OZONE THERAPY DEVICE

MEDOZONS-BEAUTY

Instruction Manual

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This document is the instruction manual for the ozone therapy device Medozons-Beauty (hereinafter - the device).

The instruction manual contains: a description of the operation of the device, the main parameters and specifications, information about its design and principle of operation, instructions for its preparation for work.

It establishes:
the rules for the operation of the device, maintenance and elimination of typical malfunctions, as well as the rules for storage, transportation and disposal.

1. Purpose of the device

The device is designed to produce an ozone-oxygen gas mixture for local and systemic ozone therapy procedures approved by order of the Ministry of Health and Social Development of the Russian Federation dated December 12, 2011 N1664н (Registered in the Ministry of Justice of the Russian Federation on January 24, 2012, Registration No 23010).

The principle of operation of the device is based on the generation of ozone from medical oxygen in a gas discharge reactor, the production of an ozone-oxygen mixture of a given concentration and its delivery to the outlet ports.

The values of the concentration of ozone in the ozone-oxygen mixture (hereinafter – O3/O2), the flow-rate and the duration of the production of the mixture, as well as the operating mode, are set by the operator by means of the device controls and are indicated on the display.

For the production of O3/O2, gaseous oxygen is used, technical and medical, in accordance with GOST 5583. For the production of O3/O2, it is allowed to use gaseous oxygen obtained from atmospheric air by the method of short-cycle non-heating adsorption or by the method of low-temperature distillation according to GOST 5583-78.

The ozone destructor built into the device, which converts ozone to oxygen, ensures that the ozone content in the residual O3/O2 is reduced to a level not exceeding the maximum allowable concentration (MAC) according to GOST 12.1.005.

The device is intended for use in stationary conditions of medical, preventive, research and other medical institutions.

During the procedures, the device delivers an ozone-oxygen gas mixture to items not included into the supply set:

- Gas distribution tubes/hoses, containers, syringes, haemacons, bottles, catheters, disposable systems. All accessories and items used in conjunction with the declared device should be made of ozone-resistant materials, such as ozone-resistant plastics, stainless steel, and quartz glass.

2. Specifications

2.1 The device operates from a single-phase AC network with a frequency of 50 Hz and a voltage of (220 ± 22) V.

The power consumed by the device from an alternating current network with a voltage of 242 V does not exceed 150 W.

2.2 Dimensions of the device are 410 x 300 x 180 mm.

Dimension tolerance is ± 10 mm.

2.3 The weight of the device is 10 kg.

Permissible weight deviation is ± 0,3 kg.

2.4 The device is operable at oxygen pressures at the inlet of the device from 0,4 kgf/cm^2 to 1.5 kgf/cm^2 (bar or arm).

2.5 The device provides the delivery of O3/O2 through the outlet nozzle (Outlet) and through the syringe filling port (Dispenser).

2.6 The device provides input and indication of procedure parameters:

- Values of the volumetric flow rate of O3/O2 from 0,2 to 1,5 l/min;
- Values of ozone concentration in O3/O2 from 0,1 to 70 mg/l;
- Duration of the procedure from 1 to 120 minutes.

2.7 The device produces O3/O2 with ozone concentration in the O3/O2:

- From 0,1 to 50 mg/l at a flow-rate of O3/O2 not more than 1,5 l/min;
- From 0,2 to 60 mg/l at a flow-rate of O3/O2 more than 0,4 l/min;
- From 0,3 to 70 mg/l at a flow-rate of O3/O2 not more than 0,4 l/min.

Discreteness of setting the ozone concentration in the O3/O2 is 0,1 mg/l.

The deviation of ozone concentration in the O3/O2 at the outlet of the device from the set value, not more than:

- ± 0,1 mg/l in the range of ozone concentrations in the O3/O2 from 0,1 to 1,0 mg/l;
- ± 10% at ozone concentrations in the O3/O2 from 1,0 to 10,0 mg/l;
- ± 15% at ozone concentrations in the O3/O2 above 10 mg/l.

2.8 The ozone concentration in the air of the working area should not exceed 0,1 mg/m^3 (MAC according to GOST 12.1.005-88).

2.9 The device provides continuous operation for 8 hours.

The device is ready for operation for no more than 10 min after switching on.

2.10 Average life time of the device is at least 5 years.

2.11 The outer surfaces of the device are resistant to disinfection according to MU 287-113 with 3 % hydrogen peroxide solution according to GOST 177-88 with the addition of 0,5 % detergent according to GOST 25644-96.

2.12 Operating conditions of the device: air temperature from 10 to 35 ºC; relative air humidity from 45 to 80 % at a temperature of 25 ºC.

2.13 For safety, the device complies with the requirements of GOST R 50267.0-92 for class I with a working part of type B.

3. Composition of the device

The supply set of the device is shown in Table 1.

Table 1

Name	Document designation	Q-ty, pcs.
Ozone therapy device Medozons-Beauty	BCAT.941137.001	1
Destructor*	BCAT.941713.001	1
Chamber "shoulder-shank" (D = 250 mm, L = 700 mm)*	BCAT.943129.002	1
Chamber “hand” (D = 250 mm, L = 400 mm)*	BCAT.943129.003	1
Chamber “foot” (D = 350 mm, L= 620 mm)*	BCAT.943129.004	1
Power cord	CAB 504-2PBF	1
Tube of plasticized polyvinyl chloride 4x1,5 (length 2 m)	ТУ2247-041-100641390-2007	1
Technical passport	BCAT.941137.000 ПС	1
Instruction manual	BCAT.941137.000 РЭ	1

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* To be supplied by customer order

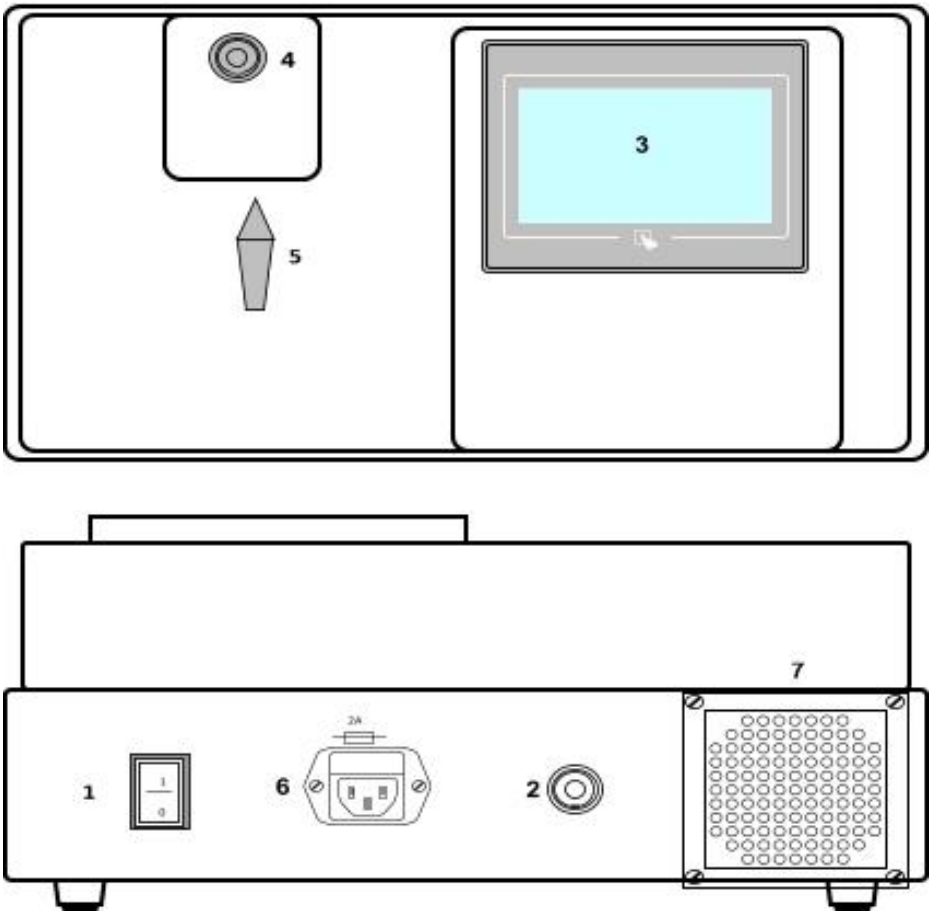
4. Design and operation of the device

The principle of operation of the device is based on the synthesis of ozone in a gas discharge chamber under the influence of a high voltage of 4-7 kV.

The device, made in the form of a stand-alone device, consists of the following functionally complete units: gas discharge chamber, high-voltage power supply unit, microprocessor control board, tactile operator panel, destructor and pneumatic circuit. In the manufacture of the device, the following materials are used:

- Device body: Double-layer sheet plastic ABS / PMMA TU 2246-002-33513246-2003, manufacturer: LLC "LADA-LIST", Russia;
- Faucet (valve) of outlet nozzle: Stainless steel of grade 16X16H3MAD, coated with black enamel PF-115 according to GOST 6465-76, manufacturer: LLC Research and production company “Stroyproduktsiya”, Russia;
- Operator panel, power switch: Protective and decorative film AUTOTEX S200, manufacturer: Mac Dermid Autoture, England;
- Chamber “shoulder-shank”, chamber “hand”, chamber “foot”, material: Plasticized film, grade RK according to TU 2245-432-00208947-2005, manufacturer: Scientific Research Institute of Chemistry and Technology of Polymers named after academician V.A.Kargin with a pilot plant (Russia);
- Tube of plasticized polyvinyl chloride 4x1,5 (length 2 m), material: PM1/42 according to TU2247-041-100641390-2007, manufacturer: JSC “BIOCHIMPLAST”, Russia.

The location of the controls, indication and switching elements of the device is shown in Figure 1, and their purpose (when the device is in operation) is given in paragraph 6.3.



1 – Power switch
2 – Oxygen inlet nozzle (Inlet)
3 – Operator panel (display and tactile keyboard)
4 – Ozone outlet nozzle (Outlet)
5 – Manual faucet of outlet nozzle (Faucet)
6 – Plug for connecting the power cord and installing fuses (2 A)
7 – Fan vents

Figure 1 – Purpose of controls, indication and switching elements of the device

The destructor is designed to decompose that part of the ozone produced by the device that was not used during the procedure.

The pneumatic circuit provides the accumulation and delivery of produced O3/O2 either to the outlet nozzle, or to the syringe filling port, or to the destructor built into the device.

To accumulate ozone, a receiver – mixer is used.

When preparing the O3/O2, it is delivered to the built-in destructor until the ozone concentration in the O3/O2 reaches the set value.

5. Indications and contraindications

Indications for use:

The device can be used to treat a wide range of diseases, such as atherosclerosis, coronary heart disease, hypertension, diseases of the respiratory system, digestion, dermato-venereological, surgical, obstetric and gynecological, neurological pathology, infectious diseases, etc.

Contraindications:

Bleeding, hyperthyroidism, thrombocytopenia, individual intolerance.

Possible side effects:

When using the device in accordance with the requirements set forth in the operational documentation, there are no possible side effects.

6. Intended use

6.1 Operational restrictions (Safety measures)

6.1.1 Possible risks for medical personnel and the patient during operation of the device:

- The risk of inhalation exposure to ozone for personnel, which may arise due to leakage of gas distribution tubes/hoses and defective accessories. In this case, the maximum allowable concentration (MAC) of ozone in the air of the working area can be exceeded. Personnel should switch off the device and ventilate the room. For further operation, leakage of gas distribution tubes/hoses should be eliminated, defective accessories should be replaced;
- The risk of electric shock. The wires connecting the device to the power supply network should not be damaged; the power sockets should have an earthing contact.
- The risk of device failure. **It is forbidden to leave a working device unattended.** If the device fails, there is a continuous beep and a message displayed on the screen.

6.1.2 When operating the device, it is necessary to follow the general safety requirements for equipment working with gaseous oxygen in accordance with GOST 12.2.052.

6.1.3 Requirement for the room in which the installation of the device is supposed.

The requirements for the room correspond to the requirements for the treatment rooms of medical institutions and are determined by SanPiN 2.1.3.2630-10 "Sanitary and epidemiological requirements for organizations engaged in medical activities."

The room should be equipped with power sockets with grounding contacts.

The room for working with the device should be equipped with supply and exhaust ventilation.

NOTE! Ozone is a toxic gas with a pungent, irritating odor. The threshold of tangible odor for ozone is 0,02 mg/m^3.

If ozone smell appears in the room, switch off the device and ventilate the room. Personnel should leave the room until the end of airing.

The maximum allowable concentration (MAC) of ozone in the air of the working area of the room according to GOST 12.1.005 should not exceed 0,1 mg/m^3; hazard class 1 according to GOST 12.1.007.

Ambient temperature during the operation of the device should be from +10 to +40 °C.

Only trained medical personnel are allowed to use the device (Personnel who have studied this operating document and have been instructed in working with ozone, oxygen, and pressure vessels, if the device is working from an oxygen cylinder).

6.1.4 During the operation of the device, it is necessary to follow the safety measures and operating restrictions specified in this instruction manual, since the mains supply voltage of the device is dangerous for operating personnel, and gaseous oxygen is used during operation of the device.

6.1.5 According to the type and degree of protection of personnel from electric shock (according to the level of electrical safety), the device belongs to class I with a working part of type B according to GOST R 50267.0-92.

6.1.6 Connecting and disconnecting the power cord to the device plug and to the power socket should be carried out only when the device is switched off.

6.1.7 When operating the device, it is necessary to follow the general safety requirements for equipment working with gaseous oxygen in accordance with GOST 12.2.052-81.

6.1.8 All connections of the ozone and oxygen hoses should be tight.

6.1.9 The device and oxygen cylinders should be located at a distance of at least 1 m from the heat source and at least 10 m from the open flame source.

6.1.10 Do not block the ventilation openings of the device.

6.1.11 Do not subject the device to vibration during operation.

6.1.12 After transportation or storage at negative temperatures, the device should be kept in a transport packaging in normal climatic conditions in accordance with GOST 15150-69 (at air temperature from +15 to +35 °C) for at least 12 hours.

6.1.13 Do not use the device with damaged seals.

6.1.14 Do not allow getting water to the inside of the device, as well as to the connectors of the device components.

6.1.15 The device requires special measures to ensure electromagnetic compatibility (EMC) and should be installed and put into operation in accordance with the information related to EMC given in the tables in Appendix A of this instruction manual.

6.1.16 The use of mobile radio frequency communication equipment can affect the device.

6.2 Preparing the device for use

6.2.1 Installation and connection of the device

During the initial start-up and after a long (more than 20 days) downtime, the device should be “warmed up”: for 10-15 minutes start the SYRINGE procedure with an ozone concentration of 60-70 mg/l and an ozone flow-rate of 1 l/min.

Preparation of the device for operation is shown by the example of saline ozonation.

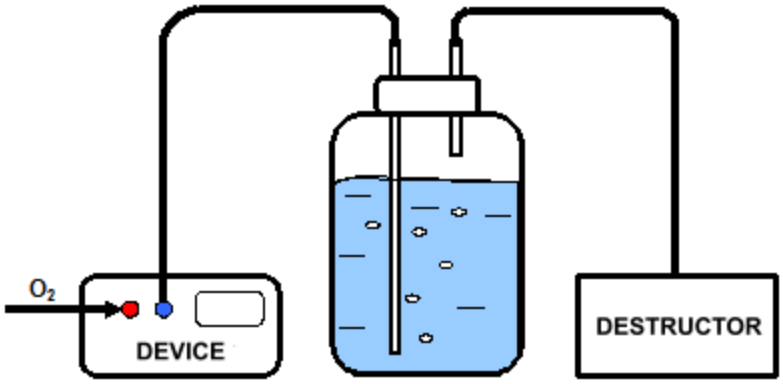
Place the device on a horizontal surface of the desktop.

After checking the integrity of the power cord, connect the power cord to the plug (pos. 6 in Figure 1) of the device.

When putting the device into operation, it is not necessary to carry out special installation, adjustment, calibration.

Plug the power cord into a power socket.

By using an ozone-resistant tube, connect the oxygen inlet nozzle of the device (pos. 2 in Figure 1) to an oxygen source with a pressure of 0,4 kgf/cm^2 to 1,5 kgf/cm^2 (bar or atm).



By using an ozone-resistant tube, connect the ozone outlet nozzle of the device (pos. 4 in Figure 1) to the ozonation object [bottle with saline solution (hereinafter - saline), a plastic chamber, etc.].

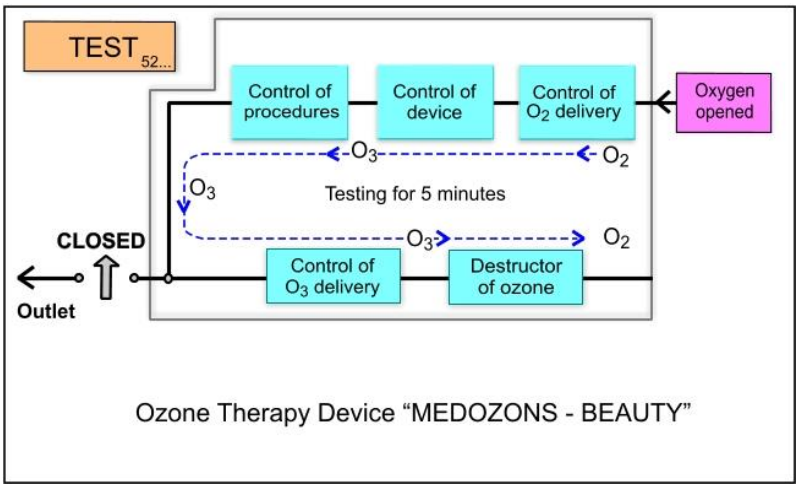
Open the oxygen supply to the device inlet.

If after bubbling (i.e., after the end of the process of passing gas through saline), unused ozone remains, it is necessary to remove it to the destructor.

6.3 Using the device

6.3.1 Switch on the device (Press the button pos. 1 in Figure 1).

On the display screen of the operator panel (pos. 3) of the device, check the indication of the information window (hereinafter - the window) shown in the Figure below. After warming up the device for 5 minutes,

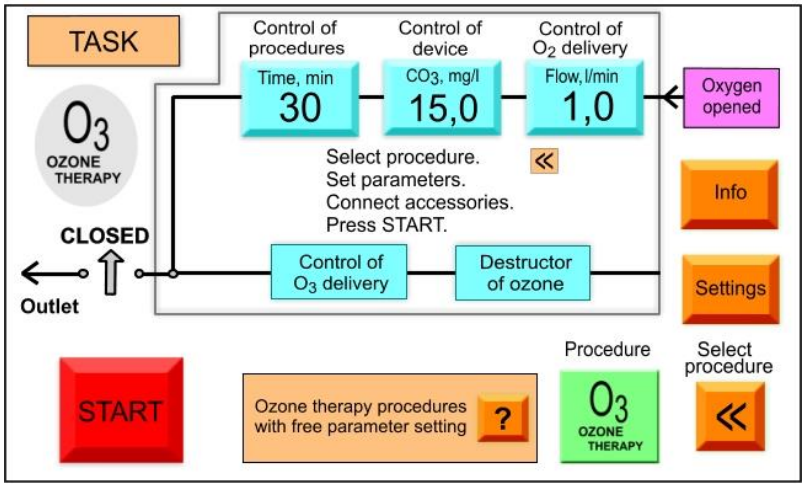


the TASK window will be indicated on the display screen, as shown in the Figure below.

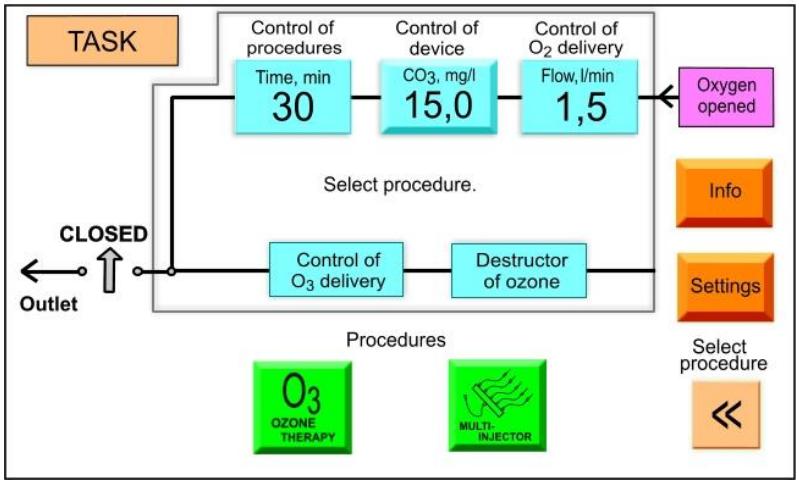
Note -

The Settings button indicated in the window is not used when operating the device for its intended purpose (the functions of this button will be described in paragraph 6.3.8).

6.3.2 If it is necessary to change the procedure, press the button **«** to select the propose **OZONE THERAPY or MULTI-INJECTOR**.



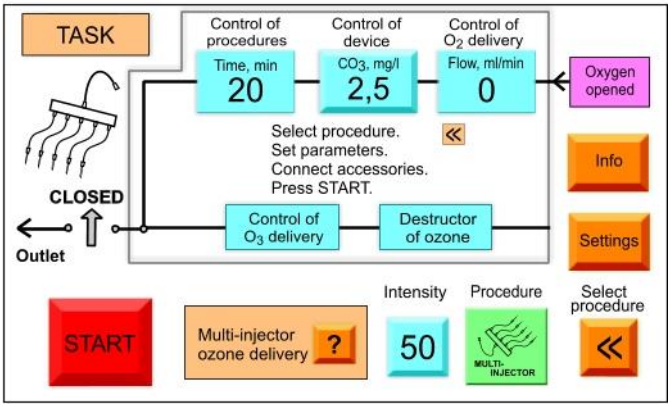
Further, as an example, we will consider the MULTI-INJECTOR procedure, which is selected by pressing the button with the same name. After pressing the above-mentioned button, the device will enter the TASK mode.



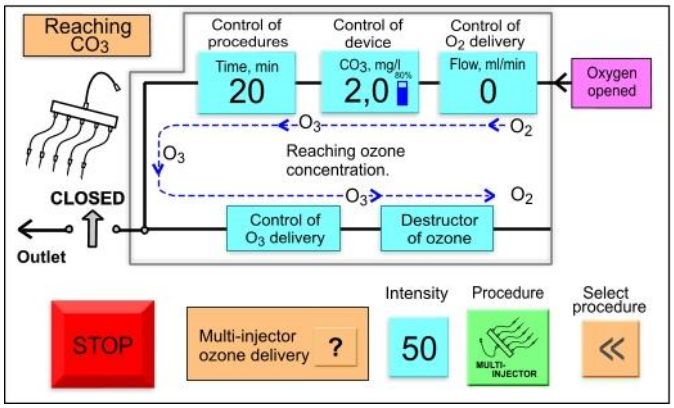
If it is necessary to change any parameter of the procedure, press the button with the name of this parameter, for example: CO3. In the TASK window, the parameters (buttons) that can be changed are shown as volume.

6.3.3 On the display screen will be a calculator window, on which you can dial a new concentration value, then press the ENTER button.

After that, the program will return to the TASK window again.

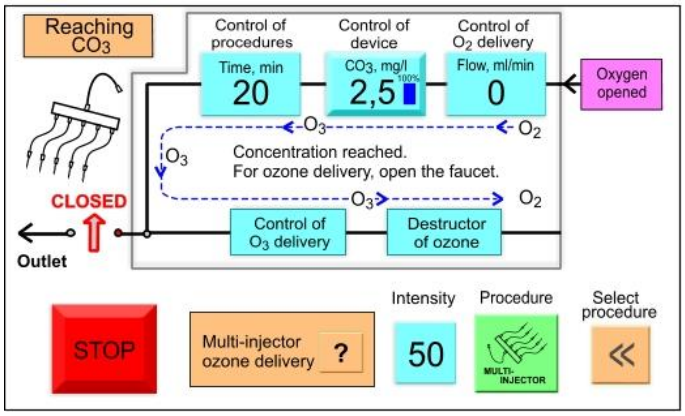


6.3.4 To start the procedure, connect the accessories and press the START button.



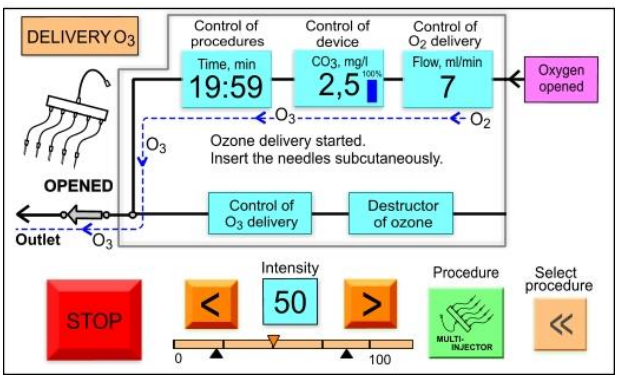
On the display screen of the device, check the window shown in the Figure on the left.

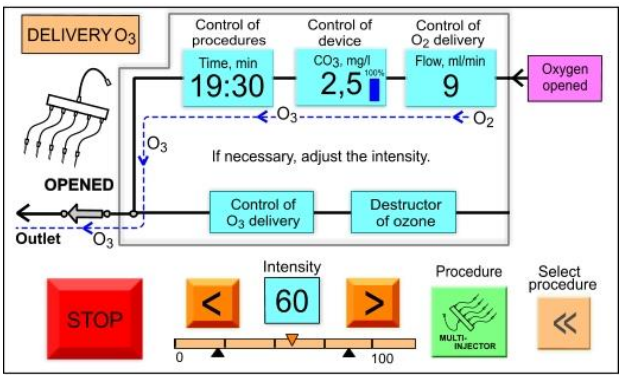
After the set concentration has been reached, the device will display the window shown in the Figure below.

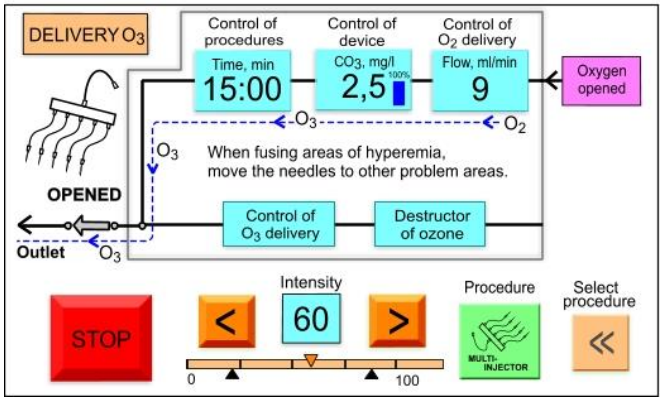


The device will start to deliver O3/O2 to the outlet nozzle after opening the faucet. Using the < > buttons it is possible to adjust the amount of an ozone-oxygen mixture supplied to the multi-injector.

Below are a few information windows that may appear on the screen during the procedure.

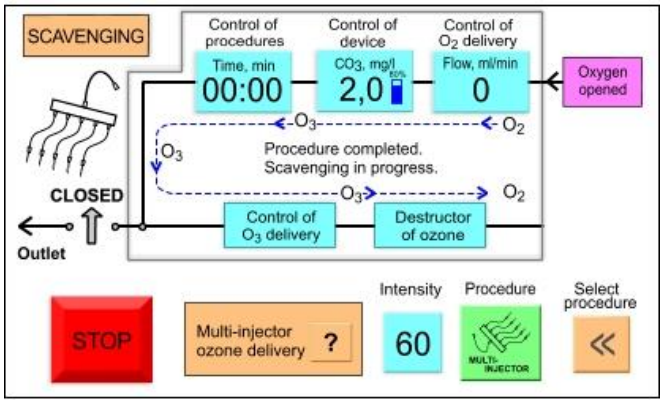






6.3.5 The delivery of O3/O2 is stopped after the end of the procedure time specified in par. 6.3.4, or by pressing the STOP button

The device begins to scavenge the internal line with oxygen in order to remove ozone to the built-in destructor after closing the faucet.



6.3.6 After scavenging (removal of the unused part of the O3/O2 to the destructor), the device will return to its initial state. At the same time, on the display screen of the device will be indicated the TASK window (par. 6.3.3).

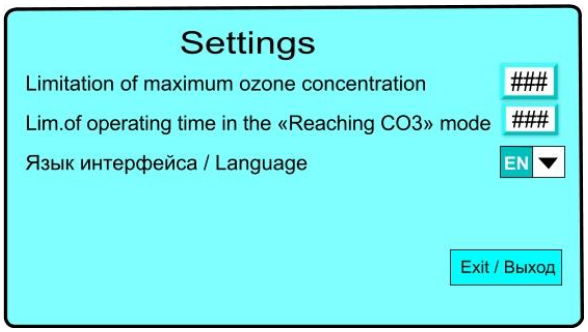
6.3.7 To take ozone into a syringe, insert the syringe into the ozone outlet nozzle (Pos. 4 in Figure 1) and open the faucet.

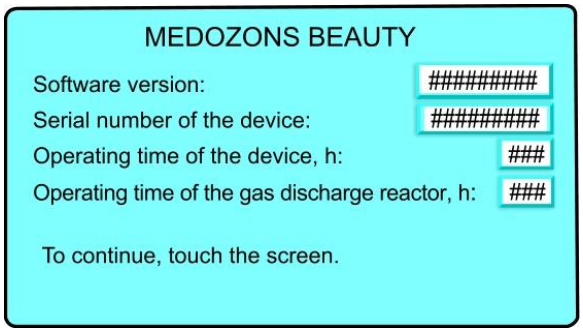
6.3.8 The menu of the device provides additional functions for setting some parameters:

- Limitation of maximum ozone concentration generated by the device to avoid a personnel error when trying to set a higher concentration of ozone in the mixture for the procedure;
- Limitation of operating time for reaching a given concentration of ozone in the mixture.

To change the parameter, press the button at the end of the lines.

6.3.9 The **INFO** button is used to call up a window with information related to this instance of the device, entered during its adjustment by the manufacturer and about the operating time of the device.





7. Maintenance

7.1 Every day, clean the device (including the fan grill – pos. 7 in Figure 1) from dust and dirt.

7.2 Check the connections of the inlet nozzle with the oxygen supply hose daily. Take measures to eliminate oxygen leakage.

7.3 Disinfection and sterilization

Before disinfection, the power cord should be disconnected from the power socket.

Disinfection of the surface of the device body, power cord, external destructor, tubes of plasticized polyvinyl chloride is carried out by double wiping the external surfaces with a cloth of calico or gauze moistened with 3 % hydrogen peroxide solution with the addition of 0,5 % detergent according to GOST 25644, or moistened with 1 % chloramine solution. Napkins should be wrung out.

Disinfection and pre-sterilization preparation of the external and internal surfaces of the chambers “shoulder-shank”, “hand”, “foot” should be carried out with the Avansept Active disinfectant, the concentration of the working solution (according to the preparation) is 1,5 %, the exposure time is 30 minutes. followed by sterilization by the plasma method or gamma radiation. Carry out disinfection after each use of items.

7.4 The device does not require calibration during operation.

7.5 When using the device, no access keys and passwords are provided

7.6 When operating the device, gaseous oxygen is used, technical and medical, in accordance with GOST 5583-78.

7.7 For the production of O3/O2, it is allowed to use gaseous oxygen obtained from atmospheric air by the method of short-cycle non-heating adsorption or by the method of low-temperature distillation according to GOST 5583-78.

8. Storage

8.1 Storage conditions of devices in terms of exposure to climatic factors should comply with the storage conditions of group 2 (C) according to GOST 15150-69 in accordance with the requirements of GOST 9.014-78 for products of group III-1, an option of temporary anticorrosive protection B3-10 with a deadline of protection without re-preservation no more than two years: air temperature from minus 50 to +40 °C, relative air humidity up to 98 % at a temperature of +25 °C.

8.2 Storage of devices should be carried out in closed storage facilities in the manufacturer’s packaging in unopened form.

8.3 The storage room should not contain conductive dust, acids, alkalis or other aggressive impurities.

8.4 The storage time of the device (without re-preservation) is twelve months from the date of shipment in the manufacturer’s packaging in the warehouse.

9. Transportation

9.1 Devices can be transported by all types of covered vehicles in accordance with GOST R 50444-92 and the rules for the carriage of goods applicable for these types of vehicles.

Transportation conditions in terms of exposure to climatic factors should comply with storage conditions 5 GOST 15150-69: air temperature from minus 50 to +40 °C, relative air humidity up to 98 % at a temperature of +25 °C.

9.2 During loading and unloading, transportation, warehousing and storage, boxes with devices should not be subjected to sharp impacts and the effects of precipitation.

When storing and transporting, it is allowed to stack boxes with devices in no more than three rows. Boxes should be in the position corresponding to the handling signs.

10 Disposal

10.1 The device does not contain elements, substances and materials dangerous to life, human health and the environment and does not require special safety measures for disposal.

10.2 Disposal is carried out on a general basis, and if there is a waste collection and treatment program defined by local authorities, disposal is carried out in accordance with this program as for household electrical appliances that do not contain elements hazardous to the environment.

Appendix A

(obligatory)

EMC Requirements

Table A.1 - List of cables supplied with the device*****

Name of the component	**Length, mm, no more**
Power cable CAB 504-2PBF	2025

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*) The use of the device with the cables indicated in Table A.1 ensures the compliance of the device with the established requirements for interference emission and interference immunity.
The use of cables not listed in Table A.1 may lead to an increase in interference emissions or a decrease in the interference immunity of the device.

Table A.2

Guidelines and declaration of the manufacturer – interference emission		
The device is intended for use in an electromagnetic environment as defined below. The buyer or user of the device must ensure its use in the specified electromagnetic environment		
Test for interference emission	CONFORMITY	Electromagnetic environment - guidelines
Industrial radio interference according to **GOST R 51318.11**	Group 1	The device uses radio frequency energy only for internal functions. The level of emission of radio frequency interference is low and probably will not lead to malfunctions of nearby electronic equipment
Industrial radio interference according to **GOST R 51318.11**	Class B	The device is suitable for use in any place of location other than residential buildings and buildings directly connected to the distribution electrical network supplying residential buildings
Harmonic current components according to **GOST R 51317.3.2**	Not applicable	
Voltage fluctuations and flicker according to **GOST R 51317.3.3**	Not applicable	

Table A.3

Guidelines and declaration of the manufacturer – interference immunity			
The device is intended for use in an electromagnetic environment as defined below. The buyer or user of the device must ensure its use in the specified electromagnetic environment			
Test for interference immunity	TEST LEVEL ACCORDING TO IEC 60601	LEVEL OF COMPLIANCE WITH REQUIREMENTS FOR INTERFERENCE IMMUNITY	Electromagnetic environment – guidelines
Electrostatic discharge (ESD) according to **GOST R 51317.4.2**	±4 kV – contact discharge ±4 kV – air discharge	±4 kV – contact discharge ±4 kV – air discharge	The floors of the room should be made of wood, concrete or ceramic tile. If the floors are covered with synthetic material, then the relative air humidity should be at least 30 %

Nanosecond impulse interference according to **GOST R 51317.4.4**	±1 kV – for power lines	±1 kV – for power lines	The quality of electrical energy in the building's electrical network must meet the typical conditions of a commercial or hospital setting
High energy microsecond impulse interference according to **GOST R 51317.4.5**	±1 kV - when applying interference according to the scheme wire-to-wire ±2 kV - when applying interference according to the scheme wire-to-ground	±1 kV - when applying interference according to the scheme wire-to-wire ±2 kV - when applying interference according to the scheme wire-to-ground	The quality of electrical energy in the building's electrical network must meet the typical conditions of a commercial or hospital setting
Dynamic voltage changes according to **GOST R 51317.4.11**	0% Un (voltage **dip**) for 0,5 and 1 period 70% Un (voltage **dip**) for 25 periods 0% Un (voltage **interruption**) for 250 periods	0% Un (voltage **dip**) for 0,5 and 1 period 70% Un (voltage **dip**) for 25 periods 0% Un (voltage **interruption**) for 250 periods	The quality of electrical energy in the building's electrical network must comply with typical conditions of a commercial or hospital setting. If the user of the device requires continuous operation in conditions of possible interruptions in the mains voltage, it is recommended to provide power to the device from an uninterruptible power supply unit
Industrial frequency magnetic field according to **GOST R 50648**	Continuous magnetic field 3 A/m	3 A/m	The levels of industrial frequency magnetic field should comply with typical conditions of a commercial or hospital setting
Note - **Un** - the voltage level of the electrical network until the test impact			

Table A.4

Guidelines and declaration of the manufacturer – interference immunity			
The device is intended for use in an electromagnetic environment as defined below. The buyer or user of the device must ensure its use in the specified electromagnetic environment			
Test for interference immunity	TEST LEVEL ACCORDING TO IEC 60601	LEVEL OF COMPLIANCE WITH REQUIREMENTS for INTERFERENCE IMMUNITY	Electromagnetic environment – guidelines
Conducted interference induced by radio frequency electromagnetic fields according to **GOST R 51317.4.6**	3 V (rms value) in the band from 150 kHz to 80 MHz outside the frequencies allocated to the HF devices[1] 3 V/m in the band from 80 MHz to 2,5 GHz	3 V (rms value)	The distance between the used mobile radiotelephone communication equipment and any element of the device, including cables, must be not less than the recommended spatial separation, which is calculated in accordance with the expression below in relation to the frequency of the transmitter. Recommended spatial separation is: $d = 1,2 \cdot P^{1/2}$
Radio frequency electromagnetic field according to **GOST R 51317.4.3**		3 V/m	$d = 1,2 \cdot P^{1/2}$ (from 80 to 800 MHz); $d = 2,3 \cdot P^{1/2}$ (from 800 МГц to 2,5 GHz). The field strength during the propagation of radio waves from stationary radio transmitters according to the results of observations of the electromagnetic environment **1)** should be lower than the level of compliance in each frequency band **2)** Interference may occur near equipment marked with 

1) Field strength during the propagation of radio waves from stationary radio transmitters, such as base stations of radiotelephone networks (cellular / wireless) and terrestrial mobile radio stations, amateur radio stations. AM and FM broadcast transmitters, television transmitters, cannot be determined by calculation with sufficient accuracy**.** For this, practical measurements of the field strength should be carried out. If the measured values at the location of the device exceed applicable levels of compliance, it is necessary to monitor the operation of the device in order to check its normal functioning**.** If a deviation from normal functioning is detected during the monitoring process, then additional measures may need to be taken, such as reorienting or moving the device.

2) Outside the band from 150 kHz to 80 MHz, the field strength should be less than 1 V/m

Notes

1 At frequencies of 80 and 800 MHz, a larger field strength value is used.

2 Expressions are not applicable in all cases. Electromagnetic propagation is affected by absorption or reflection from structures, objects, and people**.**

Table A.5

Recommended values of spatial separation between portable and mobile radio frequency communication equipment and the device

The device is intended for use in an electromagnetic environment in which the levels of radiated interference are monitored. The buyer or user of the device can avoid the influence of electromagnetic interference by providing a minimum spatial separation between portable and mobile radio frequency communication equipment (transmitters) and the device, as recommended below, taking into account the maximum output power of communications.

Nominal maximum output power of the transmitter , W	Spatial separation, m, depending on the frequency of the transmitter		
	$d = 1,2 \cdot P^{1/2}$ in the band from 150 kHz to 80 MHz	$d = 1,2 \cdot P^{1/2}$ in the band from 80 to 800 MHz	$d = 2,3 \cdot P^{1/2}$ in the band from 800 MHz to 2,5 GHz
0,01	0,12	0,12	0,23
0,1	0,38	0,38	0,73
1	1,2	1,2	2,3
10	3,8	3,8	7,3
100	12	12	23

Notes

1 At frequencies of 80 and 800 MHz, a larger field strength value is used.

2 The above expressions are not applicable in all cases. Electromagnetic propagation is affected by absorption or reflection from structures, objects, and people.

3 When determining the recommended values of the spatial separation d for transmitters with a nominal maximum output power not shown in the table, the nominal maximum output power P in watts specified in the transmitter manufacturer's documentation is substituted into the above expressions.