

LD51S

Little Doctor®

Digital Blood Pressure Monitor LD

Instruction Manual

ENG

Ciśnieniomierz elektroniczny automatyczny LD

do pomiaru ciśnienia tętniczego krwi i pulsu

Інструкція з експлуатації

POL

Прилад для вимірювання артеріального тиску та частоти пульсу цифровий LD

Інструкція з експлуатації

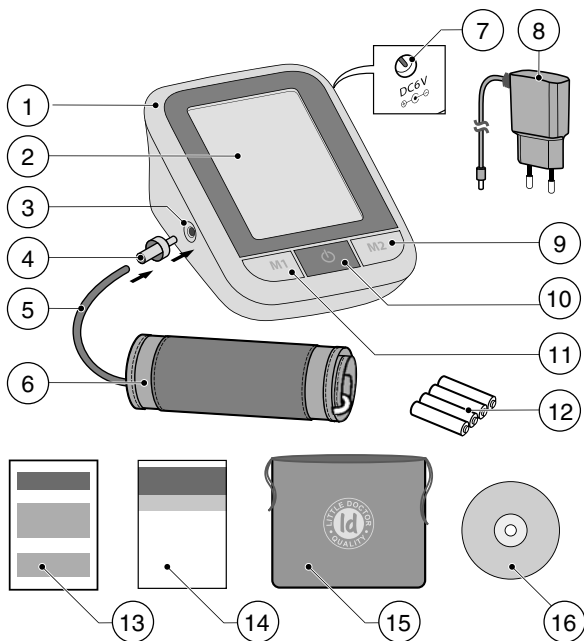
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NAME OF PARTS AND COMPONENTS



1. Main unit.
2. LCD display.
3. Cuff jack.
4. Cuff plug.
5. Air tube.
6. Cuff.
7. Power supply adapter jack.
8. Power supply LD-N057 (included).
9. Button M2 (Memory 2).
10. Button ⏻ (Start/Stop).
11. Button M1 (Memory 1).
12. Batteries.
13. Warranty Card.
14. Operation Manual.
15. Carrying Bag.
16. Compact Disc.

GENERAL INFORMATION

This manual serves to help the user safely and efficiently operate the Digital Blood Pressure and Pulse Rate Monitor LD, model LD51S (hereinafter – the DEVICE). The device shall be used in accordance with the rules given in the manual and shall not be used for any purposes other than those described herein. Carefully read and understand the entire manual and the «Recommendations for Correct Measurement» section, in particular.

INDICATIONS FOR USE

The device is designed to measure systolic and diastolic blood pressure and pulse rate in patients aged 15 or older. The device is recommended for home use by patients with impaired vision, unstable/variable blood pressure or arterial hypertension alongside with medical supervision. The cuff is suitable for the upper arm with a circumference of 25 to 36 cm.

PRINCIPLE OF OPERATION

The device uses the oscillometric method of blood pressure and pulse rate measurement. The cuff is wrapped around the upper arm and automatically inflated. The device sensor detects weak cuff pressure fluctuations, produced by the brachial artery expansion and contraction in response to each heartbeat. The amplitude of pressure waves is measured, converted to millimeters of mercury and displayed in the form of a digital value. The device has 2 memory blocks 90 cells per each for storing the measurement results. Please note that the device may not provide the indicated measurement accuracy if used or stored at a temperature or humidity other than those specified in the «Specifications» section of this manual. Please consider possible errors when measuring the blood pressure of persons with a severe arrhythmia. Please consult your doctor when measuring the blood pressure of a child.

APPLIED NEW LD TECHNOLOGIES



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



VS (Voice System) – is voice annunciation function (annunciation of measurement results, memory contents, device usage recommendations). Allows patients with impaired vision to use the blood pressure monitor more confidently.

ATTENTION! This device may only be used with the following cuff models:

- Cuff-LDA, size 25-36 cm (included)
- Cuff-LDA2, size 32-43 cm (optional).

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 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.

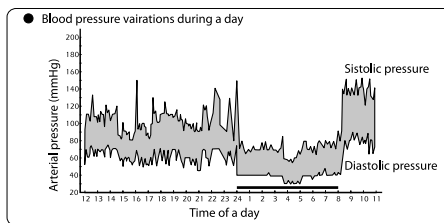


Fig.1

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.

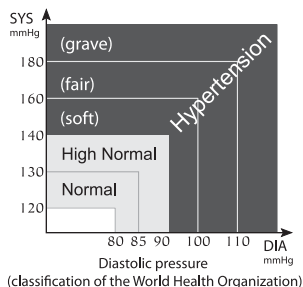


Fig.2

DEVICE POWER SUPPLY

BATTERY INSTALLATION

1. Remove the battery compartment cover and insert 4 AA type batteries, as indicated on the diagram inside the compartment. Make sure the polarities are matched. Do not apply excessive force when removing the battery compartment cover (fig. 3).

2. Replace the battery compartment cover.

- Replace all the batteries when the battery replacement indicator "☐", is constantly displayed or there is no indication on the display. The battery replacement indicator does not indicate the battery consumption degree.

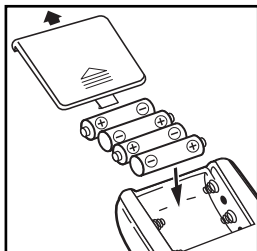


Fig.3


The batteries supplied are used to check the device functioning as sold, and their service life may be less than that of the recommended batteries.


- When replacing the batteries, replace all the batteries at the same time. Do not replace with used batteries.
- If the device is not used for a long time, remove the batteries.
- Do not leave worn batteries inside the device.

USING THE POWER SUPPLY

The manufacturer recommends to use a stabilized power supply LD-N057 (included).

The power supply jack is located on the right side of the device.

To use the device with the power supply, insert the power supply plug into the main unit, plug the power supply into the power outlet, and press the button .

After measurement, turn off the device by pressing the button , unplug the power supply from the power outlet and disconnect the power supply plug from the main unit.

CORRECT POSITIONING DURING MEASUREMENT

1. Sit at a table with your hand rested on its surface as you measure the blood pressure. Make sure that the cuff applied on the upper arm is approximately on the same level with the heart and that the forearm loosely lies on the table without moving.

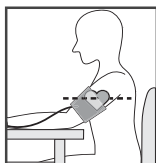


Fig.4

2. You can also measure the pressure lying on your back. Look at the ceiling, stay calm and do not move as you do the measurement. Make sure that the point of measurement on the upper arm is approximately on the same level with the heart.

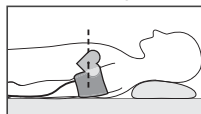


Fig.5

CUFF PREPARATION

1. Pull the cuff edge approximately 5 cm into the metal ring, as shown in the figure.

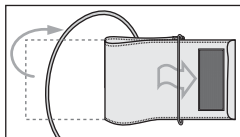


Fig.6

2. Put the left arm through the cuff loop, letting the air tube running down the inside of your arm toward the palm. If the left hand measurement is difficult, then the right hand measurement is possible. In this case please remember that the readings may differ by 5-10 mm Hg or sometimes higher

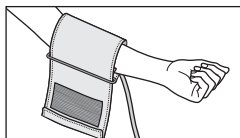


Fig.7

3. Wrap the cuff around your arm so that the bottom of the cuff is 2-3 cm above the elbow. "ARTERY" mark on the cuff should lie over the brachial artery on the inside of the arm.

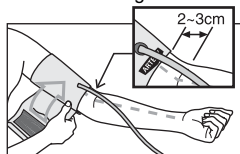


Fig.8

4. Wrap the cuff around your arm so that the bottom of the cuff is 2-3 cm above the elbow. "ARTERY" mark on the cuff should lie over the brachial artery on the inside of the arm.



Fig.9

5. When the cuff is positioned correctly, "INDEX" mark should indicate "NORMAL" area. This means that the cuff is matched correctly and corresponds to the size of the arm circumference. If the mark indicates the «<|||» area or goes leftward, the cuff is small and the readings may be slightly overestimated. If the mark indicates the «|||>» area or goes rightward, the cuff is large and the readings may be slightly underestimated

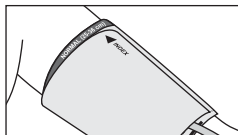


Fig.10

6. If the hand is high tapered, the cuff is recommended to be put on spirally, as shown in the figure.

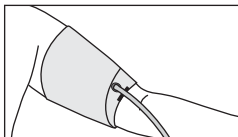


Fig.11

7. If you roll up the sleeve in a way that it squeezes your hand preventing the blood flow, the device readings may not match your blood pressure.

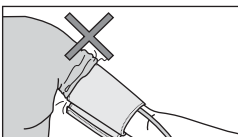


Fig.12

MEASUREMENT PROCEDURE


The device has a voice annunciation function «VS», so presetting is required prior to using: the voice system volume level and language need to be selected.

VOICE SYSTEM VOLUME LEVEL SETTING


To set the volume level on the powered-off device, press and hold M1 button and, at the same time, press the button ⏻ once. The « ■ » symbol flashes on the display. Press M1 button to select the desired volume level.

The voice annunciation level is displayed with the following symbols:

- – the voice annunciation is disabled;
- – minimum volume level;
- – medium volume level;
- – maximum volume level.


Press the button  to finish the voice annunciation volume setting.

VOICE ANNUNCIATION LANGUAGE SETTING

To set the voice annunciation language on the powered off device press and hold M1 button and, at the same time, press the  button twice. «L» symbol appears on the display. Press M1 button to select the desired language.

The voice annunciation language is displayed with the following symbols:

- | | |
|-----------------|-----------------|
| L1 – Polish; | L4 – Russian; |
| L2 – Hungarian; | L5 – Ukrainian. |
| L3 – Romanian; | |

Press the button  to finish the voice annunciation language setting.

Polish language set by default.

BLOOD PRESSURE MEASUREMENT PROCEDURE

1. Insert the cuff plug into the cuff jack.

Before taking a measurement do 3-5 deep breaths and relax. Do not move, talk or tense your arm during the measurement.

2. Press the button .

3. All the symbols will be displayed briefly (Fig. 13). You will hear a voice message about the measurement start. The device will automatically start air inflation into the cuff.

The inflation will initially stop at 190 mm Hg (Fig. 14).

4. Upon reaching 190 mm Hg, the cuff pressure will gradually decrease. The values displayed will start to decrease. The pulse is indicated by flashing “♥” symbol.

SINCE THE BLOOD PRESSURE AND PULSE RATE ARE MEASURED DURING THE CUFF DEFLATION, PLEASE REMAIN STILL AND NEITHER MOVE YOUR HAND NOR TENSE THE MUSCLE DURING THE MEASUREMENT.

5. At the end of measurement the device will deflate the cuff and display the measurement results (Fig. 15) duplicated by a voice message. M1/M2 symbols will start to flash, reminding to save the results to memory 1 or 2 by pressing M1 or M2 button respectively. If the memory is not selected within 3 minutes, the results will not be saved and the device will automatically turn off.

6. Press the  button to turn it off.

TO OBTAIN ACCURATE RESULTS, THE BREAK BETWEEN THE MEASUREMENTS IS NEEDED TO RESTORE THE BLOOD CIRCULATION.

MEMORY DATA WILL BE SAVED EVEN WITH THE DEVICE STORED WITHOUT THE BATTERIES. SAVED DATA CAN BE DELETED FROM THE DEVICE MEMORY BY FOLLOWING THE ACTIONS DESCRIBED IN THE «MEMORY FUNCTION» SECTION.

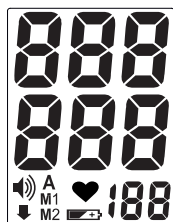


Fig.13



Fig.14

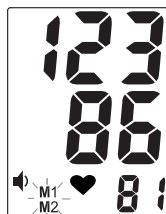


Fig.15

If no action is taken within 3 minutes after measurement, the device will automatically turn off.

AUTOMATIC INFLATION

If the initial cuff inflation (190 mm Hg) is not enough to measure the blood pressure or the arm is moved, the device will stop the measurement and inflate the cuff to the next higher level. The device has 4 fixed cuff inflation levels: 190, 230, 270, and 300 mm Hg.

Automatic cuff inflation is repeated until the measurement is completed successfully. This is not a type of malfunction.

If during the cuff inflation or during the measurement (slow pressure relief) you need to quickly release the cuff pressure, press the \odot button. The device will quickly release all air from the cuff and turn off.

MEMORY FUNCTION

1. Each measurement results (pressure and pulse) can be saved to the device memory. To do this, once the measurement completed, within no more than 3 minutes, you need to select memory M1 or M2 for saving.

THE MEASUREMENT RESULTS WILL NOT BE SAVED IN CASE OF ERROR MESSAGE DISPLAYED.

2. Each memory block can store up to 90 measurement results and the average value of the last 3 measurements. When the number of measurements exceeds 90, the oldest record is automatically deleted to save the most recent measurement values.

3. You can view the memory contents by pressing M1 or M2 button. When M1 (or M2) button is pressed for the first time, the average value of the last 3 measurements stored in M1 (or M2), indicated by «A» symbol (Fig. 16), will be displayed. When M1 (or M2) button is pressed again, the indicator of the selected memory M1 (or M2) and the cell number will be displayed, showing its contents (Fig. 17) duplicated by a voice message 1 second later. Each press of M1 (or M2) button takes you to the next memory cell.

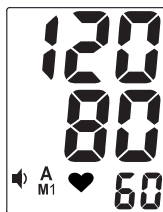


Fig.16

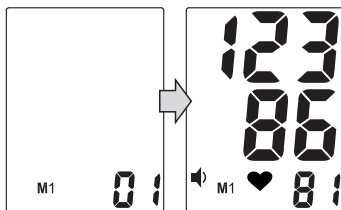

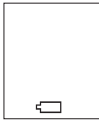


Fig.17

DEVICE MEMORY CLEARING

To delete all saved measurement results from M1 (or M2) memory, press and hold M1 (or M2) button for more than 3 seconds. «Clr» symbol will be displayed and the selected memory will be cleared.

ERROR MESSAGES

<i>Indication</i>	<i>Probable cause</i>	<i>Solution</i>
	Incorrectly positioned cuff or loose air tube plug.	Make sure that the cuff is positioned correctly and that the plug is inserted tightly and repeat the entire measurement procedure.
	Measurements could not be taken due to arm movement or talking during the measurement.	Repeat the measurement, fully following the recommendations of this operation manual.
	Worn batteries.	Replace all batteries with new ones.

MAINTENANCE, STORAGE, REPAIR AND DISPOSAL

1. This device shall be protected from high humidity, direct sunlight, shock, and vibration. **THE DEVICE IS NOT WATER RESISTANT!**
2. Do not store or use the device in close proximity to heaters or open fire.
3. If the device was stored at a negative temperature, before using the device, allow it to rest at a room temperature for at least 1 hour.
4. If the device is not used for a long time, remove the batteries. Battery leakage can damage the device. **KEEP THE BATTERIES OUT OF REACH OF CHILDREN!**
5. Protect the device from contamination and dust. Use a dry soft cloth to clean the device.
6. Prevent the device and its parts contacting with water, solvents, alcohol, or gasoline.
7. Protect the cuff from sharp objects, and never pull or twist the cuff.
8. Prevent the device from strong impacts and drops.
9. The device does not contain any measurement accuracy setting controls. Do to repair the main unit on your own. If necessary, have your device repaired only in specialized organizations.
10. When the established service life expired, it is necessary to periodically contact specialists (specialized repair organizations) to check the technical condition of the device.

11. When disposing, please follow the current regulations in your area. There are no special device disposal conditions set by the manufacturer.
12. The cuff is resistant to frequent sanitation. It is allowed to clean the inner side of the cuff tissue covering (contacts with the patient's arm) with a cotton swab soaked in a 3 % hydrogen peroxide solution. The partial discoloration of the cuff tissue covering is possible after a long-term use. Do not wash or hot iron the cuff.

POTENTIAL PROBLEMS

PROBLEM	PROBABLE CAUSE	METHOD OF CORRECTION
No indication on the display	Worn batteries. The battery polarities do not match. Dirty battery contacts. Power supply is not plugged in.	Replace all batteries for new ones. Install batteries correctly. Clean the terminals with dry cloth. Plug the power source into an electrical outlet.
Inflation stops and resumes.	Automatic inflation occurs to ensure correct measurements. Perhaps you were talking or moving your arm during the measurement?	See MEASUREMENT PROCEDURE. Calm down and repeat the measurement.
Different blood pressure every time. Measurement values are too low (high).	Is the cuff on the same level as your heart? Is the cuff positioned correctly? Is your arm tense? Perhaps you were talking or moving your arm during the measurement.	Take the correct position for measurement. Put on the cuff correctly. Calm down, apply the arm cuff correctly. Keep silence and quiet during measurement.
Pulse rate is too high (too low).	Perhaps you were talking or moving your arm during the measurement. Were the measurements taken immediately after exercise?	Keep silence and quiet during measurement. Repeat the measurement at least in 5 min.
Impossible to take multiple measurements.	Use of defective batteries.	Use only alkali batteries of well-known manufacturers.
Voice annunciation is other than English.	Voice annunciation mode set is other than English.	Set the voice annunciation language to the English.
No voice annunciation.	Voice mode disabled.	Set the voice annunciation level (See MEASUREMENT PROCEDURE).

If, despite the recommendations above, you can not obtain the correct measurement results, stop using the device and contact the maintenance organization (addresses and phone numbers of authorized organizations are listed on the warranty card). Do not try to adjust the internal mechanism on your own.

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
Indicator	liquid crystal
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	automatic
Memory	2x90 measurements + average of the last 3 measurements per each memory block
Power supply voltage, V	6
Type of power supply	4 AA batteries (LR6) or power supply, 600 mA min.
Max. power consumption, W	3,6
Voltage limit values, V	from 4,5 до 6

Power supply LD-N057 (included)	
Output voltage, V	6 ± 5%
Maximum load current	1.0 A
Input voltage	~100-240 V, 50/60 Hz
Dimensions	64 x 70 x 43 mm
Weight	85 g max.
Cord length	1500 ± 50 mm
Plug:	
Polarity of the contacts	«—» internal
Inner diameter, mm	2.1 ± 0.1
Outer diameter, mm	5.5 ± 0.1
Plug contact length, mm	10 ± 0.5
Operation conditions:	
Temperature, °C	from 10 to 40
Relative humidity, % Rh	85 and lower
Storage and transportation conditions:	
Temperature, °C	от минус 20 до 50
Relative humidity, % Rh	85 and lower
Voice annunciation languages	Polish, Hungarian, Romanian, Russian, Ukrainian
Cuff size:	larger for adults (upper arm circumference 25-36 cm)
Dimensions:	
Size (electronic block), mm	129 x 105 x 61
Weight (without package, case, batteries and adapter), g	433
Complete set	The year and month of production are included in the serial number after «A» symbol. The serial number is located on the bottom of the device
The year and month of production	The year and month of production are included in the serial number after «A» symbol. The serial number is located on the bottom of the device.

Symbols:

 ⁰¹²³ Compliance with the Directive 93/42/EEC



Important: Please read the Manual



European Authorized Representative



Name and address of the manufacturer



Keep dry



Type II



Type BF

The revision date of this Operating Manual is indicated on the last page in the form of MXXX/YYMM/XX, where YY is year, and MM is revision month.

Specifications may change without prior notice in order to improve the performance and quality of the product.

CERTIFICATION AND STATE REGISTRATION

Device 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:

Little Doctor Europe Sp. z o.o.

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

Service phone: +48 12 2684748, 2684749

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