shall be kept clean both outside and inside. Should the drying oven be out of operation for long time, it shall be covered with thin plastic film and left in a dry room.

9. Operating Mode

9.1. Switching on the instrument

Connect the power cord to a power outlet with a protective ground connection.
Turn on the instrument by pressing the "Power" button. Button and the display will light up. The PV display shows the initialization sequence and then the instrument is ready for use.

NOTE: if the set temperature (see SV display) is higher than that detected in the oven (see PV display), the instrument begins to heat as soon as the initialization phase with the set parameter of temperature.

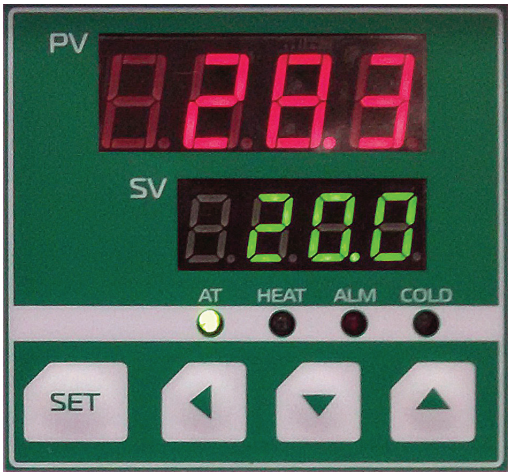


Figure 2

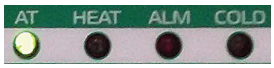
9.2. Control Elements

Figure 2 presents the control panel of the temperature controller.

Purpose of the buttons:

The “PV” display (present value) displays the measured temperature inside the oven.

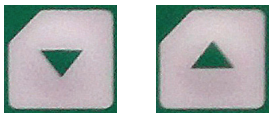
The “SV” display (set value) displays the temperature or set time.



The LEDs indicate, respectively, when the controller is:
operations (AT), heating (HEAT), in overtemperature alarm (ALM).
* only for cooling system

The SET button allows you to enter / exit the setup menus of the operating parameters and to confirm them.

The SHIFT key allows you to quickly change the digit (ones, tens, etc.) of the value of the parameter you are editing.



Adjustment buttons allow you to increase or decrease the value of the operating parameter being edited.

9.3 Setting of parameters

9.3.1 Working temperature

When instrument is switched on, pushing once the key (SET)  , the display PV shows “SP” (=set point) and the SV display shows the last set value of temperature.

Set the wanted temperature value (Celsius degree) pressing keys  and  . It’s possible a quick movement between the digits using the key  .

Confirm the set value with another press of (SET)  .

9.3.2. Working time

After confirmed the temperature value, the PV display shows “ST” (=set time) and the SV display shows the last set value of time.

Set the wanted temperature value (in minutes) pressing keys  and  . It’s possible a quick movement between the digits using the key  .

Confirm the set value with another press of (SET)  .

NOTE: the value "0000" indicates the operation mode "continuous", means that the oven works until it is turned off with the "Power" button maintaining the set temperature.
If, however, has been set to a value defined time, for example 30 minutes, the oven will reach the predetermined temperature and maintain it for 30 minutes.
After reaching the set temperature thus began the count-up, which can be viewed at any time by pressing the key ◄: the PV display will show "TIME" and the SV display will show the time passed from the start of the cycle.
After the set time an intermittent beep and the word "END" on the SV display alerts you to the end of the heating cycle.
Press any button to silence the buzzer.

NOTE: once the heating cycle and silenced the alarm, the oven does not automatically resume to heat but remains in the standby phase with the word "END" on the SV display.
To shoot heating is required hold ▼ and ▲ keys simultaneously for at least 4 seconds and the word "END" disappear.
At this point the heating is resumed with the set parameters of temperature and time, or you can reset the operating parameters and resume the heating.

10. Clean and maintenance

Proper maintenance and cleaning of the instrument guarantee its good conditions.
The inner chamber of the instrument is made of stainless steel, so it can be cleaned with any detergent provided it is not aggressive and / or corrosive.
You should clean the inside and outside surfaces with a standard all-purpose cleaner sprayed on a soft cloth.
Before proceeding with any cleaning or decontamination, the user must ensure that the method used does not damage the instrument.

IMPORTANT:
If the instrument must be returned for service, it is necessary to provide for proper cleaning and possible decontamination by pathogens of the same.
It is also recommended to put the instrument in its original packaging to send it in for repairs.

11. Troubleshooting

Fault	Possible causes	Remedy
The instrument cannot be switched on	The alimentation plug is poorly connected or not connected to the receptacle, or the power cord is disconnected	Connect the power cord to the oven receptacle and insert the plug into the AC socket
	The fuse has blown out	Replace the fuse
The temperature in the chamber fails to increase	Incorrect temperature setting	Set the required temperature
	The electric heater is faulty	Replace the electric heater
	The temperature controller is faulty	Replace the temperature controller
	The temperature sensor is faulty	Replace the temperature sensor
	The fan is not running	Replace the fan
The set temperature cannot be reached	The vent damper is fully opened	Close the damper to some extent
	The working chamber is overfilled; there is no place for movement of air	Unload the chamber partially to ensure the free circulation of air
The fan is not running	The fan motor is faulty	Stop working and check the motor and capacitor
The display indicates dashes instead of the temperature value	The temperature sensor is faulty	Replace the temperature sensor
The "END" lettering is displayed	Stop by the timer	To restart, hold down the ▼ and ▲ keys simultaneously for 4 seconds

12. Storage and Transportation Rules

1. The drying oven shall be stored indoors in the packing box at the air temperature of +5 to +40°C and relative air humidity of not more than 80%.
2. The unpacked device should be stored at ambient air temperature of +5 to +40°C and relative humidity of 80%.
3. The device 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%.

13. Warranty

Ecohim Co. Ltd. guarantees the compliance of the product with the specification stipulated in item 4 hereof provided the consumer adheres to the operation, transportation and storage conditions.

The guaranteed service life of the drying oven is 12 months from the date of shipment to the consumer as determined from the bill of lading.
The warranty maintenance shall be only performed by the supplier's authorised service centres.
Within the warranty period, the free repair or replacement of the product is provided for. The guaranteed service life of the product shall be extended for the time, for which it was not used due to the defects detected.

14. Claims Information

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

Ecohim Co. Ltd.
22 17th Line, building I, Suite 406, Vasilyevsky Island, Saint Petersburg 199178
Phone (812) 322-96-00, fax (812) 448-76-00
E-mail: info@ecohim.ru
URL: www.ecohim.ru

No claims may be submitted:

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

15. Certificate of Acceptance

ES-4610, ES-4620 muffle furnace No. **4K6__E**_____ has been verified in accordance with the current technical documentation, statutory requirements of national standards and recognised to be ready for service.

Date of manufacture _____

Stamp of the Technical Control Department

Inspector _____