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microlife BP 3AS1-2

Semi-automatic Blood Pressure Monitor

Instruction Manual (1-11)

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microlife®

Semi-automatic Blood Pressure Monitor

Instruction Manual

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1. Introduction

1.1. Features

The blood-pressure monitor is a semi-automatic, digital blood-pressure measuring device for use on the upper arm, which enables very fast and reliable measurement of the systolic and diastolic blood-pressure as well as the pulse frequency by way of the oscillometric method of measuring.

The device offers a very high and clinical tested measurement accuracy and has been designed to provide a maximum of user-friendliness.

Before using, please read through this instruction manual carefully and then keep it in a safe place. For further questions on the subject of blood-pressure and its measurement, please contact your doctor.

Attention!

1.2. Important information about self-measurement

- Do not forget: **self-measurement means control**, not diagnosis or treatment. Unusual values must always be discussed with your doctor. **Under no** circumstances should you alter the dosages of any drugs prescribed by your doctor.
- The pulse display is **not** suitable for checking the frequency of heart pacemakers!
- In cases of cardiac irregularity (Arrhythmia), measurements made with this instrument should only be evaluated after consultation with the doctor.

Electromagnetic interference

The device contains sensitive electronic components (Microcomputer). Therefore, avoid strong electrical or electromagnetic fields in the direct vicinity of the device (e.g. mobile telephones, microwave cookers). These can lead to temporary impairment of the measuring accuracy.

2. Important information on the subject of blood-pressure and its measurement

2.1. How does high/low blood-pressure arise?

The level of blood-pressure is determined in a part of the brain, the so-called circulatory centre, and adapted to the respective situation by way of feedback via the nervous system. To adjust the blood-pressure, the strength and frequency of the heart (Pulse), as well as the width of circulatory blood vessels is altered. The latter is effected by way of fine muscles in the blood-vessel walls.

The level of arterial blood-pressure changes periodically during the heart activity: During the «blood ejection» (Systole) the value is maximal (systolic blood-pressure value), at the end of the heart's «rest period» (Diastole) minimal (diastolic blood-pressure value).

The blood-pressure values must lie within certain normal ranges in order to prevent particular diseases.

2.2. Which values are normal?

Blood pressure is too high if at rest, the diastolic pressure is above 90 mmHg and/or the systolic blood-pressure is over 140 mmHg. In this case, please consult your doctor immediately. Long-term values at this level endanger your health due to the associated advancing damage to the blood vessels in your body.

With blood-pressure values that are too low, i.e. systolic values under 100 mmHg and/or diastolic values under 60 mmHg, likewise, please consult your doctor.

Even with normal blood-pressure values, a regular self-check with your blood-pressure monitor is recommended. In this way you can detect possible changes in your values early and react appropriately.

If you are undergoing medical treatment to control your blood pressure, please keep a record of the level of your blood pressure by carrying out regular self-measurements at specific times of the day. Show these values to your doctor. **Never use the results of your measurements to alter independently the drug doses prescribed by your doctor.**

Table for classifying blood-pressure values (units mmHg) according to World Health Organization:

Range	Systolic Blood-pressure	Diastolic Blood-pressure	Measures
Hypotension	lower than 100	lower than 60	Consult your doctor
Normal range	between 100 and 140	between 60 and 90	Self-check
Mild hypertension	between 140 and 160	between 90 and 100	Consult your doctor
Moderate hypertension	between 160 and 180	between 100 and 110	Consult your doctor
Severe hypertension	higher than 180	higher than 110	Consult your doctor immediately

Further information

- If your values are mostly standard under resting conditions but exceptionally high under conditions of physical or psychological stress, it is possible that you are suffering from so-called «labile hypertension». Please consult your doctor if you suspect that this might be the case.
- Correctly measured diastolic blood-pressure values above 120 mmHg require **immediate medical treatment**.

2.3. What can be done, if regular increased/low values are obtained?

- a) Please consult your doctor.
- b) Increased blood-pressure values (various forms of hypertension) are associated long- and medium term with considerable risks to health. This concerns the arterial blood vessels of your body, which are endangered due to constriction caused by deposits in the vessel walls (Arteriosclerosis). A deficient supply of blood to important organs (heart, brain, muscles) can be the result. Furthermore, with long-term continuously increased blood-pressure values, the heart will become structurally damaged.
- c) There are many different causes of the appearance of high blood pressure. We differentiate between the common primary (essential) hypertension, and secondary hypertension. The latter group can be ascribed to specific organic malfunctions. Please consult your doctor for information about the possible origins of your own increased blood pressure values.
- d) There are measures which you can take, not only for reducing a medically established high blood pressure, but also for prevention. These measures are part of your general way of life:

A) Eating habits

- Strive for a normal weight corresponding to your age. Reduce overweight!
- Avoid excessive consumption of common salt.
- Avoid fatty foods.

B) Previous illnesses

Follow consistently any medical instructions for treating previous illness such as:

- Diabetes (Diabetes mellitus)
- Fat metabolism disorder
- Gout

C) Habits

- Give up smoking completely
- Drink only moderate amounts of alcohol
- Restrict your caffeine consumption (Coffee)

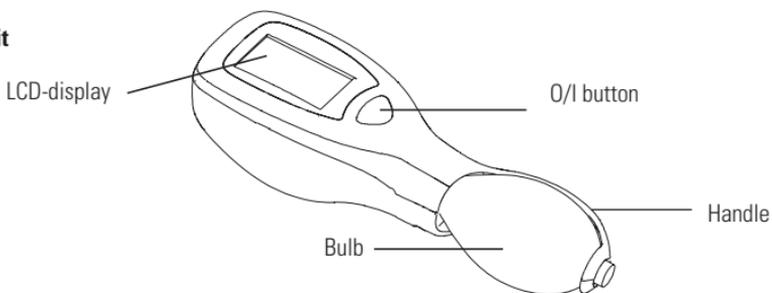
D) Physical constitution

- After a preliminary medical examination, do regular sport.
- Choose sports which require stamina and avoid those which require strength.
- Avoid reaching the limit of your performance.
- With previous illnesses and/or an age of over 40 years, please consult your doctor before beginning your sporting activities. He will advise you regarding the type and extent of types of sport that are possible for you.

3. The various components of the blood-pressure monitor

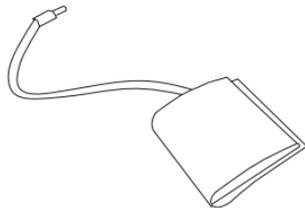
The illustration shows the blood-pressure monitor, consisting of:

a) Measuring unit



b) Cuff

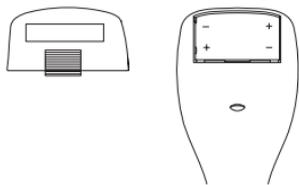
cuff type M for arm circumference 22–32 cm or
cuff type L for arm circumference 32–42 cm
(available as special accessory)



4. Putting the blood-pressure monitor into operation

4.1. Inserting the batteries

After you have unpacked your device, first insert the batteries. The battery compartment is located on the underside of the device (see illustration).



- a) Remove cover as illustrated
- b) Insert the batteries (2 x size 1,5 V), thereby observing the indicated polarity.
- c) If the battery warning appears in the display, the batteries are empty and must be replaced by new ones.



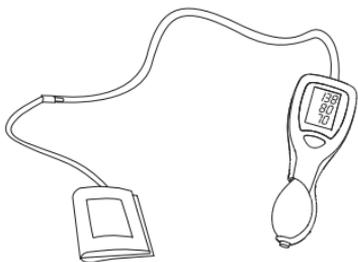
Attention!

- After the battery warning appears, the device is blocked until the batteries have been replaced.
- Please use «AAA» Long-Life or Alkaline 1.5 V Batteries. The use of 1.2 V Accumulators is not recommended.
- If the blood-pressure monitor is left unused for long periods, please remove the batteries from the device.

Functional check: Press and hold the O/I button down to test all the display elements. When functioning correctly all segments appear.

4.2. Tube connection

Cuff (1-tube cuff + T-connector):
Insert the cuff tube into the opening provided on the back of the instrument, as shown in the diagram.



5. Carrying out a measurement

5.1. Before the measurement

- Avoid eating, smoking as well as all forms of exertion directly before the measurement. All these factors influence the measurement result. Try to find time to relax by sitting in an armchair in a quiet atmosphere for about 5 minutes before measurement.
- Remove any garment that fits closely to your upper arm.
- Always measure on the same arm (normally left).
- Attempt to carry out the measurements regularly at the same time of day, since the blood-pressure changes during the course of the day.

5.2. Common sources of error

Note: Comparable blood-pressure measurements always require the same conditions! These are normally always quiet conditions.

- All efforts by the patient to support their arm can increase blood-pressure. Make sure you are in a comfortable, relaxed position and do not activate any of the muscles in the measurement arm during the measurement. Use a cushion for support if necessary.
- If the wrist artery lies considerably lower (higher) than the heart, an erroneously higher (lower) blood-pressure will be measured! (Each 15 cm difference in height results in a measurement error of 10 mmHg!)
- Cuffs that are too narrow or too short result in false measurement values. Selecting the correct cuff is of extraordinary importance. The cuff size is dependent upon the circumference of the arm (measured in

the centre). The permissible range is printed on the cuff. If this is not suitable for your use, please contact your dealer. **Note:** Only use clinically approved **Original-Cuffs!**

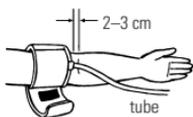
- A loose cuff or a sideways protruding air-pocket causes false measurement values.

5.3. Fitting the cuff

- a) Push the cuff over the left upper arm so that the tube points in the direction of the lower arm.



- b) Lay the cuff on the arm as illustrated. Make certain that the lower edge of the cuff lies approximately 2 to 3 cm above the elbow and that the rubber tube leaves the cuff on the inner side of the arm.



Important! The mark (ca. 3 cm long bar) must lie over the artery which runs down the inner side of the arm.

- c) Tighten the free end of the cuff and close the cuff by affixing the Velcro.



- d) There must be no free space between the arm and the cuff as this would influence the result. Clothing must not restrict the arm. Any piece of clothing which does (e.g. a pullover) must be taken off.



- e) Secure the cuff with the Velcro closer in such a way that it lies comfortably and is not too tight. Lay your arm on a table (palm upwards) so that the cuff is at the same height as the heart. Make sure that the tube is not kinked.



Note:

If it is not possible to fit the cuff to your left arm, it can also be placed on the right one. However, all measurements should be made using the same arm.



5.4. Measuring procedure

After the cuff has been appropriately positioned, the measurement can begin:

- a) Press the O/I button. Make sure the tube is properly attached to the instrument. The following appears in the display for 2 seconds: (Diag.). A short be-be-beep follows to indicate that the instrument has equilibrated with the pressure of the surroundings and the measurement can therefore begin. A «0» is shown in the display.



- b) Grasp the handle and bulb with your free hand and inflate the cuff to a pressure at least 40 mmHg higher than the expected systolic pressure. If you do not know the value of this pressure, inflate to a value of approximately 160 - 180 mmHg. The cuff pressure is shown continuously on the LCD.
- c) After the inflation process remain in a quiet and relaxed sitting position. The measurement now proceeds on its own. If no measurement takes place and all that appears in the display is a flashing, upwards pointing arrow, see below under «Inflate further». When the instrument detects a pulse, a heart symbol in the display starts to flash.
- d) A longer beep is sounded when the measurement has been completed. The systolic, and diastolic blood pressures and pulse rate now appear in the display.
At the same time, the cuff pressure will be automatically released by the quick release valve of the device.



5.5. Inflating further

If the cuff is not inflated sufficiently, the measurement is broken off after a few seconds and a flashing arrow pointing upwards appears in the display. It is then necessary to inflate further to at least 20 mmHg higher than the previous value. The instruction to inflate further can appear several times if the pressure is still not sufficient.



Attention:

If the cuff is inflated too far (over 300 mmHg), «HI» appears in the display and a warning signal is sounded. The cuff pressure must then be immediately released by pressing the O/I button. As soon as the cuff is inflated sufficiently and the measurement is proceeding, continue as described under points c-d.



5.6. Discontinuing a measurement

If it is necessary to interrupt a blood pressure measurement for any reason (e.g. the patient feels unwell), the O/I button can be pressed at any time.

The device immediately lowers the cuff-pressure automatically.



5.7. Memory – displaying the last measurement

The measured results are stored in the instrument until a new measurement is carried out or the batteries are removed. You can call up the stored values at any time by pressing the O/I button for at least 3 seconds.



6. Error messages/malfunctions

If an error occurs during a measurement, the measurement is discontinued and a corresponding error code is displayed.
(Example Error no. 1)



Error No.	Possible cause(s)
ERR 1	The systolic pressure was determined but afterwards the cuff pressure fell below 20 mmHg. This situation can occur, for example, if the tube becomes unplugged after the systolic blood pressure has been measured. Further possible cause: No pulse has been detected.
ERR 2	Unnatural pressure impulses influence the measurement result. Reason: The arm was moved during the measurement (Artefact).
ERR 5	The measured results have indicated an unacceptable difference between the systolic and diastolic pressure. Take another measurement, carefully following the instructions. Contact your doctor, if you still obtain unusual results.
HI	The pressure in the cuff is too high (over 300 mmHg) OR the pulse is too high (over 200 beats per minute). Relax for 5 minutes and repeat the measurement.*
LO	The pulse is too low (less than 40 beats per minute). Repeat the measurement.*

* Please consult your doctor, if this or any other problem occurs repeatedly.

Other possible malfunctions and their elimination – If problems occur when using the device, the following points should be checked and if necessary, the corresponding measures are to be taken:

Malfunction	Remedy
The display remains empty when the instrument is switched on although the batteries are in place.	<ol style="list-style-type: none">1. Check whether the batteries are installed with the correct polarity and correct if necessary.2. If the display is unusual, re-insert batteries or exchange them.
The pressure does not rise although the pump is running.	<ul style="list-style-type: none">• Check the connection of the cuff tube and connect properly if necessary.
The device frequently fails to measure the blood pressure values, or the values measured are too low (too high).	<ol style="list-style-type: none">1. Fit the cuff correctly on the arm.2. Before starting the measurement make sure that the cuff is not fitted too tightly and that there is no rolled-up sleeve exerting pressure on the arm above the measuring position. Take off articles of clothing if necessary.3. Measure the blood pressure again in complete peace and quiet.
Every measurement results in different values although the device functions normally and the values displayed.	<ul style="list-style-type: none">• Please read the following information and the points listed under «Common sources of error». Repeat the measurement.
The blood pressure values measured differ from those measured by the doctor.	<ul style="list-style-type: none">• Record the daily development of the values and consult your doctor about them.

Further information

The level of blood-pressure is subject to fluctuations even with healthy people. Important thereby is, **that comparable measurements always require the same conditions (rest conditions)!**

You must consult your specialist dealer or chemist if there are technical problems with the blood-pressure instrument. **Never attempt to repair the instrument yourself!**

Any unauthorised opening of the instrument invalidates all guarantee claims!

7. Care and maintenance, recalibration

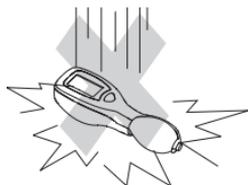
a) Do not expose the device to either extreme temperatures, humidity, dust or direct sunlight.



b) The cuff contains a sensitive air-tight bubble. Handle this carefully and avoid all types of straining through twisting or buckling.



c) Clean the device with a soft, dry cloth. Do not use petrol, thinners or similar solvent. Spots on the cuff can be removed carefully with a damp cloth and soap-suds. **The cuff must not be washed!**



d) Handle the tube carefully. Do not pull on it. Likewise, this is not to be buckled or laid over sharp edges.

e) Do not drop the instrument or treat it roughly in any way. Avoid strong vibrations.



f) **Never open the device!** Otherwise the manufacturer calibration becomes invalid!

Periodical recalibration

Sensitive measuring devices must from time to time be checked for accuracy. We therefore recommend a periodical inspection of the static pressure display **every 2 years.**

Your specialist dealer would be pleased to provide more extensive information about this.

8. Guarantee

The blood-pressure monitor is guaranteed for **3 years** from date of purchase. This guarantee includes the instrument and the cuff. The guarantee does not apply to damage caused by improper handling, accidents, not following the operating instructions or alterations made to the instrument by third parties. The guarantee is only valid upon presentation of the guarantee card filled out by the dealer.

Name and company address of the responsible dealer:

9. Technical specifications

Weight:	310 g g (with batteries)
Size:	68 (W) x 186 (L) x 48.5 (H) mm
Storage temperature:	-20 °C to +50 °C 15 to 90% relative humidity maximum
Operation temperature:	10 °C to 40 °C
Display:	LCD-Display (Liquid Crystal Display)
Measuring method:	oscillometric
Pressure sensor:	capacitive
Measuring range:	
SYS/DIA:	30 to 280 mmHg
Pulse:	40 to 200 per minute
Memory:	Storing the last measurements automatically
Measuring resolution:	1 mmHg
Accuracy:	
Pressure:	within ± 3 mmHg
Pulse:	$\pm 5\%$ of the reading
Power source:	2 x 1.5 V Batteries; size AAA
Cuffs:	cuff type M for arm circumference 22–32 cm or cuff type L for arm circumference 32–42 cm (optional)
Reference to standards:	EU directive 93/42/EEC, NIBP - requirements: EN 1060-1 /-3 /-4 & ANSI / AAMI SP10

Technical alterations reserved!

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