

# LD-250U

Little Doctor®

**Ультразвуковой ингалятор LD**

*Руководство по эксплуатации*

**Ультразвуковий інгалятор LD**

*Інструкція з експлуатації*

**Ultrasonic Nebulizer LD**

*Instruction Manual*

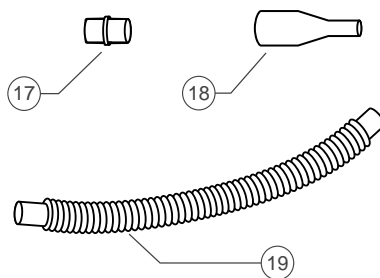
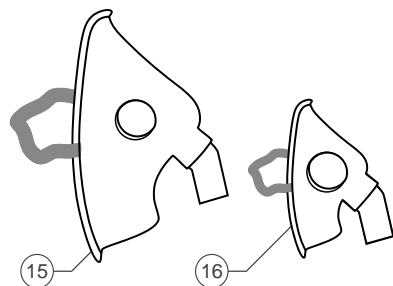
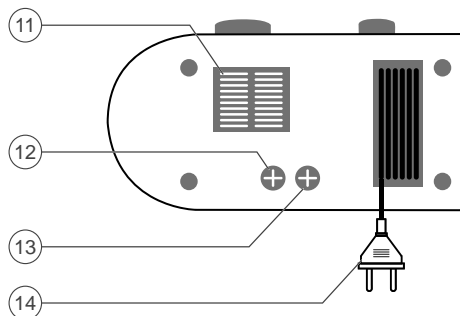
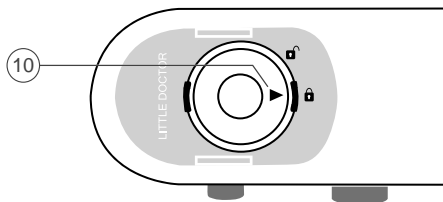
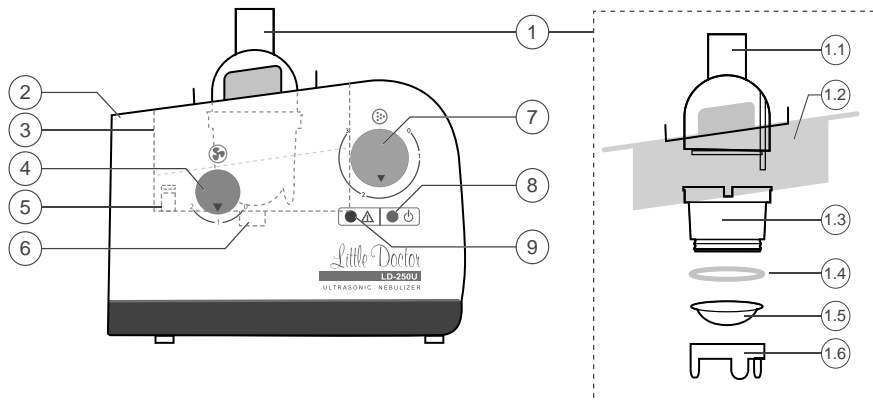
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## PARTS AND COMPONENTS



No POSITION ON THE SCHEME	NAME	DESCRIPTION
1	Nebulizer chamber	Removable camera for the formation of aerosol inhalation solution LD-N061.
1.1	Upper part of nebulizer chamber	Part of nebulizer chamber. Place connected to a tube.
1.2	Cover of nebulizer chamber	Cover of water reservoir. Part of the nebulizer chamber.
1.3	Middle part of nebulizer chamber	Movable part of nebulizer chamber for possibility of replacing the reservoir for the medicine solution.
1.4	Strip	Strip nebulizer chamber for sealing connection of parts
1.5	Reservoir for solution	Reservoir for solution for inhalation LD-N050. Volume of 12 ml. <i>Expendable material.</i>
1.6	Bottom part of nebulizer chamber	Part of nebulizer chamber with legs to set the nebulizer chamber on the table.
2	Main unit	Main unit of device.
3	Water reservoir	Water reservoir. Water is poured to a certain level, and cools the radiator, and transmits vibrations to the nebulizer chamber.
4	Regulator «  »	It regulates the flow of air in the nebulizer chamber. Position «2» corresponds to the maximum air flow.
5	Water level sensor	Water level sensor in the reservoir. With low water level sensor turns off the ultrasonic generator. Tag «WATER LEVEL» on the sensor indicates the desired level of water in the reservoir.
6	Radiator	Piezoelectric converter of electrical oscillations.
7	Regulator «  »	The regulator of intensity of aerosol formation, the switch power device (0 - powered device is turned off, 3 - the maximum intensity).
8	Indicator «  »	Green light ON / OFF power device.
9	Indicator «  »	Red light indicates a lack of water in the reservoir.
10	Pointer lock	Pointer lock the upper part of an nebulizer chamber.
11	Air fan	Cooling fan for electronic components and pumping air into the nebulizer chamber.
12	Slot with safety fuse	Safety fuse 24V/1,5A. <i>Expendable material.</i>

13	Slot with safety fuse	Safety fuse 220V/0,5A. <i>Expendable material.</i>
14	Power cord	Power cord for connection to an AC outlet.
15	Adult mask	Adult inhalation mask LD-N041. <i>Expendable material.</i>
16	Child mask	Child inhalation mask LD-N040. <i>Expendable material.</i>
17	Sleeve	Sleeve inhalation LD-N053 to connect two tubes together. <i>Expendable material.</i>
18	Inhalation mouthpiece	Inhalation mouthpiece LD-N023. <i>Expendable material.</i>
19	Tube	Inhalation tube LD-N052. <i>Expendable material.</i>

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## NEBULIZER THERAPY – WHAT IS IT?

Nebulizer is a device for formation and spraying of aerosol. The word “nebulizer” is derived from the Latin word “nebula” (fog, cloud) and was first used in 1874 for a device that turns a liquid substance into an aerosol for medical purposes. One of the first portable “aerosol apparatuses” was created by J. Sales-Girons in Paris in 1859. The first nebulizers were used as steam jet energy sources and were applied for inhalation the vapors of resins and antiseptics by tuberculosis patients. Presently, the term “inhaler” is often used instead of “nebulizer”.

The purpose of the nebulizer therapy is to quickly deliver to the respiratory passages a therapeutic dose of a preparation in aerosol form. Continuous supply of aerosol allows, within several minutes, creating high concentration of a medicine in the upper and lower respiratory passages and lungs, with low probability of any by-effects. Respectively, effective bronchodilation (bronchi expansion) is reached, and the need for hospitalization is eliminated or the hospital stay is reduced.

Little Doctor International (S) Pte. Ltd. offers you to use inhaler LD-250U, whose distinctive features are the possibility to use a wide range of medicines, low inhalation solution residual volume, and reliable and simple use. We thank you for your choice.

## GENERAL INFORMATION

The ultrasonic nebulizer LD is designed for treatment and prevention of respiratory diseases of trachea, bronchus, lung with aerosol of WATER solutions of medicines in hospitals and at home. This manual is intended to assist the user in the safe and efficient operation of the ultrasonic nebulizer LD.

The device should be used in accordance with the rules contained in this document, and should not be used for purposes other than those described here. It is important to read and understand the entire instruction manual.

Functionally, this device consists of an aerosol chamber (hereinafter referred to as “Inhalation chamber”) and power unit. A fan is integrated inside this device for cooling electronic components and for forced air supply to an inhalation chamber. This device is controlled by ON/OFF, aerosol flow rate and air feed knobs located on the body. For ease of use, indicator lights are available for indication of device operating modes.

## SAFETY PRECAUTIONS

**! Important!** Not allowed to use inhaled solutions containing ether, oil or suspended solids (suspension), including herbal teas and herbal infusions. All types of standard inhalation solution in liquid form for inhalation therapy, produced by pharmaceutical companies, natural mineral waters are recommended for use.






- *Solutions for inhalation have to be prepared under sterile conditions from 0,9% sodium chloride as a solvent. You should not use tap water or even boiled water as inhalation means Cookware, which is preparing the solution, previously should be disinfected by boiling.*

- *Character of inhalation (through the mouth using a mouthpiece or nose with a mask), duration (usually no more than 10-15 minutes) and frequency, and used inhalation solutions should be determined by YOUR DOCTOR.*
- *For using, position your device vertically on a table.*
- *Children should use the device under adult supervision.*
- *If you are not using the device - unplug it from the electrical outlet by removing the plug from the socket.*
- *Do not touch the power cord plug with wet hands.*
- *Do not place the device in water, drain, or in the shower. Do not use while bathing.*
- *Do not touch the device if it fell into the water. Immediately disconnect from the electrical outlet.*
- *Before use, make sure the power cord is not damaged.*
- *The power supply cord must not touch hot or heated surfaces.*
- *If the device does not work, see «TROUBLESHOOTING TIPS».*
- *Use only accessories that are designed to LD-212S and described in this manual.*
- *Do not insert any object into holes of the device.*
- *The device is not designed for outdoor use.*

**⚠ Warning!** This device can not be used for inhalation anesthesia and artificial ventilation.

## USE OF THE DEVICE

**⚠ Important!** Before using the appliance for the first time it is necessary to make a full cleaning, as described in paragraph 1 of section «Care, storage, repair and disposal».

1. Take an inhalation chamber from the main device body holding by edges on a chamber cover (Fig. 1).
2. Fill a reservoir with water up to mark "WATER LEVEL" on the level sensor. If water level is drops below its limit, this sensor will block feeding a piezoelectric cell and red indicator «» will light on.
3. Put the inhalation chamber vertically on a table. Uncouple the top of the inhalation chamber. To do this, turn the inhalation chamber cover counterclockwise so that to make mark «» point to «» (Fig. 2). To remove a cover from an inhalation chamber, pull it upwards.
4. Pour out maximum 12 ml, but not less than 2 ml, of inhalation solution in the reservoir.
5. Put on a cover on the inhalation chamber and close it turning clockwise so that to make mark «» point to «» (Fig. 3).
6. Insert the inhalation chamber back in the main device body.

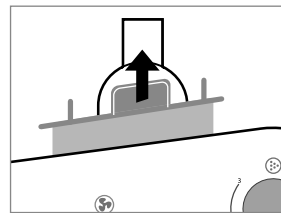


Fig. 1

7. Connect a tube together with a mask or mouthpiece to the inhalation chamber. If necessary, you may extend a tube stretching it or joining with another tube by coupling.  
*It should be noted that the more length of an inhalation tube, the less flow rate of inhalation solution.*

**! Important!** Each patient is encouraged to use personal mouthpiece and / or mask.

8. Bring controls in their original positions:
  - Set knob «⊗» to position «0».
  - Set air feed control knob «⊗» to position «1»
9. Insert power supply plug in the outlet.
10. Choose your most comfortable posture near the device.  
Put a mask on your face or take a mouthpiece. NOW, THIS DEVICE IS READY FOR USE.

**! Important!** For effective inhalation, you should calm down, relax and sit upright. If you use inhaler in bed, put a cushion under your back so that you keep lying straight. Any uncomfortable posture can block some sections of lungs and respiratory tract areas.

11. Initial inhalation process:
  - a) turn knob «⊗» clockwise to position «1», red indicator lamp «⬆» lights on and the device starts generating aerosol.
12. When this device is used for the first time, adjust knob «⊗» to optimal aerosol production rate. Aerosol production rate and, consequently, inhalation solution flow rate primarily depend on solution viscosity. For example, inhalation solution flow time values stated against positions of knob «⊗» are listed in Table regarding ESSENTUKY water inhalation solution.

*Table "Relation of inhalation solution flow time to positions of knob «⊗» when ESSENTUKY water is used as inhalation solution"*

Position of knob «⊗»	Approximate inhalation solution flow time (volume – 10 ml, remains – maximum 1 ml, air flow knob position – "2"), min.
1	25-30
2	15-18
3	6

**NOTE 1:** If the inhaler is used by children, it should be noted that exceeded aerosol flow might evoke child's forced respiration. In this case, we advice reducing aerosol flow by adjusting air flow knob «⊗», thus increasing inhalation period.

**NOTE 2:** While inhaling, some condensation may be produced under the bottom of the instrument body.

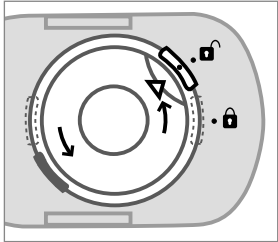


Fig. 2

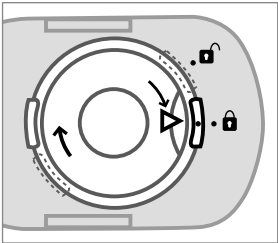


Fig. 3



## 12. After use:

- a) For switching off the instrument, set knob «⊕» to position «0»;
- b) Unplug the instrument power cord;
- c) Uncouple an inhalation chamber from the main body, remove an inhalation chamber top cover and drain inhalation solution remains;
- d) Drain water from the reservoir;
- e) Wipe the instrument body by soft cloth and dry it in the air;
- f) Keep this device in a dry place and out of reach of children.

## CARE, STORAGE, REPAIR AND DISPOSAL

### ! Important!

1. Regularly clean the device and all accessories. It is recommended that all the accessories should be wiped with a 3% solution of hydrogen peroxide with addition of 0.5% solution of a detergent (for example, a laundry powder). After that, the nebulizer should be washed by a rich jet of water. The mouthpieces and nose nozzles may be treated by boiling for 10 minutes or autoclaving at 150°C. After the treatment, wipe dry all parts of the device with a soft cloth.
2. Keep this Device from exposure to direct sunlight, shocks.
3. Do not keep and use this Device near heating installations and open fire.
4. Keep the Device clean and protect it from dust.
5. Contact of device with aggressive solutions is not allowed.
6. Repair the Device only in authorized organizations.
7. On expiration of the warranted service life apply from time to time to authorized repair organizations to check the technical condition of the Device. Dispose to time to authorized repair organizations to check the technical condition of the Device. Dispose of the Device and its components according to the application local regulations. No special requirements to disposal of this Device are defined by the manufacturer.

## WARRANTY

The following LD product is covered by warranty for the period 36 months. The warranty does not apply to the consumables (masks, mouthpieces, inhalation tubes etc.). The warranty liabilities are contained in the warranty card given at the sale of this device to a purchaser. The addresses of organizations for warranty maintenance are given in the warranty card.

## COMPLETE SET

1. Main Unit with Chamber LD-N061 – 1 pc.
2. Adult inhalation mask LD-N041 – 1 pc.
3. Child inhalation mask LD-N040 – 1 pc.
4. Inhalation mouthpiece LD-N023 – 2 pcs.
5. Medicine cup – 5 pcs.
6. Inhalation tube LD-N052 – 2 pcs.
7. Sleeve LD-N053 – 1 pc.

- 8. Safety fuse – 2 pcs.
- 9. Instruction Manual – 1 pc.
- 10. Package – 1 pc.
- 11. Warranty Card – 1 pc.

TECHNICAL SPECIFICATIONS

Model	LD-250U
Type	Ultrasonic
Power consumption, not more, VA	40
Productivity of aerosol, max	1,5 ml/min
Range of aerosol particles, mkm (MMAD)	1-5 (90%)
Max. capacity of medication cup, ml	12
Residual volume for inhalation solution, not more, ml	1
Noise level, not more, dB	55
Max. operating time	20 minutes
Cooling time	40 minutes
Ultrasonic frequency, MHz	~ 1,7
Rated voltage:	~ 230V 50Hz
Electric shock protection level	Type BF
Operation conditions:	
Temperature, °C	from 10 to 35
Relative humidity, % Rh	85% and lower
Atmospheric pressure, kPa	from 86 to 106
Storage and transportation conditions:	
Temperature, °C	from -10°C to 40 °C
Relative humidity, % Rh	95% and lower
Atmospheric pressure, kPa	from 50 to 106
Net Weight, no more	1,35 kg
Size (electronic block), mm	193 x 105 x 178
Year of manufacture	Indicated on the device case in the serial number in the form of «AYYMM250XXXX» where YY is the year and MM is the month of production.

\* - Measured by Little Doctor International (S) Pte. Ltd.

SYMBOLS

CE<sub>0123</sub> CE marking in conformity with EC directive 93/42/EEC

Important: Read the manual

GOST conformity mark

EC Representative

Manufacturer

Mark of conformity of the Ukraine

Class II

Type BF

Protect from moisture

Eurasian Conformity Mark




The device has not been sterilized

Storage/operation temperature and humidity

Serial number

## TROUBLESHOOTING. DETECTION AND CORRECTION

At occurrence of any problems when using the device, refer to the table below for possible causes of failure:

1	Check indicator. «  »	Light is off.	1. Make sure that a power plug is inserted in an outlet. 2. Check position of knob «  ». Make sure that this knob is not in position «OFF». 3. Check and, if necessary, change 24V/1.5A and 220V/0.5A fuses. If faults are not removed by the above procedures, contact to an AUTHORIZED SERVICE CENTER.
		Light is on.	Go to step 2.
2	Check indicator. «  »	Light is on.	1. Check whether a water level sensor float is on water surface. 2. Add water in a reservoir up to mark «WATER LEVEL».
		Light is off.	Go to step 3.
3	Check amount of inhalation solution inside an inhalation chamber (more than 1 ml).	Inhalation solution lacks or its amount is not enough.	Add inhalation solution in an inhalation chamber.
		Enough amount of inhalation solution.	Go to step 4.
4	Check solution formulation.	Inhalation solution contains one of the following components: ether, oils or suspended particles including broths and herbage tinctures.	By no means use inhalation solutions containing ether, oils or suspended particles (suspensions), including broths and herbage tinctures. We advise using all types of standard liquid nebulizer therapeutic solutions produced by reputable pharmaceutical companies.
		Inhalation solution does NOT contain ether, oils or suspended particles, including broths and herbage tinctures.	Please, contact to an AUTHORIZED SERVICE CENTER.



Warning! Maximum 1 inhalation solution reservoir only may be inserted in an inhalation chamber (see 1.5 –on page 2).

## CERTIFICATION AND STATE REGISTRATION

This device manufacturing is certified according to international standard ISO 13485. Device comply with the requirements of European Directive MDD 93/42/EEC, international standards EN 980, EN 1041, ISO 14971, EMC (IEC 60601-1-2, CISPR 11 (Group 1, Class A), IEC 61000-3-2, IEC 61000-3-3).

✉ **Complaints and requests should be addressed to:**

Little Doctor Europe Sp. z o.o.

57G Zawila Street, 30-390, Krakow, Poland

Service phone: +48 12 2684748, 2684749

**Manufactured under control:**

Little Doctor International (S) Pte. Ltd., Yishun Central P.O. Box 9293 Singapore 917699

**Manufacturer:**

Little Doctor Electronic (Nantong) Co. Ltd., No.8, Tongxing Road Economic & Technical Development Area, Nantong 226010, Jiangsu, PEOPLE'S REPUBLIC OF CHINA

**Distributor in Europe:**

Little Doctor Europe Sp. z o.o.

57G Zawila Street, 30-390, Kraków, Poland

Sales Office phone: +48 12 2684746, 12 2684747, fax: +48 12 268 47 53

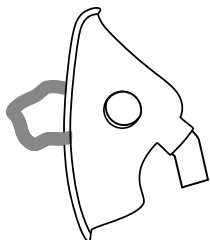
E-mail: [biuro@littledoctor.pl](mailto:biuro@littledoctor.pl)

[www.LittleDoctor.pl](http://www.LittleDoctor.pl)

**Authorized Representative in the EU:**

Little Doctor Europe Sp. z o.o.

57G Zawila Street, 30-390, Krakow, Poland



### Adult inhalation mask LD-N041

- Intended for use with LD-210C, LD-211C, LD-212C, LD-213C, LD-214C, LD-215C, LD-216C compressor nebulizers and LD-207U, LD-250U ultrasonic nebulizers.
- Made of latex.
- For personal use only.
- Package quantity – 1 pc.



### Child inhalation mask LD-N040

- Intended for use with LD-210C, LD-211C, LD-212C, LD-213C, LD-214C, LD-215C, LD-216C compressor nebulizers and LD-207U, LD-250U ultrasonic nebulizers.
- Made of latex.
- For personal use only.
- Package quantity – 1 pc.



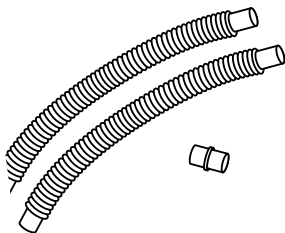
### Inhalation mouthpiece LD-N023

- Intended for use with LD-207U, LD-250U ultrasonic inhalers.
- Made of plastic.
- For personal use only.
- Package quantity – 2 pcs.



### Medicine cup LD-N050

- Intended for use with LD-250U ultrasonic inhalers.
- Made of plastic.
- For personal use only.
- Package quantity – 5 pcs.



### Inhalation tube LD-N052 and sleeve LD-N053

- Intended for use with LD-250U ultrasonic inhalers.
- Made of plastic.
- For personal use only.
- Package quantity:
  - tube – 2 pcs.
  - sleeve – 1 pc.

\* Purchased separately.

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