DIGITAL BLOOD PRESSURE MONITOR
DS-500
INSTRUCTIONS

ENGLISH

This manual is intended to assist the user in the safe and efficient operation of Digital Blood Pressure Monitor DS-500. The product must be used in accordance with the procedures contained in this manual and must not be used for purposes other than those described herein. It is important to read and understand the entire manual. In particular, please read carefully and become familiar with the section entitled “TIPS ON TAKING YOUR BLOOD PRESSURE.”

PRECAUTIONS FOR USE

Do not inflate the cuff when it is not wrapped around your arm.

Do not disassemble or modify the unit.

Direct sunlight. Do not drop or strike the unit. Make sure not to avoid extreme temperature variations, humidity, shock, dust, and direct sunlight. Do not drop or strike the unit. Make sure not to expose the unit to moisture. This unit is not water resistant.

Do not disassemble or modify the unit.

Do not inflate the cuff when it is not wrapped around your arm.

METHOD OF MEASUREMENT

This product employs the oscillometric method for measurement of blood pressure and pulse rate. The cuff is connected to the main unit and wrapped around the arm. Circuits within the cuff sense the small oscillations in pressure against the cuff produced by the expansion and contraction of the arteries in the arm in response to each heart beat. The amplitude of each pressure waves are measured, converted to millimeters of mercury, and displayed on the LCD as a digital value. If the pulse rhythm detected during measurement was irregular, irregular pulse rate rhythm indication be displayed. A memory circuit stores the 30 most recent measurement results with date and time for comparison and computes the average value of stored data.

PARTS NAMES AND PRODUCT COMPONENTS

INDEX FOR USE

The DS-500 system is intended for the non-invasive measurement of systolic and diastolic blood pressure and determination of pulse rate in adults, i.e., age 12 and above; this unit is not designed for neonatal use. Also, an inaccurate reading may result if this instrument is used on a child’s arm. Consult your physician if you wish to take a child’s blood pressure. This product is recommended for use with patients with labile blood pressure or known hypertension in a home care environment as an adjunct to medical management. The cuff will accommodate an upper arm circumference range of approximately 22 to 32 centimeters. Pressure is measured over a range of 0 to 300 mmHg and pulse rate over a range of 40 to 160 beats/minute.

PRODUCT SPECIFICATIONS

Model : DS-500
Operating Principle : Oscillometric method
Indicator : 13 digits liquid crystal display
Pressure Indicating Range : 0 to 300 mmHg (Cuff pressure)
Measuring Range : 50 to 250 mmHg (systolic)
40 to 140 mmHg (diastolic)
40 to 160 bpm (pulse rate)
Accuracy : ±3 mmHg (Cuff pressure)
±5% of reading (pulse rate)
Inflation : Automatic inflation
Deflation : Automatic (electric control valve)
Exhaust : Automatic exhaust valve
Power Supply : 4 pcs. 1.5 volt “AA” (LR6) type batteries
Power Consumption : 4W (max.)
Memory : 30 measurements x 2 and averages
Operating Environment : +10°C to +40°C, 85% relative humidity or below
Storage Environment : -5°C to +50°C, 85% relative humidity or below
Cuff : Coverage arm circumference ; 22 to 32cm
Main Unit : Weight ; Approx. 255g (without batteries)
Size ; 152 x 100 x 60 mm (W x D x H)
Key to symbols : Δ : Important ; Read operating instructions
This device complies with EMC [IEC60601-1-2], EN1060-1 and EN1060-3.
Specifications are subject to change without notice due to improvements in performance.

CARE AND MAINTENANCE

Use only a soft, dry cloth to clean the unit. Do not use gasoline, paint thinner, or other strong solvents on the unit. Since the cuff may absorb perspiration and other fluids, inspect it for stain and discoloration after each use. When cleaning the cuff, do not machine wash or scrub it. Use a synthetic detergent and gently rub the surface. Air dry thoroughly. Make sure fluid never gets in AIR HOSE.

When storing the unit, do not place heavy objects on it and do not coil AIR HOSE too tightly. When the unit has been stored at a temperature below the freezing point, keep it for at least 1 hour in a warm place before using. Remove the batteries if the instrument is to be stored for an extended period of time. Keep the batteries out of reach of children.

We suggest that you have your blood pressure monitor checked every 2 years. This operation may only be performed by the manufacturer or by firms authorized by the manufacturer.
INSTALLING BATTERIES AND SETTING THE CLOCK

1. Open the battery compartment cover.
2. Install four “AA” (LR6) type batteries into the compartment.
   Make sure that the polarities correspond to the (+) and (–) marks inside the battery compartment. The batteries can be easily installed by pressing their (–) side against the spring.
   Do not use rechargeable batteries.
3. Close the battery compartment cover.
   Do not force the battery cover into position.

4. Year flashes on the display.
   Clock can be set only after the batteries are reinstalled. Adjust the clock so that measurement results are stored with correct date and time.
   Use M1 BUTTON to increase the flashing year and M2 BUTTON to decrease the year.
   Press POWER BUTTON to confirm and move to next step.

5. Month flashes. Adjust the month with M1 BUTTON and/or M2 BUTTON, press POWER BUTTON to confirm.

6. Day flashes. Adjust the day with M1 BUTTON and/or M2 BUTTON, press POWER BUTTON to confirm.

7. Hour flashes. Adjust the hour with M1 BUTTON and/or M2 BUTTON, press POWER BUTTON to confirm.
   The clock is in 24 hour mode.

8. Minute flashes. Adjust the minute with M1 BUTTON and/or M2 BUTTON, press POWER BUTTON to confirm.

Clock is set and the unit is turned off.
The clock is displayed while the unit is turned off.

TIPS ON TAKING YOUR BLOOD PRESSURE

Blood pressure is a measurement of the force exerted by the heart in pumping the blood through the arteries and the resistance by the veins in this flow.

Blood pressure varies all the time, influenced by mental and physical factors and is never constant.
In general, blood pressure is highest during the working hours and gradually decreases during the afternoon and evening hours. It is low during sleep and increases at a relatively fast rate after arising from bed.
Causes for Changes in Blood Pressure
- Body movement
- Emotions
- Smoking
- Temperature
- Changes in the surroundings such as movement or noise, etc.

Blood pressure measured at home tends to be lower than when measured in a hospital, clinic or doctor’s office.
This is because you are tense at the hospital and relaxed at home. It is important to know your stable normal blood pressure at home.

Let a qualified physician interpret your blood pressure readings.
Depending on your age, weight and general condition, blood pressure can be slightly different. Consult with your doctor on determining what blood pressure is normal for you.

Blood pressure changes shown below.
Upper arm blood pressure data


CORRECT MEASURING POSTURE

Sit at the table and let the table support your arm as you take the blood pressure measurement.
Make sure that the measurement location on the upper arm is at approximately the same height as the heart, and that the forearm is extended naturally on the table and does not move.

You may lie on your back and take the measurement. Look at the ceiling, stay calm, and do not move your neck or body during the measurement. Again, make sure that the measurement location on the arm is at approximately the same height as the heart.

Measured data may vary slightly depending on the posture during measurement.
If the cuff is lower (higher) than the heart, the measured reading tends to become larger (smaller).
1. Place the cuff on your left arm with the air hose positioned toward your hand.

2. Wrap the cuff around your arm with the edge of the cuff approximately 2–3 cm above the elbow. AIR TUBE should be on the palm side of the arm.

3. Press the surface of the cuff to make sure that the hook & loop fastens securely.

When wrapping the cuff, wrap it loosely enough around the arm so that two fingers can be placed between the cuff and the arm. If the cuff is wrapped more tightly or loosely than this, inaccurate blood pressure readings may result.

If you are wearing a shirt that might restrict circulation in your upper arm or you roll your sleeve up over the upper arm, the blood flow will be restricted, preventing accurate measurement.

---

**MEASUREMENT PROCEDURES**

**Insert TUBE PLUG into AIR CONNECTOR.**

**Press POWER BUTTON.**

Deflation mark flashes.

The cuff is automatically inflated to the applied pressure.

Pressure (displayed value) starts to decrease and pulse is indicated by heart mark.

When the measurement is complete, air is automatically released from the cuff.

Blood pressures and pulse rate are displayed.

Heart mark flashes when pulse rhythm detected during measurement was irregular.

Press either one of memory buttons, M1 or M2, and the result is stored in the selected bank.

The selected memory bank number is shown on the display. The result is stored in the bank selected when the unit is turned off. Irregular pulse rhythm indication will not be stored, only blood pressure and pulse rate are stored. When a measurement resulted in an error, it will not be stored.

Press POWER BUTTON to turn off the power.

If you forget to turn off the unit, it will automatically turn off after 3 minutes.

---

**AUTOMATIC REPRESSURIZATION**

If the pressure applied is judged insufficient in the early phase of measurement or if movement of the hand or wrist occurs during measurement, the unit will inflate again to a level about 40 mmHg higher. Automatic Repressurization is repeated until a measurement is made. However, this does not indicate a problem.

To manually control pressurization, hold down POWER BUTTON immediately after the start of inflation and release it when the pressure reaches the level 50 mmHg higher than the expected maximum systolic pressure. If the pressure value has exceeded 180 mmHg, the inflation will stop when the key is released. Pressure can be increased to approximately 300 mmHg.

---

**IRREGULAR PULSE RHYTHM INDICATION**

A flashing heart mark in the measurement result display indicates irregular pulse rhythm.

Irregular pulse rhythm can be a result of body movement during measurement or arrhythmias. Although continuous appearance of the indication under quiet measurements may suggest arrhythmias, do not make any judgment on your own before consulting with your doctor.

---

*Don’t execute repeated measurements for congestion of blood could result in false measurement. Let your arm rest for at least 5 minutes.*
Measured result is stored in either M1 or M2. Each of two memory banks can hold up to 30 results and their average. When the number of measurements exceeds 30, the oldest data will be deleted to record new data. You may decide which bank to store your measurement results to avoid data mixture with someone else’s, or may use two banks to save data measured in the morning and evening separately.

RECALLING STORED DATA

Press POWER BUTTON once while measurement result is being displayed after a measurement.

Press memory M1 BUTTON or memory M2 BUTTON to see stored data.

The average of the stored result in the selected bank is displayed.

The latest result stored is displayed when there is only a single result and the clock display remains when there are no results stored.

The memory data is displayed for approximately 30 seconds. Approximately 30 seconds after memory button is released, the apparatus will turn off.

Press memory button to move to next data.

The indication at the top of the display alternately changes from memory data number to date and to time.

The memory data number 1 is the latest among the stored data in the selected memory bank.

Every depression of memory button switches among the memory data.

As memory is pressed, the memory data number increases; the bigger the number, the older the result.

ERROR DISPLAYS AND TROUBLESHOOTING

ERROR SYMBOl / SYMPTOM  
OVER-PRESSURIZATION;  
CUFF INFLATED TO THE MAXIMUM PRESSURE;

Do not move during measurement.

MEASUREMENT ERROR;

Measurement could not be made because of moving or talking during measurement.

Remain still and quiet during measurement.

INFLATION ERROR;

TUBE PLUG is not correctly inserted.

Do not move during measurement.

The cuff is not properly applied.

Properly apply the cuff.

DEFLATION ERROR;

Measurement could not be made because of moving or talking during measurement.

Remain still and quiet during measurement.

NO POWER;

Batteries are exhausted.

Replace all batteries with new ones.

Have the batteries polarities been positioned incorrectly?

Replace the battery terminals clean!

LOW BATTERY;

Battery is weak.

Replace all batteries with new ones.

ERROR SYMBOl / SYMPTOM  
IMPROPER OPERATION;

POWER BUTTON was accidentally pressed during battery replacement.

Press POWER BUTTON to turn off the power once and press it again to start a measurement.

Measurement is interrupted once and cuff is deflated and inflated again.

When noise is detected or diastolic blood pressure is low, the cuff is deflated and inflated again.

Did you move during measurement?

Do not move during measurement.

Are you measuring with correct posture?

Replace all batteries with new ones.

Pulse rate is too low (or high).

Faster or slower than normal.

Did you move during measurement?

Do not move during measurement.

Did you take measurement immediately after exercise?

Measure with the correct posture.

See TIPS ON TAKING YOUR BLOOD PRESSURE.

Measurement result is not stored.

When no memory button is selected before turning off the monitor after a measurement.

Did you select correct memory bank number after the measurement?

Confirm the memory bank number.

The power is automatically turned off.

Have you left the instrument untouched after the measurement?

This does not indicate a problem.

The instrument automatically turns off 3 minutes after a measurement or 30 seconds after memory display.

If you cannot get correct measurement with the methods above, do not tamper with the internal mechanism. Contact your dealer. If the unit malfunction, please return it to the dealer or an authorized service representative for service according to the warranty.

TECHNICAL DESCRIPTION

Supplemental/Modifying Instructions - Electromagnetic Immunity

Recommendations on local or stationary RF transmitters

Table 1: Guidance on minimizing electromagnetic immunity

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause/Check Point</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over-pressurization</td>
<td>The cuff was inflated to the maximum pressure because of movement of body etc.</td>
<td>Do not move during measurement.</td>
</tr>
<tr>
<td>Measurement error</td>
<td>Measurement could not be made because of moving or talking during measurement.</td>
<td>Remain still and quiet during measurement.</td>
</tr>
<tr>
<td>Inflation error</td>
<td>TUBE PLUG is not correctly inserted.</td>
<td>Reinsert TUBE PLUG and make sure that it is securely inserted. Properly apply the cuff.</td>
</tr>
<tr>
<td>Deflation error</td>
<td>Measurement could not be made because of moving or talking during measurement.</td>
<td>Remain still and quiet during measurement.</td>
</tr>
<tr>
<td>No power</td>
<td>Batteries are exhausted.</td>
<td>Replace all batteries with new ones.</td>
</tr>
<tr>
<td>Low battery</td>
<td>Battery is weak.</td>
<td>Replace all batteries with new ones.</td>
</tr>
</tbody>
</table>

Table 2: Error displays and troubleshooting - electromagnetic immunity

<table>
<thead>
<tr>
<th>Error display</th>
<th>Cause/Check Point</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVER-PRESSURIZATION</td>
<td>The cuff was inflated to the maximum pressure because of movement of body etc.</td>
<td>Do not move during measurement.</td>
</tr>
<tr>
<td>MEASUREMENT ERROR</td>
<td>Measurement could not be made because of moving or talking during measurement.</td>
<td>Remain still and quiet during measurement.</td>
</tr>
<tr>
<td>INFLATION ERROR</td>
<td>TUBE PLUG is not correctly inserted.</td>
<td>Reinsert TUBE PLUG and make sure that it is securely inserted. Properly apply the cuff.</td>
</tr>
<tr>
<td>DEFLECTION ERROR</td>
<td>Measurement could not be made because of moving or talking during measurement.</td>
<td>Remain still and quiet during measurement.</td>
</tr>
<tr>
<td>NO POWER</td>
<td>Batteries are exhausted.</td>
<td>Replace all batteries with new ones.</td>
</tr>
<tr>
<td>LOW BATTERY</td>
<td>Battery is weak.</td>
<td>Replace all batteries with new ones.</td>
</tr>
</tbody>
</table>

Table 3: Guidance and manufacturer’s declaration - electromagnetic immunity

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause/Check Point</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement error</td>
<td>Measurement could not be made because of moving or talking during measurement.</td>
<td>Remain still and quiet during measurement.</td>
</tr>
<tr>
<td>Inflation error</td>
<td>TUBE PLUG is not correctly inserted.</td>
<td>Reinsert TUBE PLUG and make sure that it is securely inserted. Properly apply the cuff.</td>
</tr>
<tr>
<td>Deflation error</td>
<td>Measurement could not be made because of moving or talking during measurement.</td>
<td>Remain still and quiet during measurement.</td>
</tr>
<tr>
<td>No power</td>
<td>Batteries are exhausted.</td>
<td>Replace all batteries with new ones.</td>
</tr>
<tr>
<td>Low battery</td>
<td>Battery is weak.</td>
<td>Replace all batteries with new ones.</td>
</tr>
</tbody>
</table>

Table 4: Error displays and troubleshooting - electromagnetic immunity

<table>
<thead>
<tr>
<th>Error display</th>
<th>Cause/Check Point</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVER-PRESSURIZATION</td>
<td>The cuff was inflated to the maximum pressure because of movement of body etc.</td>
<td>Do not move during measurement.</td>
</tr>
<tr>
<td>MEASUREMENT ERROR</td>
<td>Measurement could not be made because of moving or talking during measurement.</td>
<td>Remain still and quiet during measurement.</td>
</tr>
<tr>
<td>INFLATION ERROR</td>
<td>TUBE PLUG is not correctly inserted.</td>
<td>Reinsert TUBE PLUG and make sure that it is securely inserted. Properly apply the cuff.</td>
</tr>
<tr>
<td>DEFLECTION ERROR</td>
<td>Measurement could not be made because of moving or talking during measurement.</td>
<td>Remain still and quiet during measurement.</td>
</tr>
<tr>
<td>NO POWER</td>
<td>Batteries are exhausted.</td>
<td>Replace all batteries with new ones.</td>
</tr>
<tr>
<td>LOW BATTERY</td>
<td>Battery is weak.</td>
<td>Replace all batteries with new ones.</td>
</tr>
</tbody>
</table>

Table 5: Guidance and manufacturer’s declaration - electromagnetic immunity