LD5, LD5a

Little Doctor

ENG

POL

Digital Blood Pressure Monitor

Instruction Manual

Ciśnieniomierz elektroniczny automatyczny LD do pomiaru ciśnienia tętniczego krwi i pulsu

Instrukcja Obsługi

LITTLE DOCTOR ld QUALITY

ENG

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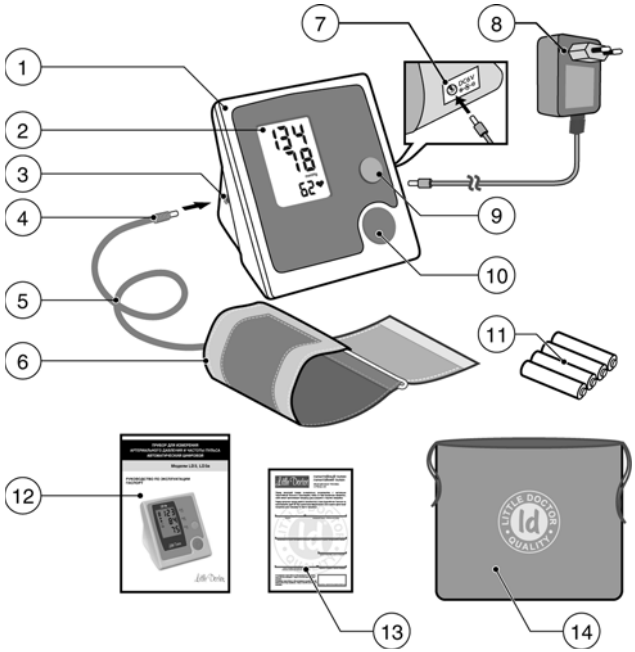

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GENERAL INFORMATION

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This Instruction Manual is designed to assist the user with safe and effective operation of the automatic digital Device for measurement of blood pressure and heartbeat rate LD, modification LD5 (LD5a) (hereinafter – the "Device"). Use this Device according to the rules described in this Manual. Operate the Device only as intended. Do not use the Device for any other purposes. Read and understand the whole Instruction Manual, in particular "Recommendations on Correct Measurement".

INDICATIONS FOR USE

Use this Device to measure your systolic and diastolic blood pressure and heartbeat rate in patients aged from 15. This Device is recommended for use by persons with unstable blood pressure or known arterial hypertension at home as an addition to medical surveillance. The cuff is designed for the upper arm with the circumference approximately from 25 to 36 cm.

OPERATION PRINCIPLE

This Device uses the oscillometric method of blood pressure and pulse rate measurement. Wrap the cuff around your upper arm and it starts to be inflated automatically. The sensitive element of the Device feels the weak pressure oscillations in the cuff generated by widening and contraction of the brachial artery in response to every heartbeat. The amplitude of the pressure waves is measured, converted into millimeters Hg and shown on the display as figures. The Device is capable to store in its memory up to 30 sets of measurement values. Remember that the Device will not maintain the mentioned accuracy of a measurement if it is used or stored at a temperature or humidity other than those specified in Technical Specifications of this Manual. We are warning about possibility of mistakes in blood pressure measurement with this Device in persons with pronounced cardiac arrhythmia. Consult the doctor concerning blood pressure measurement of your child.

APPLIED NEW LD TECHNOLOGIES

Fuzzy Algorithm is the algorithm for processing the measurement values with regard to peculiarities of the man's heartbeat, thus, ensuring high measurement accuracy.

Scale WHO – classification of measurement results according to recommendation of World Health Organization (WHO).

Indication of arrhythmia – special symbol «♥» on device display informs about availability of irregular pulse; in this case, measurement result will be correct.

WARNING! This Device may be used only with cuff Cuff-LDA, size 25-36 cm (delivered in a set with the Device).

RECOMMENDATIONS ON CORRECT MEASUREMENTS

1. For correct measurement you should know that THE BLOOD PRESSURE IS SUBJECT TO SHARP VARIATIONS EVEN WITHIN THE SHORT TIME INTERVALS. The blood pressure depends on many factors. It is usually lower in summer and higher in winter. The blood pressure varies together with the atmospheric pressure, depends on physical loads, emotional excitement, stresses and dietary regime. Drugs, drinking alcohol and smoking produce significant effect. Even the very procedure of blood pressure measurement in a polyclinic sends the blood pressure high in many people, thus, the blood pressure measured at home often differs from the values received in a polyclinic. As the blood pressure tends to rise at low temperatures, make measurements at an indoor temperature (approximately 20° C).

If this Device stayed under a low temperature, keep it for at least 1 hour at an indoor temperature before use, otherwise the measurement result may be incorrect. During a day the difference in readings for healthy people may be 30-50 mmHg of systolic pressure and to 10 mmHg of diastolic pressure. The dependence of the blood pressure on various factors is individual for each person. Accordingly, it is recommended to keep a special book with blood pressure records. ONLY A CERTIFIED DOCTOR USING YOUR RECORDS IS CAPABLE TO ANALYZE THE TENDENCY OF YOUR BLOOD PRESSURE VARIATIONS.

2. At cardiovascular and some other diseases requiring blood pressure monitoring make measurements in the hours fixed by your attending doctor. REMEMBER THAT THE DIAGNOSTIC AND ANY TREATMENT OF

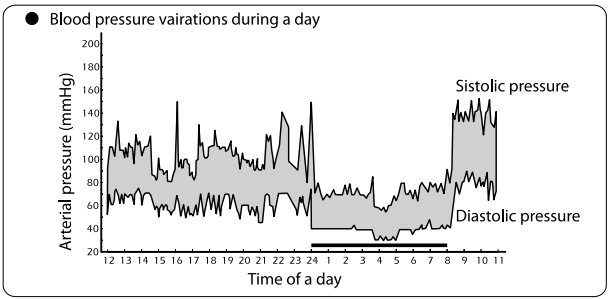

Fig. 1

HYPERTENSION MAY BE CONDUCTED ONLY BY A CERTIFIED DOCTOR ON THE BASIS OF BLOOD PRESSURE VALUES OBTAINED BY THIS DOCTOR. TAKING OF DRUGS AND THEIR DOSES SHOULD BE PRESCRIBED ONLY BY YOUR ATTENDING DOCTOR.

3. At such disorders as deep vascular sclerosis, weak pulse wave and also in patients with the prominent distortions of cardiac rhythm it may be difficult to measure the blood pressure accurately. IN SUCH CASES CONSULT A CERTIFIED DOCTOR ABOUT APPLICATION OF THE ELECTRONIC DEVICE.

4. KEEP QUIET DURING A MEASUREMENT TO OBTAIN THE ACCURATE VALUES OF YOUR BLOOD PRESSURE WITH THE ELECTRONIC DEVICE. Measure your blood pressure in the calm and comfortable conditions at the indoor temperature. No eating an hour before measurement; no smoking, taking tonic agents, alcohol 1.5-2 hours before measurement.

5. The accuracy of blood pressure measurement depends on whether the cuff matches the size of your arm. THE CUFF SHOULD NOT BE TOO SMALL OR TOO LARGE.

6. Wait 3 minutes between measurements for the blood to restore its circulation. However, the persons with prominent atherosclerosis due to considerable loss of vascular elasticity may need to increase the wait time between measurements (10-15 minutes). This also refers to the patients suffering for long from diabetes. For more accurate determination of blood pressure it is recommended to make a series of 3 consecutive measurements and to use the average value.

POWER SUPPLY OF THE Device

BATTERY INSTALLATION

1. Open the cover of the battery compartment and install 4 “AA” size batteries according to polarity marked inside the compartment. Do not use much force to remove the cover of the battery compartment (Fig. 2).

2. Close the battery cover.

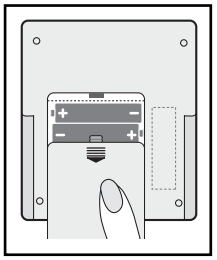

Fig. 2

- Replace all batteries when the Low Battery Indicator “▭”, appears on the screen or when there is no any indication on the screen. The Low Battery Indicator does not show the discharge level.
- The batteries supplied with the Device are intended for check of the Device performance at sale and their service life may be shorter than of the recommended batteries.
- Replace all four batteries at the same time. Do not use the waste batteries.
- If the Device is unused for a long time, remove all batteries.
- Do not leave the waste batteries in the Device.
- Rechargeable power cells, type AA, may also be used

USE OF THE DEVICE WITH THE POWER SOURCE

The jack for connection of the power source is on the back side of the Device (Fig. 3).
Use the power source only with the following technical characteristics:

The output voltage, V	: 6V ± 5%
Maximum output current	: not less than 600 mA
Plug:	
Terminal polarities	: "minus" – internal
External diameter	: 5,5 ± 0,1 mm
Internal diameter	: 2,1 ± 0,1 mm
Length	: 10 ± 0,3 mm

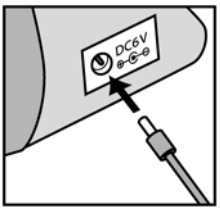

Fig. 3

The manufacturer recommends application of the stabilized power source LD-N057 (it is attached to modification LD5a). When the Device is used with the power source for a long time, remove all batteries.

CORRECT POSITION DURING MEASUREMENT

1. Sit at a table so that during blood pressure measurement your hand rests on its surface. Be sure that the cuff is placed approximately at the level of your heart and that your arm lies freely on the table and does not move.

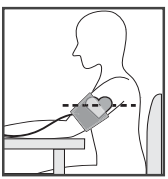

Fig. 4

2. You can measure the blood pressure lying on the back. Look at the ceiling, keep quiet and do not move during measurement. Be sure that the cuff is placed approximately at the level of your heart (Fig. 5).

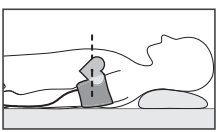

Fig. 5

CUFF PREPARATION

1. Insert the cuff end for about 5 cm into a metal ring (Fig. 6).

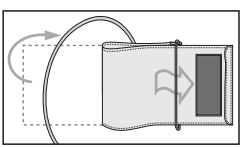

Fig. 6

2. Apply the cuff to your left upper arm so that the air tube is directed to your palm. If the measurement on your left arm is difficult, you may use your right arm. In this case remember that the readings may differ by 5-10 mmHg and even more (Fig. 7).

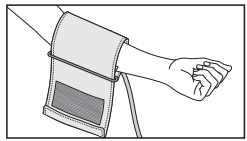

Fig. 7

3. Wrap the cuff around your upper arm so that the bottom of the cuff is approximately 2-3 cm above your elbow. The sign “ARTERY” should be over the arm artery (Fig. 8).

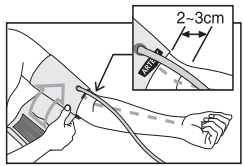

Fig. 8

4. Fix the cuff so that it fits tightly to the arm, but see that it is not overtight. Too tight or too free placement of the cuff may give inaccurate readings (Fig. 9).

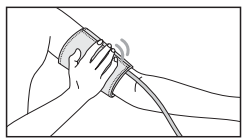

Fig. 9

5. On the fixed cuff the sign “index” should point to the area “normal (25-36 cm)”. it means that the cuff is chosen correctly and fits the size of your upper arm. if the sign points to the area marked «◀■■» or to the left, the cuff is too small and the readings will be higher. If the sign points to the area marked «■■▶» or to the right, the cuff is too large and the readings will be lower (Fig. 10).

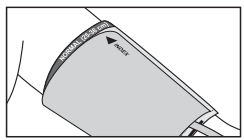

Fig. 10

6. If the arm has a conic form, the cuff should be put on with a spiral movement (Fig. 11).

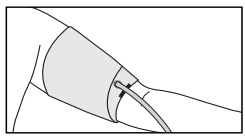

Fig. 11

7. If the rolled-up sleeve squeezes the arm interfering with free blood flow the Device may give inaccurate figures not corresponding to your actual blood pressure (Fig. 12).

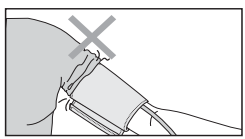

Fig. 12

MEASUREMENT PROCEDURE

1. Insert the Air Tube Plug into the Cuff Jack. Make 3-5 deep inhales and exhales before taking a measurement and relax. Do not move, do not speak and do not toughen your arm.

2. Press button O/I.

3. All symbols will appear on the display screen for a short time, two short sound signals will be given and the Device will inflate automatically the air into the cuff.

At first the inflation will stop at the level of 190 mmHg.

Fig. 13

4. After reaching the level of 190 mmHg the cuff will gradually deflate. The figures on the screen will count back. The pulse symbol"♥" will start flickering (Fig. 13).

If irregular pulse rhythm is detected during measurement, symbol of arrhythmia «♥)». will appear upon measurement end. During periodical appearance of this indication apply to Your attending doctor.

Apart from numerical value of pressure, result is also displayed on scale WHO (Fig. 14). Scale WHO – three-color scale of classification of received value of arterial pressure, according to recommendation of World Health Organization. The scale is available from the left.

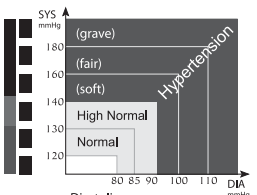

Fig. 14

AS THE BLOOD PRESSURE AND PULSE ARE MEASURED DURING AIR DEFLATION FROM THE ARM CUFF KEEP QUIET AND DO NOT MOVE YOUR ARM AND DO NOT TOUGHEN YOUR ARM MUSCLES.

5. When the measurement is complete the sound signal is given, the arm cuff completely deflates and your measurement results flash on the screen (Fig. 15).

6. Press the Button O/I to switch off the Device. For taking a new measurement repeat all steps described in this paragraph.

Fig. 15

TO OBTAIN THE ACCURATE RESULT MAKE INTERVAL BETWEEN MEASUREMENTS TO RESTORE THE BLOOD CIRCULATION. WAIT FOR AT LEAST 3 MINUTES BEFORE MAKING A NEW MEASUREMENT.

The Device is designed to store automatically the results of each measurement (blood pressure and pulse) in the memory every time a measurement is completed.
THE DATA WILL BE KEPT IN THE MEMORY EVEN IF THE DEVICE IS STORED WITHOUT BATTERIES. TO DELETE ALL VALUES STORED IN THE MEMORY YOU SHOULD MAKE ACTIONS DESCRIBED IN “MEMORY FUNCTION”.
If the Device is ON and is unused for 3 minutes it will be switched off automatically.

AUTOMATIC RE-INFLATION

When during the first blood pressure measurement the cuff inflation to a level of 190 mmHg is not sufficient or you move your arm the Device stops measurement and re-inflates the cuff to the higher level. The Device has 4 fixed levels of the arm cuff inflation: 190, 230, 270 and 300 mmHg.

The automatic re-inflation is repeated until the measurement is completed successfully. This is not a defect.

FORCED DEFLATION FROM A CUFF

For rapid air release from of the arm cuff during arm cuff inflation or during a measurement (slow deflation) press the O/I Button.

MEMORY FUNCTION

1. The result of every measurement (blood pressure and pulse) is automatically stored in the Device memory.

IF THE NOTICE ON ERROR APPEARS THE MEASUREMENT RESULT WILL NOT BE STORED.

2. The Device stores up to 30 sets of measured values and the average figures of last 3 measurements. When the number of measurements exceeds 30, the oldest record is deleted to save the most recent values.

Fig. 16

3. The Device stores up to 90 sets of measured values and the average figures of last 3 measurements. When the number of measurements exceeds 30, the oldest record is deleted to save the most recent values (Fig. 16). At second pressing on the M Button the screen will show for a short time index “1” (number of the memory cell) and after this the recent measurement result (Fig. 17). At each subsequent pressing on the M Button the index of the next number of the memory cell will flash and the content of this cell will be displayed.

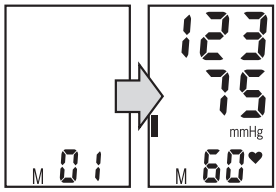

Fig. 17

MEMORY CLEARING

To delete all values stored in the memory, press the M Button and hold it down for more than 5 seconds. Symbols “Clr” will appear on the screen and all values will be deleted from the memory (Fig. 18).

Fig. 18

INFORMATION ABOUT ERRORS

Indication	*Likely cause*	*Methods of correction*
	The arm cuff is applied incorrectly or the air tube plus is inserted not tightly enough.	Be sure that the arm cuff is applied correctly and the plug is inserted tightly. Repeat the whole measurement procedure.
	Measurements cannot be made due to hand movement or talking during measurements.	Repeat the measurement following strictly the recommendations of this Manual.
	Batteries are discharged.	Replace the batteries for new ones.

CARE, STORAGE, REPAIR AND DISPOSAL

1. Keep this Device from exposure to higher humidity, direct sunlight, shocks, vibration. THIS DEVICE IS NOT WATERTIGHT.
2. Do not keep and use this Device near heating installations and open fire.
3. If the Device was stored at a temperature below the freezing point, keep it at least for 1 hour in some warm place before use.

4. Remove the batteries if the Device will be unused for a long time. Battery leaking may damage the Device. KEEP BATTERIES OUT OF REACH OF CHILDREN.
5. Keep the Device clean and protect it from dust. Use the dry soft cloth to clean the Device.
6. Keep the Device and its components away from water, solvents, spirit and petrol.
7. Protect the arm cuff from contacting on sharp things; do not stretch or fold tightly the arm cuff.
8. Do not subject the Device to strong shocks, such as dropping on the floor.
9. This Device does not contain special controls to adjust the measurement accuracy. It is prohibited to open individually the electronic block. Repair the Device only in authorized organizations.
10. On expiration of the warranted service life apply from time to time to authorized repair organizations to check the technical condition of the Device.
11. 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.
12. The arm cuff may withstand multiple sanitary treatments. The internal tissue surface of the arm cuff (contacting on arm) may be cleaned with cotton ball soaked in 3%-solution of hydrogen peroxide. At long use the partial color fading of the tissue coating of the arm cuff is possible. Washing and ironing of the arm cuff are not allowed.

TROUBLESHOOTING TIPS

PROBLEM	LIKELY CAUSE	METHOD OF CORRECTION
After pressing the O/I Button no indication on the display.	Discharge of batteries. Polarity of batteries is not observed. Battery terminals are contaminated.	Replace all batteries for new ones. Install batteries correctly. Clean the terminals with dry cloth.
Inflation is stopped and resumed.	Automatic re-inflation to obtain correct measurements. Perhaps you talk or move your arm during the measurement?	See MEASUREMENT PROCEDURE. Calm down and repeat the measurement.

Every time the blood pressure is different. Measurements are too low/high.	Check that the arm cuff is level with your heart? Check that the arm cuff is applied correctly? Perhaps your arm muscles are tough? Perhaps you talk or move your arm during the measurement?	Take the correct position for measurement. Take the correct position for measurement. Apply the arm cuff correctly. Keep silence and quiet during measurement.
Measurements of the pulse rate are too high/low.	Perhaps you talk or move your arm during the measurement? Perhaps you make measurement directly after physical load?	Keep silence and quiet during measurement. Repeat the measurement at least in 5 min.
Impossibility to make a large of number of measurements.	Application of poor batteries.	Use only alkali batteries of well-known manufacturers.
Spontaneous failure of power supply.	Actuation of automatic de-energizing system.	This is not a defect. The Device is disconnected automatically in 3 minutes after the last operation of the Device.

If regardless of the above recommendation you are unable to get correct measurement results, stop the use of this Device and apply to a maintenance organization (addresses and telephones of authorized organizations may be found in the warranty card). Do not try to adjust the internal mechanism by yourself.

WARRANTY

1. The following LD product is covered by warranty for the period specified in the warranty card.
2. The warranty liabilities are contained in the warranty card given at the sale of this device to a purchaser.
3. The addresses of organizations for warranty maintenance are given in the warranty card.

TECHNICAL SPECIFICATIONS

Measurement method	oscillometric with Fuzzy Algorithm
Display	LCD, three-line display
Pressure indication range in an arm cuff, mmHg	from 0 to 300
Measurement range: pressure in an arm cuff, mmHg pulse rate, 1/min	 from 40 to 260 from 40 to 160
Range of admissible absolute error at measurement of air pressure in an arm cuff, mmHg	±3
Range of admissible relative error at pulse rate measurement, %	±5
Inflation	automatic (air pump)
Deflation at measurement	automatic (mechanical valve in device)
Rapid pressure relief	automatic (electric valve)
Memory	30 recent measurements + average value of the last three measurements
ADAPTER LD-N057 (ATTACHED TO LD5A)	
Output voltage, V Max load current, mA Input voltage Dimensions, mm Weight, kg Plug: Polarity of terminals Internal diameter, mm External diameter, mm Length of plug contact, mm	6 ± 5% not less than 600 ~200-240 V, 50/60 Hz 64 x 70 x 43 not more 0,3 «–» internal 2.1 ± 0.1 5.5 ± 0.1 10 ± 0.5
Max power intake, W	3,6
Power source, V	6
Type of power supply:	4 “AA” size batteries (LR6) or adapter not less than 600 mA
Operation conditions: Temperature, °C Relative humidity, % Rh,	 from 10 to 40 85 and lower

Storage and transportation conditions: Temperature, °C Relative humidity, % Rh	 from -20 to 50 85 and lower
Cuff size:	larger for adults (upper arm circumference 25-36 cm)
Dimensions: Size (electronic block), mm Weight (without package, case, batteries and adapter), g	 118 x 120 x 117 437
Completeness	electronic block, Cuff-LDA (in a set with a tube and plug), 4 batteries, power source LD-N057 (only for LD5a), a case, Instruction Manual, warranty card, package
Year of manufacture	Year the manufacture is given in the bottom of the device body in a serial number after symbols “AA”
Symbol definition	Type BF applied part. Read Instruction Manual. CE 0123 European Union Approval.

Technical characteristics may be changed without preliminary notification to improve the operation and quality of the product.

CERTIFICATION AND STATE REGISTRATION

This device manufacturing is certified according to international standard ISO 13485:2003. Devices LD3, LD3a comply with the requirements of European Directive MDD 93/42/EEC, international standards, EN980, EN1041, EN1060-1, EN1060-3, EN10601-1-2, ISO 14971.

Power source LD-N057 complies with international standard EN 55022 Class A, protection level against electric shock: Class II, Type B.

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