

HEM-9000AI Non-Invasive Blood Pressure Monitor with Augmentation Index (AI)

• Instruction Manual

EN

Thank you for purchasing the OMRON HEM-9000AI unit.

Read all of the instructions in the instruction manual before you operate the unit and keep it near the unit all the times for future reference.

Contents

1. Indications	4
2. Exemptions	5
3. Notes on Safety	6
4. Cleaning and Maintenance	11
5. Package Contents	12
5.1. Main Unit	12
5.2. Accessories (Included and Sold Separately)	12
6. Accessories	13
7. Introduction to the HEM-9000AI	14
8. General Preparation	15
8.1. Component Names/Descriptions	15
8.2. Connecting the Main Unit and AI Pulse Wave Measurement Unit Inserting the Memory Card	17
8.3. Setting the Date and Time	19
8.4. Setting the Blood Pressure/AI Measurement Method and Registering ID Information	22
8.5. Loading Printer Paper	23
9. Measurement Preparation	24
9.1. How to Apply the Blood Pressure Cuff	24
9.2. How to Apply the AI Pulse Wave Sensor Unit	26
10. Post - Measurement	29
10.1. How to Remove the AI Pulse Wave Sensor Unit	29
11. Selecting the Measurement Method	30
11.1. Selecting the Measurement Method	30
12. AI + Blood Pressure Measurement	31
12.1. Measuring AI + Blood Pressure Together	31
13. Blood Pressure Measurement	36
13.1. Blood Pressure Measurement	36
13.2. Auscultation	38
14. AI Measurement	40
14.1. AI Measurement	40
14.2. Changing Magnification and Scroll Speed	43
15. Print	44
15.1. Printing Measurement Results	44

16	Memory Retrieval	46
16.1.	Show All Data List	46
16.2.	ID Search	48
16.3.	Delete Data	49
16.4.	Data Detail	50
16.5.	Print Continuous Pulse Waves	51
16.6.	Trend Graph	53
16.7.	Adding and Modifying Blood Pressure Measurement Values	55
17.	Registering ID Information	57
17.1.	ID Registration	57
17.2.	Retrieval / Edit ID	61
17.3.	Replace ID	63
18.	Configuration Options	64
18.1.	How to Change the Settings	64
18.2.	How to Change the Setup	66
18.3.	How to Change the Measurement Settings	67
18.4.	How to Change Settings for Printing	70
18.5.	How to Change Display/Sound Settings	74
18.6.	How to Change the Clock Settings	76
18.7.	How to Change Settings for Storing	77
18.8.	Returning to the Default Settings	78
18.9.	Registering Hospital Name	79
18.10.	Memory Card	80
18.11.	Keyboard	82
19.	Calibration Measurement	83
19.1.	How to Execute a Test Measurement	83
20.	Introduction to Troubleshooting	85
21.	Error List	86
22.	Specifications	92

1. Indications

Indications for use

The HEM-9000AI is intended to measure systolic and diastolic blood pressure and pulse rate in adults with an arm circumference of 17-42 cm, and to calculate radial augmentation index (AI).

The HEM-9000AI is intended for use in physicians' offices, hospitals, clinics and other medical facilities where non-invasive blood pressure and radial AI measurements/calculations are performed on patients and invasive measurement is contraindicated.

The Augmentation Index (AI) function of the HEM-9000AI has not been evaluated on patients who have intra-ventricular conduction delays (VCD).

Contraindications for use

As with any non-invasive measurement device, there are clinical conditions which can influence the accuracy of the results. Also, the subject's position, physiological condition and other environmental factors can affect the measurement/calculation.

The OMRON HEM-9000AI Non-Invasive Blood Pressure Monitor with Augmentation Index should not be used with patients who have the following conditions:

1. Patients with a known arrhythmia.
2. Patients with insufficient peripheral circulation, acute cases of low blood pressure or low temperature.
3. Patients who use a pacemaker.
4. Patients experiencing a seizure.
5. Children younger than 18 years old.
6. Patients who should not have blood pressure measurements taken from their arms.
7. Patients with an artificial heart.
8. Patients whose artery cannot be found by palpation.

2. Exemptions

Read and familiarize yourself with all Instruction Manual materials, including the instructions for use, warnings, precautions, limitations and capabilities before using the OMRON HEM-9000AI Device.

OMRON will not bear any responsibilities on the following matters.

1. When a problem or damage occurs caused by the maintenance and/or repair conducted by a person other than OMRON or the dealer specified by OMRON.
2. The problem or damage of OMRON product caused by the product of other manufacturer not delivered by OMRON.
3. The problem and damage caused by the maintenance and/or repair using the repair parts not specified by OMRON.
4. The problem and damage caused by the results not observing the Notes on Safety or the operational method mentioned in this Instruction Manual.
5. Under the circumstances not within the operating conditions of this unit including the power source or the setting environment mentioned in this Instruction Manual.
6. The problem and damage caused by the result(s) of remodeling or improper repair of this product.
7. The problem and damage caused by act of god such as fire, earthquake, flood, or lightening.



1. The contents of this Instruction Manual may be changed without prior notice.
2. We have thoroughly reviewed the contents of this Instruction Manual.
However, if an inadequate description or error is found, please let us know.
3. It is prohibited to copy a part of or the entire Instruction Manual without obtaining OMRON's permission. Unless this Instruction Manual is used by an individual (company), it cannot be used without getting OMRON's permission from the standpoint of the Copyright Law.

3. Notes on Safety

GIVE PARTICULAR ATTENTION TO ALL SAFETY PRECAUTIONS

Warning signs and graphic symbols are intended for the safe and correct use of the product, and to prevent harm or damage to you and others.

Symbols and definitions are as follows:

 Warning	Indicates a possibility that people will suffer death or serious injury resulting from incorrect use.
 Caution	Indicates a possibility that people will be injured or objects will be damaged resulting from incorrect use.

Warning:

Clinical

- Do not use unless you are a healthcare worker.
- Do not use for monitoring vital signs in an intensive care unit.
- The device has a safety mechanism built in to prevent pressure from rising above 300 mmHg. If this safety mechanism fails or pressurization fails to stop while measuring, disconnect the AI pulse wave sensor unit or cuff, or unplug the air tube from the blood pressure monitor itself.
 - Peripheral nerve damage might result.
- Do not apply a cuff or use the AI pulse wave measurement unit on an arm being transfused or injected with an intravenous injection.
 - Intravenous injection or transfusion cannot be performed properly.
- Do not use this device on patients who cannot clearly describe their pain.
 - It may cause injury to the user if cuff pressurization release stops or pulse wave sensor pressure release is delayed.
- Do not use this device during an MRI scan.
 - It might cause an accident.
- If a power outage occurs while the device is measuring, promptly detach the cuff and pulse wave sensor unit.
 - Injury may result when pressing the wrist for a long period.
- Do not slide the AI pulse wave sensor during AI measurement.
 - Injury to the wrist might result.

Device Set Up

- Do not touch the power cord with a wet hand.
 - Electric shock might result.
- Do not use cords except those provided.
 - Electric shock might result.
- Do not plug into outlet without grounding pin or pin receptacle.
 - If plugged into incorrect outlet, electric shock might result.

Device Use

- Plug the main unit into an outlet (do not plug into a multi-plug outlet adapter).
 - Fire or electrical shock might result.
- Plug the power cord in firmly. Clean dust off on the power cord.
 - Electric shock, a short-circuit or fire might result.
- Do not use when the power cord is damaged or not firmly plugged in.
 - Electric shock, a short-circuit or fire might result.
- Do not pull the power cord when unplugging the power cord from an outlet.
 - It might cause fire or electric shock due to breaking or short circuiting the power cord.
- Do not use in the presence of a flammable gas or where flammable gas may be generated or released. (e.g., combustible anesthetics, hyperbaric chambers, oxygen tents, in presence of combustible/flammable liquids.)
 - Explosion or fire might result.
- When you use this device with other medical devices, read the instruction manuals of those devices carefully. Ensure that all the warnings and notes are also understood on those devices before using.
- If the following cases or situations occur, stop using this device immediately, turn it off, unplug the power cord from the outlet, and contact OMRON.
 - If there is smoke or an unusual odor.
 - If this device is dropped or subject to a strong impact.
 - If liquid or foreign substances enter the device.
 - Failure state.
 - Electric shock, a short circuit or fire might result.
- In addition, follow the instructions below in any of the above situations:
 - Display an “Out of Order, Do Not Use” sign on the front of the main unit.
 - Stop using the device.
 - Electric shock might result.

- Do not disassemble or modify this device.
 - Electric shock, fire, failure or malfunction might result.
- Do not use with any cuffs except those provided by OMRON specifically for this device and model.
 - It might cause incorrect measurement results.
- Do not use any power cords except power cords provided by OMRON specifically for this device.
 - Fire or electric shock might result.
- Do not replace the fuses on your own.
 - Fire or electric shock might result.
 - The fuses are specifically designed for this device. Contact Professional Services for replacement of the fuses.
- Do not connect the HEM-9000AI to commercial computers or devices that do not meet medical safety standards:
 - This could cause electric shock.
 - This device meets medical safety standards and the leakage current is limited to be within standard specifications.
- Apply the pulse wave sensor on bare skin.
 - Pulse waves might not be detected, and unnecessary pressure might be applied on the pulse wave sensor.
 - The user might be injured.

Device Maintenance

- After using the unit or cleaning, do not plug the power cord into a mains outlet until the unit and power cord are sufficiently dry.
 - Fire or electric shock might result.
- Do not place or store in a place that can be reached by water or chemicals.
 - Electric shock might result.

Caution:

Clinical

- When results seem unreliable, use other measurement procedures prior to invasive techniques.
- Make sure that the patient does not touch this device while the test is being conducted.
- Only measure when the patient is quiet, not talking or moving.
- In the following cases, check blood pressure and pulse by auscultation:
 - (a) When an irregular pulse wave is found
 - Advise the patient not to shake or move the body while measuring. This may cause a condition similar to irregular pulse wave.
 - (b) When an error occurs or you have doubt about the measurement value.
 - An incorrect measurement may be registered due to external vibration or patient movement while measuring.
 - A measurement error or inability to measure may occur in cases of abnormal peripheral circulation or very low blood pressure.
 - A measurement error or inability to measure may occur in cases of a patient with a short blood pressure fluctuation, such as an irregular heartbeat.

Device Set up

- Do not connect the air tube, cuff or AI pulse wave measurement unit to another device.
 - Erroneous results may occur.
- Do not insert or remove the AI pulse wave sensor if a connector or an air tube is unplugged.
 - It may cause damage to the AI pulse wave sensor or pressure air bag might result.
- Do not place this device upside down.
 - Electric parts and mechanical parts might break down.

Device Use

- Do not install parts or instruments not specified for this device.
- Do not push the buttons or LCD display with any sharp or hard material.
 - Failure or damage might result.
- Do not touch the AI pulse wave sensor with any sharp or hard material.
 - Damage might result.
- Do not insert and remove the memory card while saving or retrieving data.
 - Memory card data damage might result.
- Make sure the time is set correctly on the main unit.
 - Measurement might be recorded with the wrong time.
- Turn off the power to the unit and unplug the power cord from the electrical outlet before moving the unit.
- Do not insert or remove the AI pulse wave sensor while measuring AI.
 - It may cause damage to the AI pulse wave sensor or pressure air bag might result.
- Do not inflate without wrapping the cuff around the arm.
- Do not use a damaged cuff.
- Do not use a cellular phone or a radio transceiver in the room where this device is located.
 - Malfunction might result.
- Do not use other medical devices near this device.
 - Malfunction might result.
 - Other medical devices might be affected.
- This device might be affected by an electric appliance or microwave apparatus. Do not use any electronics or microwaves in the vicinity of this device.
- Do not use in extreme meteorological environments, such as unmanaged high temperature, high humidity, low temperature, and low humidity.
 - Malfunction might result.
- Do not use this unit in a vehicle, such as an ambulance.

- Do not use any printer paper other than the printer paper provided by OMRON specifically for this device and model.
 - Damage to the printer might result.
 - Printed text, waveforms and measurement results may smear or fade.
- Do not pull on paper before printing is complete.
 - Damage to the printer might result.
- Use only an OMRON designated memory card.
 - Using memory cards not designated for use with this device might result in measurement results or ID information not saving correctly, or might prevent them from being retrieved later.
- Do not drop this device.
- Do not put anything on this device.
 - The printer cover might crack.
- Do not install or store this unit near water or liquid medication.
 - Electric parts might break down.
 - A patient might receive an electric shock.
- Do not slide the pulse wave sensor when the power supply is off.
 - The pulse wave sensor might be damaged.
- Attach the Pulse Wave Sensor Unit properly. (Refer to Section 9.2.)
 - The device might display an inaccurate measurement result.
- Apply the Blood Pressure Cuff properly. (Refer to Section 9.1.)
 - The device might display an inaccurate measurement result.

Device Maintenance

- Unplug the main unit connector from outlet when not in use for a long period.
 - Electric shock or an electric discharge fire due to deterioration of the insulating material might result.
- Turn off and unplug the main connector when installing/removing parts or performing maintenance.
 - Electric shock or injury might result.
- Do not damage, modify, bend forcefully, pull, twist, or bundle the power cord. In addition, do not put heavy material on it.
 - Failure or damage might result.
- Do not disinfect this device by autoclave or gas sterilization.
 - Damage might result.
 - The user might get a rash.
- Do not wash with water or immerse in water.
 - Damage might result.
 - The device may display an inaccurate measurement result.
- Do not slide the AI pulse wave sensor when the power supply is off.
 - It may cause damage to the AI pulse wave sensor.
- Be sure to inspect the unit on regular basis. Check accuracy on a 1 year interval.

Shipping

- This is a high-precision device. Before shipping this device contact OMRON for shipping instructions.

4. Cleaning and Maintenance

Maintenance prior to use

1. Check this device regularly.
2. When not in use for a long time, ensure that this device functions correctly and safely before using it.
 - Check all cord, cable and tube connections.
 - Check that this device functions correctly by checking button functions.
 - Check that the time displayed on the device is accurate.
3. Do not install or store this unit in the following conditions:
 - In direct sunlight.
 - In a location that is dusty or has high air salinity.
 - On a sloping or vibrating object that creates impact
 - Where chemicals are stored or combustible gas is generated.
 - In high temperature or high humidity.
 - Where water, liquid medications or chemicals may be spilled.

Maintenance after use

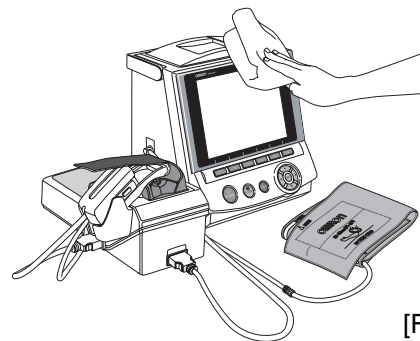
PLEASE NOTE

- Do not sterilize

Store this device and the attachments after performing the proper maintenance and in an orderly way.

Clean the surface of the main unit, the surface of the wrist rest, the outside of the AI pulse wave measurement unit, the cuff and cables with the following procedure.

1. Use a damp cloth with 30 to 50% isopropyl alcohol or 70% ethyl alcohol for cleaning the surface.
DO NOT use gasoline, thinner, benzene or highly concentrated alcohol when cleaning this device.
Do not disinfect this unit by autoclave or gas sterilization (EOG, formaldehyde, or high concentration ozone), or do not implement ultraviolet disinfection.
Do not wash or wet the wrist belt.
Do not wash or wet the cuff.

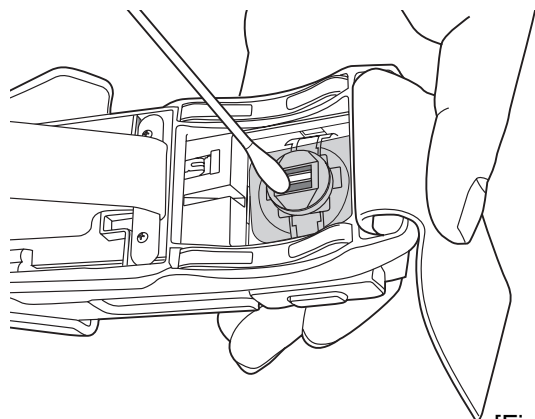


[Fig. 1]

2. Wipe with a soft, dry cloth. [Fig. 1]

Be careful when cleaning the AI pulse wave sensor!

Turn the power on.
Slide the pulse wave sensor into position as illustrated in [Fig. 2].
Turn the power off.
Wipe the sensor gently with a dry clean cotton swab or with a moistened cotton swab dipped in diluted rubbing alcohol. [Fig. 2]
After cleaning is completed, turn the power on.
Slide the AI pulse wave sensor back in holder.
Note: The sensor may be damaged or scratched if the power is off when sliding pulse wave sensor.



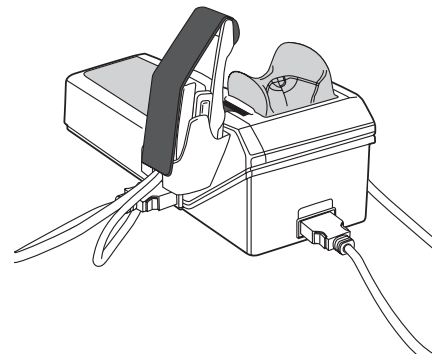
[Fig. 2]

5. Package Contents

5.1. Main Unit



Main Unit (display unit)



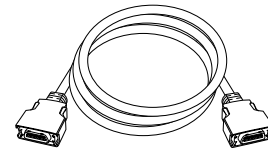
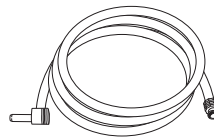
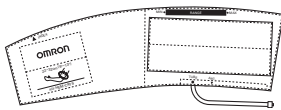
AI Pulse Wave Measurement Unit
(Including the AI pulse wave sensor unit)

5.2. ACCESSORIES (Included and Sold Separately)

Adult arm cuff
(in 3 sizes - S, M and L with built-in air bag)
See cuff size information in Section 6,
ACCESSORIES.

Air Tube (1.3 m)
Model: HEM-9T1.3
Art no.: 6984328-4

Connection Cable
Model: HEM-9000-CABLEZ
Art no.: 9956251-4

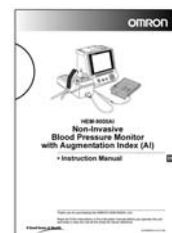
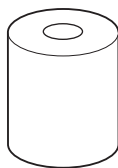
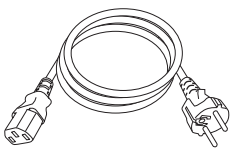


Power Cord
Model: NEU12-2
Art no.: 1096522-0

Printer Paper*
(1 Roll Included)
Sold 5 rolls to a box
Model: HEM-9000-PAPERZ
Art no.: 6970159-5

Memory Card to record*
measurements (128 MB)
Model: HEM-9000-IC128Z
Art no.: 9956250-6

Instruction Manual
(Including warranty card)
Art no.: 1658718-9



Quick Start Instruction
Manual
Art no.: 1664287-2,
1664288-0,
1664289-9

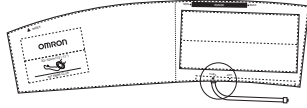


Items identified with an asterisk (*) are consumable and not covered under the warranty

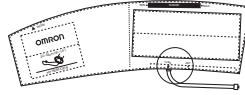
6. Accessories

ACCESSORIES (Sold Separately)

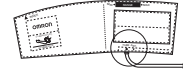
- Large size adult arm cuff
Model: HEM-9CLC
Art no.: 4928654-0
Applicable arm circumference:
32 to 42 cm



- Medium size adult arm cuff
Model: HEM-9CMC
Art no.: 4928640-0
Applicable arm circumference:
22 to 32 cm



- Small size adult arm cuff
Model: HEM-9CSC
Art no.: 4928639-7
Applicable arm circumference:
17 to 22 cm



- Air Tube (1.0 m)
Model: HEM-TUBE-100X
Art no.: 6984327-6

- Wheeled Cart
(with basket to place cuff)
Model: HEM-9000-STANDZ
Art no.: 7980234-9

- Printer Paper (5 Roll Set)
Model: HEM-9000-PAPERZ
Art no.: 6970159-5

- Keyboard
Model: HEM-9000-KEYBZ
Art no.: 9951049-2

- Memory Card (128MB)
Model: HEM-9000-IC128Z
Art no.: 9956250-6

- Power Cord (for U.K.)
Model: HEM-9000-ACCAU
Art no.: 9983975-3

To purchase accessories or replacement parts call OMRON.

7. Introduction to the HEM-9000AI

Functional Description

The OMRON Non-Invasive Blood Pressure Monitor with AI, HEM-9000AI, has been developed for blood pressure measurement and AI calculations.

Blood pressure measurement is obtained via digital oscillometric method using a blood pressure cuff. An accompanying AI calculation is made based on several components of the patient's pulse wave, which is obtained through applanation tonometry (measures pressure required to indent the artery) using a sensor placed against the radial artery.

Configuration of Pulse Waves

A pulse wave is a wave in a blood vessel generated when blood is pressurized into the aorta by the contraction of the heart. The pressure changes within the blood vessels create the wave action, and this is called a pressure pulse wave. Looking closely at the wave, it consists of two primary elements: ejected wave and reflected wave.

(Refer to Figure 1)

The ejected wave is generated by the contraction of the heart, which sends blood throughout the body. The reflected wave is generated by the reflection of the ejected wave, after the ejected wave propagates throughout the body, reflecting from an artery bifurcation or from a peripheral artery. The pattern formed by the superimposition of these two wave elements is regarded as the pulse wave pattern.

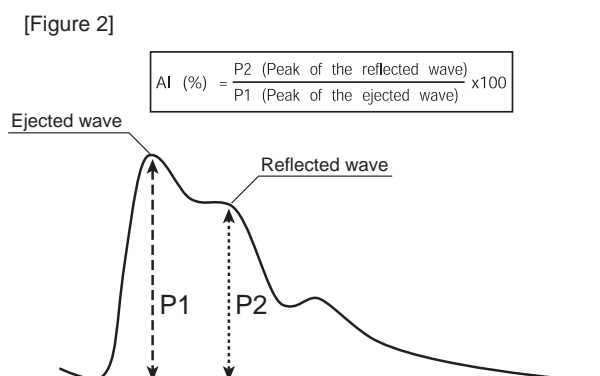
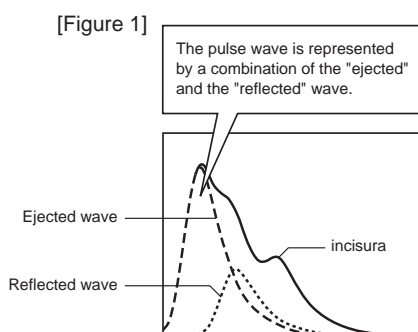
In addition, an incisura (notch) on the back of the reflected wave represents a pressure change caused by reverse flow as the aortic valve, located at the opening of the aorta, is closed.

Pulse Wave and Blood Pressure

The pulse wave represents a local blood pressure change caused by the passage of blood from the left ventricle into the aorta, accompanied by the wave action through the artery. Systolic blood pressure is measured during the period of ventricular contraction, creating a wave. Diastolic blood pressure is measured between periods of ventricular contraction.

AI is defined as

AI defines an amplitude value ratio of the peak point (P2) at which the reflected wave is overlapped to the peak point (P1) at which the ejected wave is overlapped. (Refer to Figure 2)

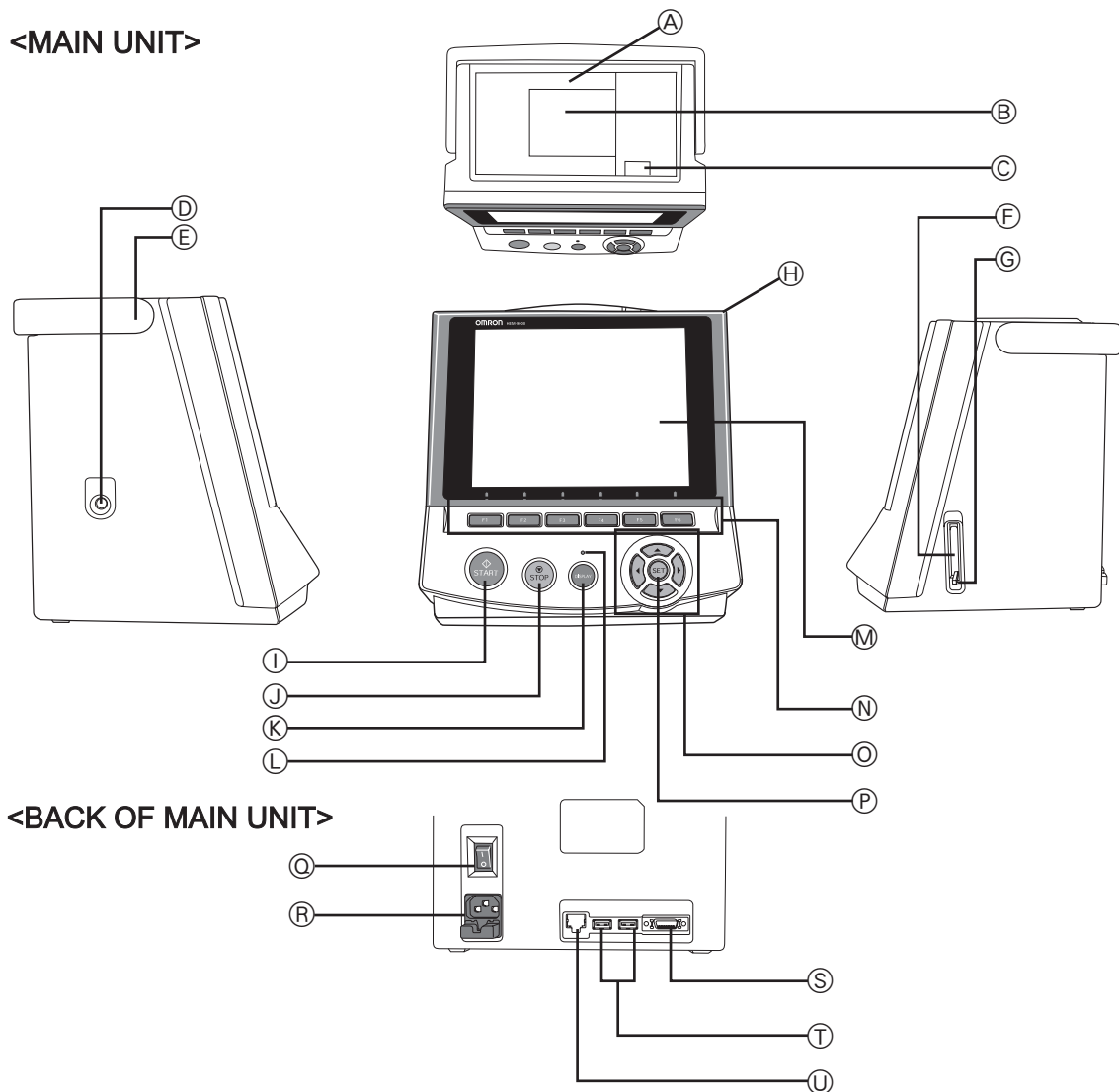


What AI indicates

When a peripheral blood vessel is stiff, the reflected wave becomes larger. When the blood vessels in the pulse wave propagation path are stiff, the time in which the reflected wave returns becomes shorter. As a result, the peak of the reflected wave will be near the peak of the ejected wave. Both of these phenomena increase AI. The heart enhances myocardial contractility to overcome the increased blood pressure. If this lasts for a long time, the heart will become strained, showing that when the AI is higher, the "load on the heart" is higher.

8. General Preparation

8.1. Component Names/Descriptions



A. Printer cover

B. Print paper storage (built-in)

C. Print paper release button

D. Air connector

E. Handle

F. Memory card slot

G. Eject button

H. Main unit

I. START button

J. STOP button

K. DISPLAY button

L. DISPLAY light

M. LCD display

The material used in the front of the panel is PMMA.

N. Function keys

O. Left, right, up, down movement/select buttons

P. SET button

Q. Power switch

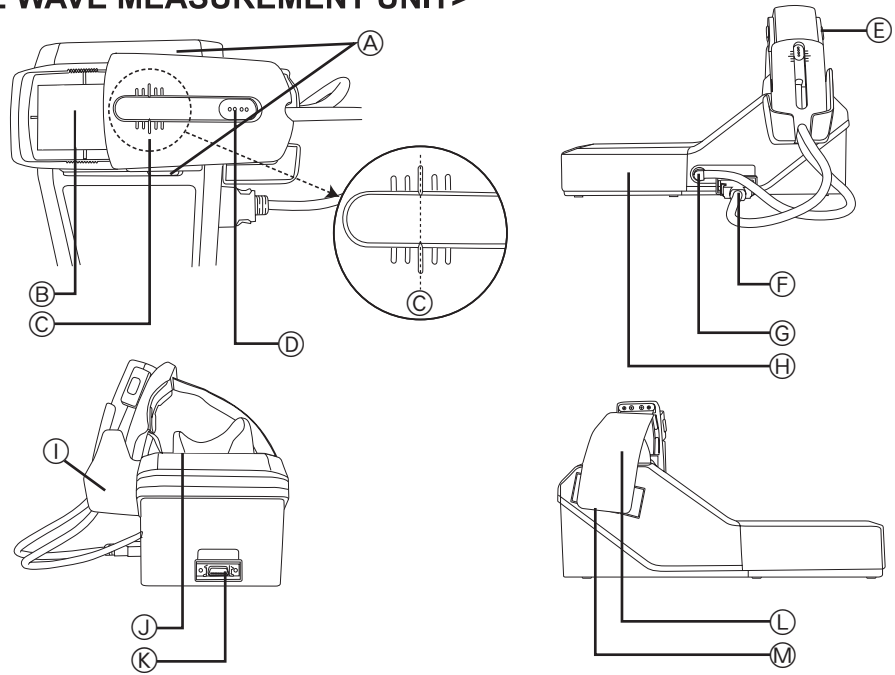
R. Power connector

S. AI measurement unit connector

T. USB connectors x 2

U. Maintenance connector (not used)

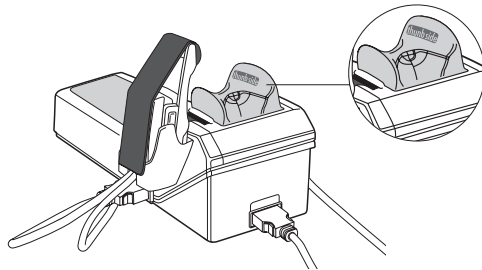
<AI PULSE WAVE MEASUREMENT UNIT>



- | | |
|---|---|
| <ul style="list-style-type: none"> A. Slide stoppers B. Palpation window C. Base line D. Indicator lights | <ul style="list-style-type: none"> H. Elbow placement board I. AI Pulse Wave sensor unit storage clip J. Rubber wrist rest K. Main unit connector |
| <ul style="list-style-type: none"> F. AI Pulse Wave sensor unit connector G. Air connector | <ul style="list-style-type: none"> L. Wrist belt M. Fastener |

8.2. Connecting the Main Unit and AI Pulse Wave Measurement Unit Inserting the Memory Card

1. Make sure that the power switch is in the OFF position. [Fig. 1]
2. Insert the air plug of the blood pressure cuff in the air connector on the left side of the main unit. (Refer to 9.1.) [Fig. 2]
3. Attach the rubber wrist rest to the pulse wave measurement unit

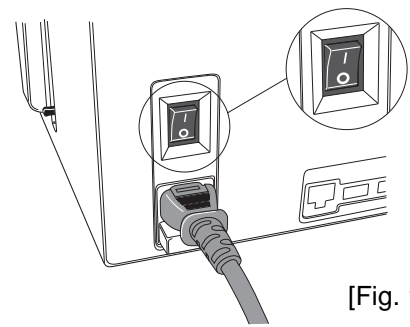


Attach the wrist rest so that the side marked “thumb side” is on the thumb side of the arm (i.e., the thumb side is on the left side of the patient when using the patient’s left hand for measurement and on the patient’s right side for right-hand measurement).

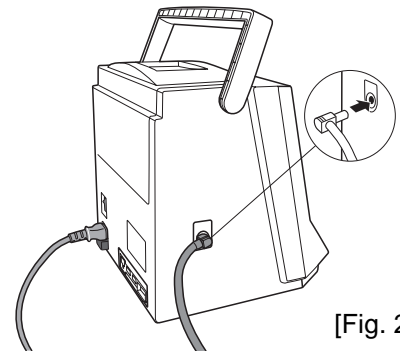
4. Plug one end of the connection cable (see Section 5. for illustration) into the main unit connector on the back of the AI pulse wave measurement unit. The plug will click and lock into place. [Fig. 3]
5. Plug the other end of the connection cable into the AI measurement unit connector on the back of the main unit. [Fig. 4]
6. Plug the connection cable of the AI Pulse Wave sensor unit into the AI Pulse Wave sensor unit connector.

Attach the air plug of the AI Pulse Wave Sensor unit on the Air connector. [Fig. 5]

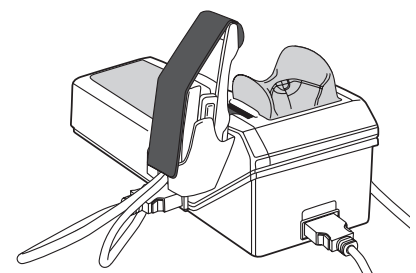
A cap is attached on the sensor when the unit is shipped. Remove it before you use it for the first time.



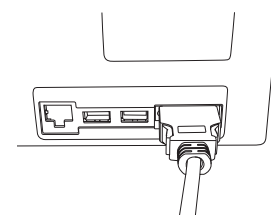
[Fig. 1]



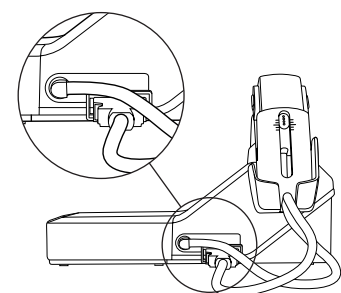
[Fig. 2]



[Fig. 3]



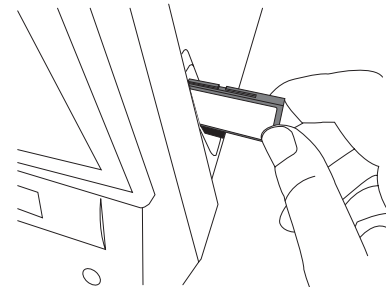
[Fig. 4]



[Fig. 5]

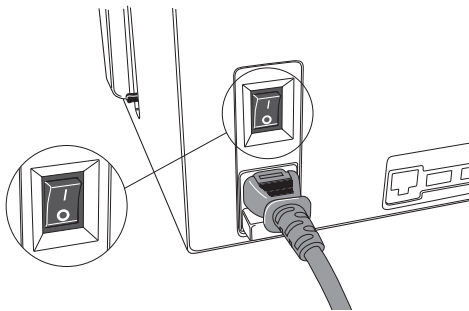
Turning on the power, and checking the time/date

- 7. Insert the memory card into the slot on the right side of the main unit.
All measurement data will be saved to the memory card. The measurement results will not be saved if the memory card is not properly inserted in or if there is insufficient memory available on the card. Note that since the file system takes up 7MB of memory, the available space on a new card will be slightly less than the total card memory. [Fig. 6]

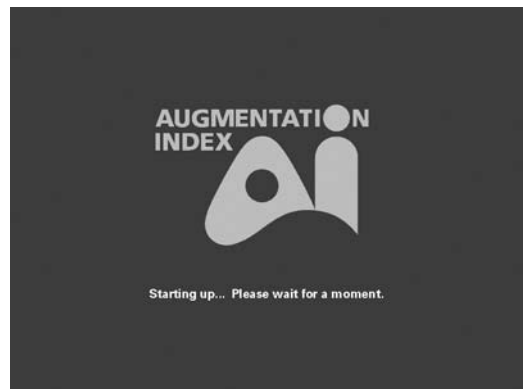


[Fig. 6]

- 8. Load the printer paper.
(Refer to 8.5. "Loading Printer Paper".)
- 9. Plug the female end of the power cord into the back of the main unit. Then plug the male end of the power cord into an electrical outlet with grounding.
- 10. Press the "I" end of the power switch at the back of the main unit. [Fig. 7]
(After displaying "Starting up.... Please wait for a moment" for approximately 30 seconds, the measurement screen will appear.) [Fig. 8]

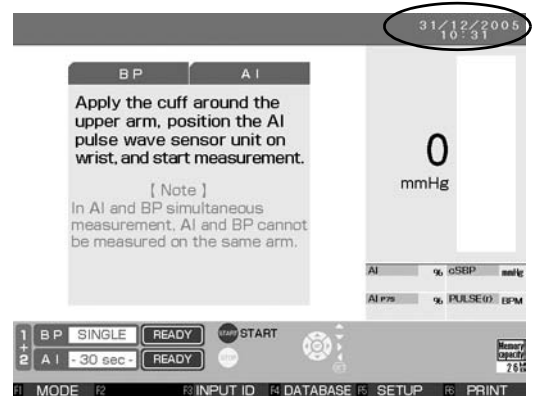


[Fig. 7]



[Fig. 8]

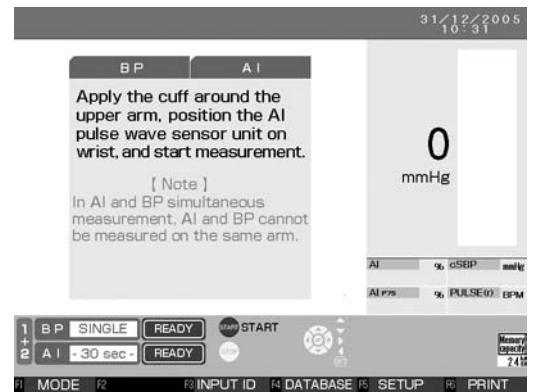
- 11. Check to be sure the time displayed on the upper right corner of the screen is correct.
If necessary, see the following page for instructions on how to set the time or date. [Fig. 9]



[Fig. 9]

8.3. Setting the Date and Time

1. Press the F5 key on a screen where F5 [SETUP] appears at the bottom. [Fig. 1]



[Fig. 1]

2. The setup screen will be displayed.

Move the [] cursor in the upper-left part of the screen up or down using the [▲ ▼] buttons to select "DATE/TIME" from the menu column. Press the SET button or the [▶] button to move the cursor to the right. [Figs. 2 and 3]



[Fig. 2]



[Fig. 3]

3. To change the [DATE] under [DATE / TIME]:

Move the [] cursor to [DATE] and press the SET button or the [] button. [Fig. 4]

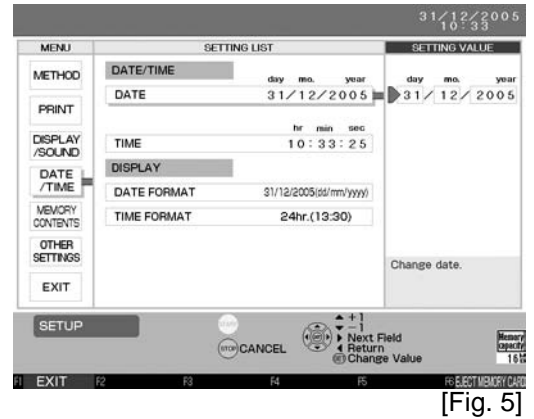
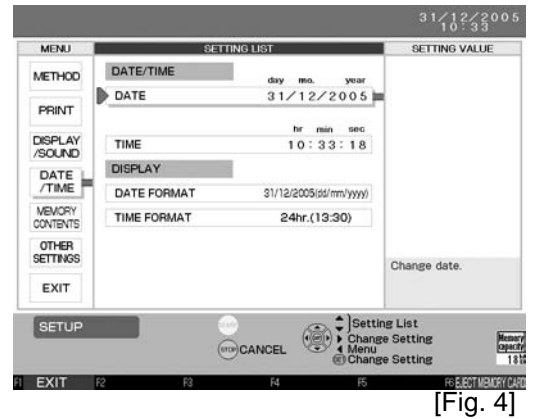
Move the [] cursor using the [] button to select the item (day/month/year) under [SETTING VALUE] to change. [Fig. 5]

Use the [] [] buttons to change the setting value.

[] [] These buttons increase and decrease the values for day, month and year. The year setting range is from 2005 to 2030.

Press the SET button to accept the selected values.

The date format can be changed. (Refer to Section 18.6.)



4. Follow these steps to change the [TIME] under [DATE / TIME]:

Change the time.

Move the [▶] cursor to [TIME] and press the SET button or the [▶] button. [Fig. 6]

Move the [▶] cursor using the [▶] button or the [◀] button to select the item (hour/minute/second) under [SETTING VALUE] to change. [Fig. 7]

Use the [▲ ▼] buttons to change the setting value.

[▲ ▼] These buttons increase and decrease the values for hour, minute and second.

Press the SET button to accept the selected values. The clock will resume as soon as the SET button is pressed. To accurately set the clock to the correct time, set it slightly in advance and press the SET button as soon as the set time becomes the current time.

Press the F1 [EXIT] key to go back to the measurement screen.



[Fig. 6]



[Fig. 7]

8.4. Setting the Blood Pressure/AI Measurement Method and Registering ID Information

1. Setting the Blood Pressure/AI Measurement Methods

There are three methods for blood pressure measurement: Single, Average - 2 times, and Average - 3 times.

The default setting is [SINGLE].

To change this setting, follow the instructions in Section 18.3.

When measuring AI, the duration can be set to any of the following: 15 seconds, 30 seconds, 1 minute, or 3 minutes.

The measurement time set here is the duration of the pulse wave sampling. The total time required for measurement is slightly longer.

The default setting is [30] seconds.

To change this setting, follow the instructions in Section 18.3.

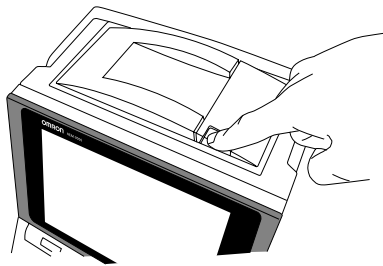
2. Registering the patient's ID

Register the patient's ID before beginning measurement to continuously track trends/transitions in the measurement results.

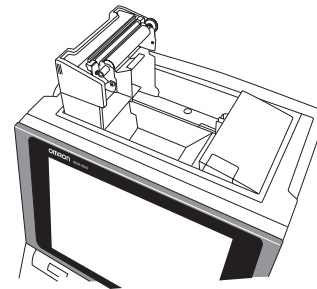
Follow the procedure outlined in Section 17.1. to register the ID information.

8.5. Loading Printer Paper

1. Press the release button at the top of the main unit to open the printer cover.
[Figs. 8 and 9]



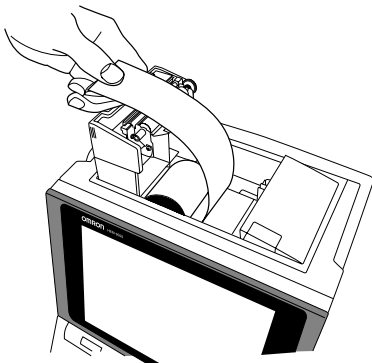
[Fig. 8]



[Fig. 9]

2. Load the specially designed printer paper into the holder in the direction shown in the diagram. [Fig. 10]

* Make sure you use OMRON printer paper, refer to Section 5.2.



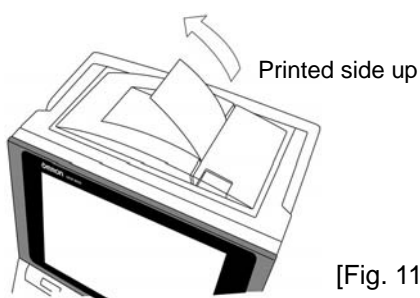
[Fig. 10]

Load the printer paper as shown in the diagram.

* Pull out the paper so that it protrudes from the printer cover when closing.

When loading a new roll of paper, pull the end out about 25 cm (10 inches). The end of the roll is sealed with glue, which does not make a suitable printing surface.

3. With a small amount of paper sticking out, push the cover closed until it locks into place. [Fig. 11]



[Fig. 11]

* When the power is on, the paper will automatically advance and cut.

9. Measurement Preparation

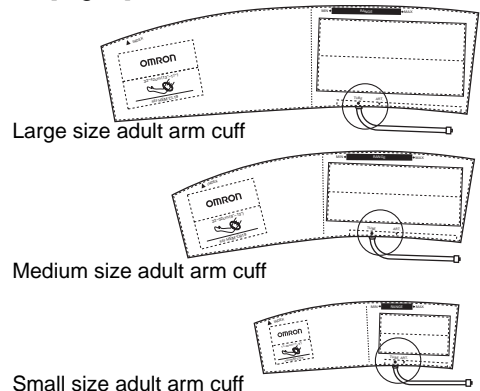
9.1. How to Apply the Blood Pressure Cuff

1. Select a cuff according to the circumference of the patient's arm. [Fig. 1]

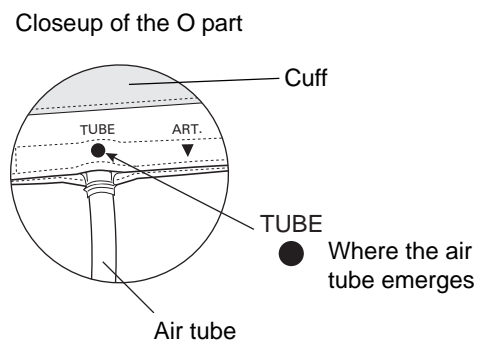
Arm circumference	Name of the arm cuff
17 - 22cm	Small size adult arm cuff
22 - 32cm	Medium size adult arm cuff
32 - 42cm	Large size adult arm cuff

- * Use an appropriate cuff according to the circumference of the patient's arm.
- * If an inappropriate cuff size is used, the device might not measure blood pressure accurately.
- * Check before wrapping the cuff that:
 1. The bladder is set inside the cuff.
 2. The tube is not twisted in the cuff.
 3. The tube of the bladder emerges from the cuff as shown in the figure at right. [Fig. 2]

[Fig. 1]



[Fig. 2]

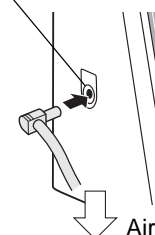


2. Connect the air tube firmly.

- * When connecting the air tube to the main unit, connect the air tube plug firmly into the air connector as shown in [Fig. 3].
- * Connect the air tube and the cuff / bladder set by turning as shown in [Fig. 4].
- * A total air tube length of 1.5 m is provided with the Air Tube (HEM-9T1.3) in the package.

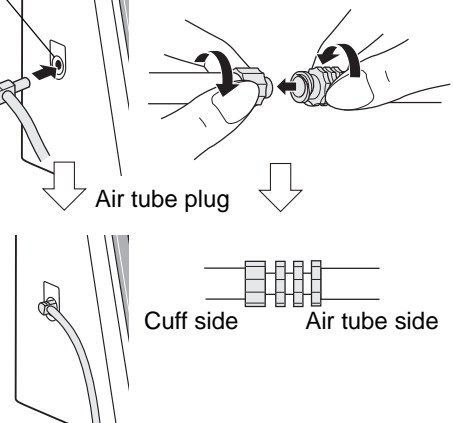
[Fig. 3]

Air Connector



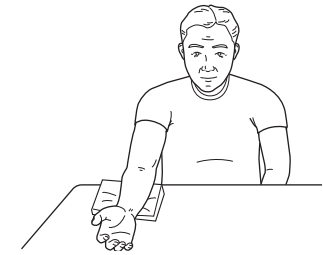
Air tube plug

[Fig. 4]



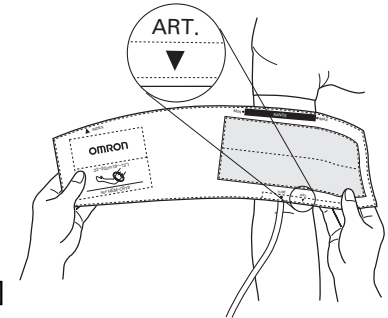
3. Turn the patient's right palm up. [Fig. 5]

Always wrap the cuff around the upper part of the patient's right arm directly on the skin. Wrapping the cuff around bulky clothing or a rolled-up sleeve can cause the readings to be inaccurate.



[Fig. 5]

4. Align the brachial artery with the artery position mark "ART. ". [Fig. 6]



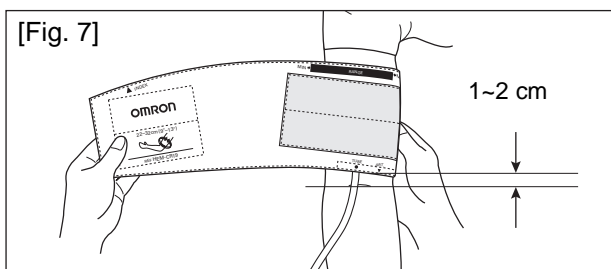
[Fig. 6]

5. Wrap firmly with both hands, snug, and make sure to fasten with the hook and loop fastener. For this step, place the cuff 1 ~ 2 cm (a little less than one inch) above the inside of the elbow joint. [Figs. 7-10]

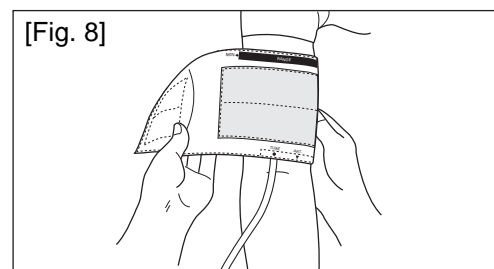
* If after wrapping, INDEX, printed on the cuff, is misaligned with RANGE, select a different, more appropriate size cuff according to the circumference of the arm, and wrap again.

* If not wrapped with appropriate cuff, the arm might become numb, or the HEM-9000AI might not be able to measure blood pressure correctly.

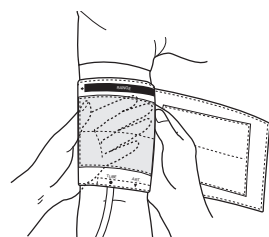
* Wrapping the cuff at an angle will have no impact on the measurements, so allow the cuff to follow the shape of the arm.



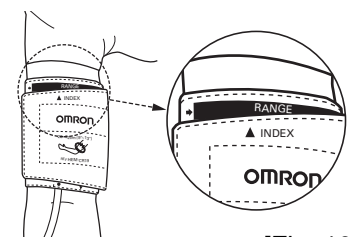
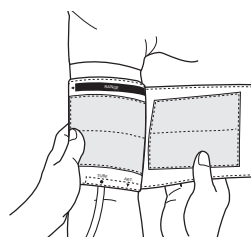
[Fig. 7]



[Fig. 8]



[Fig. 9]

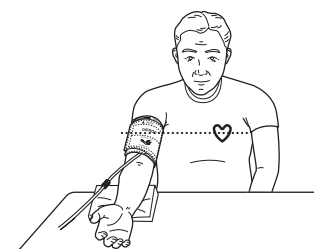


[Fig. 10]

6. Align the cuff to be at the same height as the heart.

* Maintain the height of the cuff at the same height as the heart in order to measure accurately.

[Fig. 11]



[Fig. 11]

9.2. How to Apply the AI Pulse Wave Sensor Unit

AI measurement is intended only for adults with a wrist circumference of 10-19 cm around the radius protrusion.

Proper posture

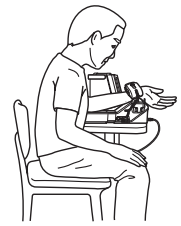
Adjust the height of the chair to align the height of the wrist with the height of the heart. By sitting back and keeping the back straight, the arm will naturally be straight. [Figs. 12 and 13]

- * Place the AI pulse wave measurement unit on a flat, horizontal (non-sloping) surface.
- * When measuring with the left arm, place the AI pulse wave measurement unit on the left side of the patient. (The wrist rest is set up for a left hand as the initial configuration.) Adjust the elbow placement board of the AI pulse wave measurement unit according to the length of the arm of the patient. (The elbow placement board can be extended approximately 10 cm) [Fig. 14]
- * Instruct the patient to relax and not to move during measurement.



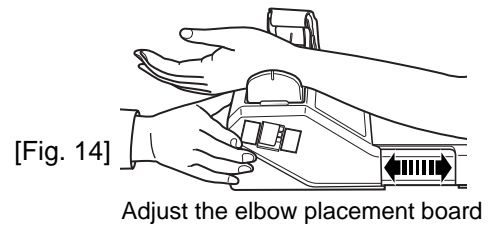
Good posture

[Fig. 12]



Bad posture

[Fig. 13]



[Fig. 14]

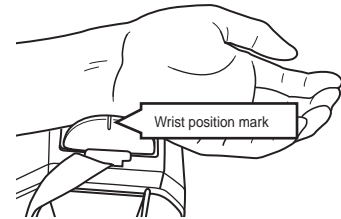
Adjust the elbow placement board

1. Place the wrist.

Place the thumb on the side of the wrist rest indicated by the “thumb side” printing on the wrist rest. [Figs. 15 and 16]

Align the wrinkle of the wrist joint with the wrist position mark on the wrist rest. [Fig. 15]

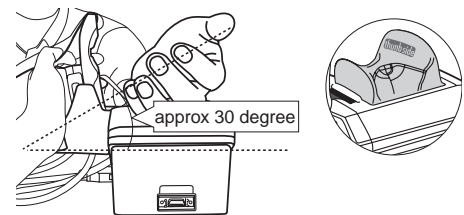
- * Instruct the patient, saying “relax your hand”. Patient’s palm will face the front naturally. (It should be a little limp.)



[Fig. 15]

The wrist rest has a slope of approximately 30 degrees. When putting one’s hand along the slope of the wrist rest, the wrist goes up by a slope of approximately 30 degrees.

- * When measuring with the right arm, adjustment of the wrist rest will be required. Remove the wrist rest from the top of the AI Pulse Wave Measurement Unit. Turn it so that the “thumb side” is facing the opposite direction. Reinsert the wrist rest on the top of the AI Pulse Wave Measurement Unit. You will now have the correct slope for a right hand measurement. Tilt the wrist to turn the thumb up.

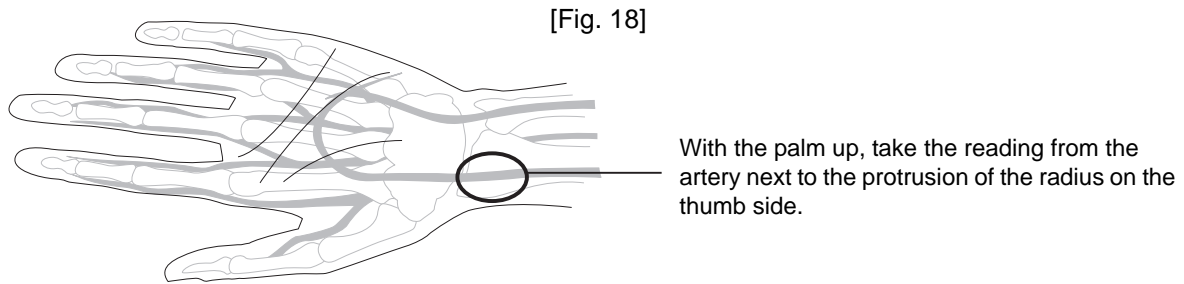


[Fig. 16]

2. Adjust the elbow placement board.

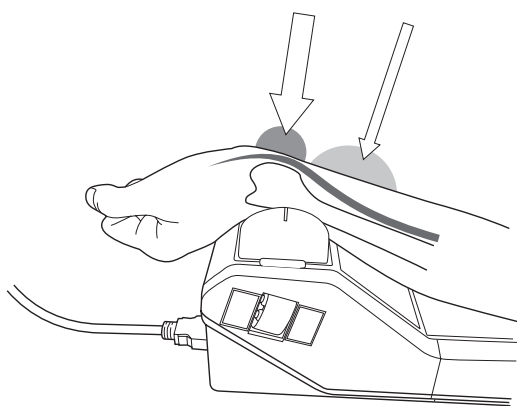
Adjust the elbow placement board of the AI pulse wave measurement unit according to the length of the arm of the patient. [Fig. 14]

The Best Points for Taking an AI Measurement



The best point is right next to the radius protrusion where the pulse is the strongest. If it is not possible to locate the radius protrusion, the best point is where the pulse feels the strongest in the area where the bone is close to the skin and is hard to the touch.

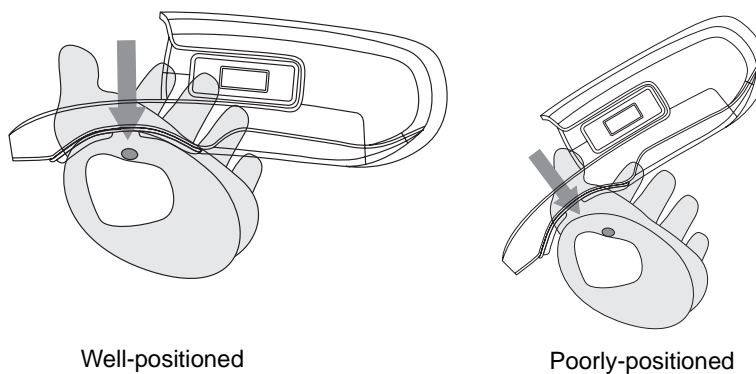
[Fig. 19] Well-positioned Poorly-positioned



Even if the pulse is strong but the bone is not close to the skin, the blood vessel may be hard to access, making it difficult to apply pressure.

Once a point for taking a reading is located, attach the AI pulse wave sensor unit snugly to the wrist allowing no gap to form between the unit and the wrist.

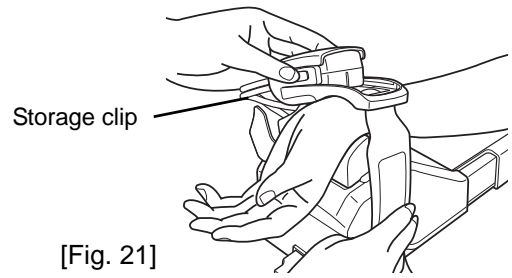
[Fig. 20]



3. Locate the radial artery by palpation.

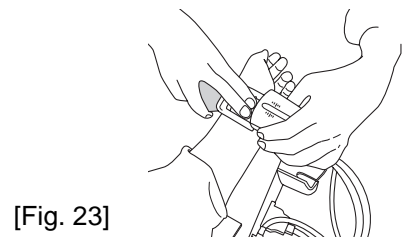
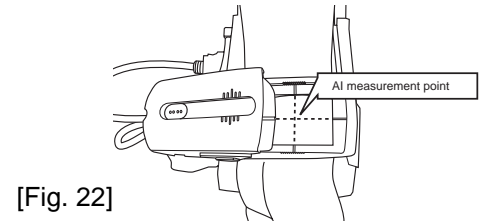
Once you have located the radial artery, use a commercially-available, non-permanent felt tip marker to mark the spot on the artery which will be best for your AI pulse wave measurement.

A proper measurement can only be done over the bone at the radial artery.



4. Attach the AI pulse wave sensor unit.

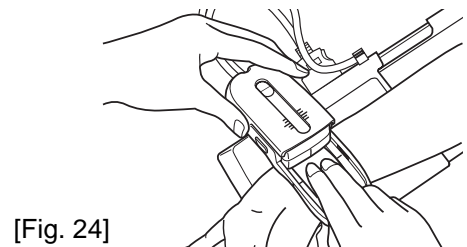
Remove the pulse wave sensor unit from its storage clip and centre the two intersecting black lines on the sensor unit frame (the point where the reading is taken) over the wrist artery spot you marked in 3. above. Align the wrist wrinkle just below the palm with the inner edge of the frame. Use the hook and loop fastener to hold the unit in place. [Figs. 21-22]



5. Confirm the artery's position again.

Confirm if the AI pulse wave sensor unit frame's black lines intersect the artery by palpation. [Figs. 23-24]

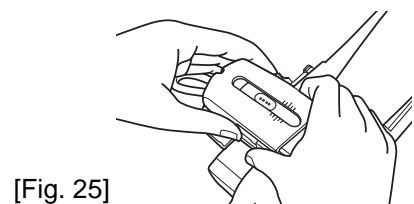
- * Instruct the patient to relax and not to move.
- * If misaligned, go back to 4. above.



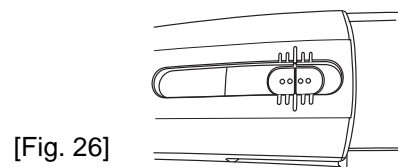
6. Adjust the sensor. [Figs. 25 and 26]

Adjust the AI pulse wave sensor by pressing in the slide stoppers on both sides.

Continue moving the AI pulse wave sensor until the black line on the AI pulse wave sensor is aligned with the centre (longest) line of the AI pulse wave sensor unit's outer shell.



- * The AI pulse wave sensor unit can be moved slightly by pressing the slide stoppers at both sides.
- * Return the AI pulse wave sensor to its original position after measurement.

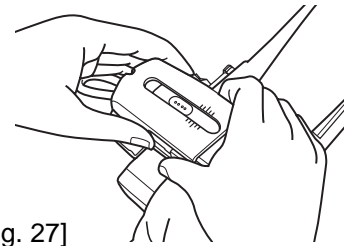


Align the centre line of the outer shell and the black line on the sensor unit.

10. Post - Measurement

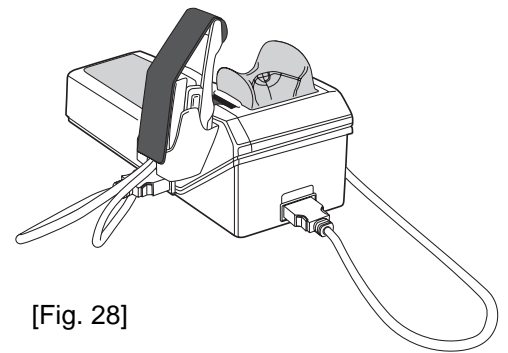
10.1. How to Remove the AI Pulse Wave Sensor Unit

1. Check that measurements are complete. [Fig. 27]
Push down the slide stoppers on both sides and return the sensor to its original position. Put the AI pulse wave sensor back in the storage clip.



[Fig. 27]

2. Remove the fastener from around the subject's wrist, and store. [Fig. 28]
Attach the protection cap back on the sensor when it is stored.



[Fig. 28]

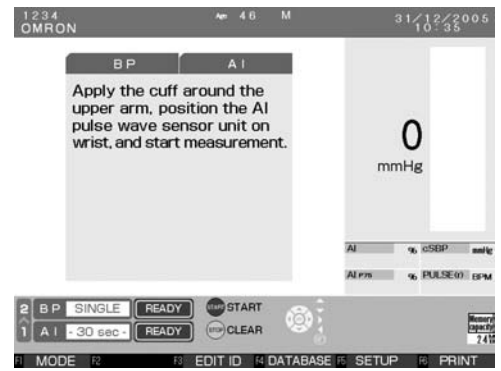
11. Selecting the Measurement Method

11.1. Selecting the Measurement Method

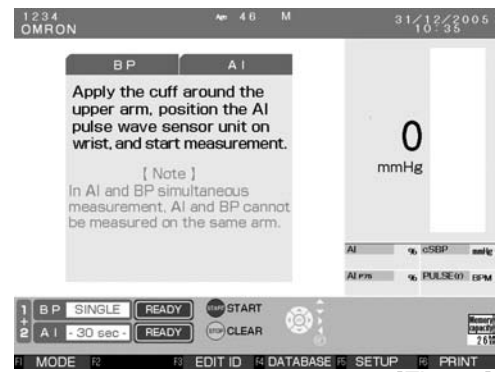
This device has the following three measurement options: AI + blood pressure measurement (1. below), blood pressure measurement (2. below), and AI measurement (3. below). Change the measurement option by pressing the F1 key [MODE] until the desired option is selected [Figs. 29-32].

1. Measuring both AI and blood pressure. (Refer to Section 12.1.)

The AI and blood pressure can be measured either automatically, alternating between the two measurements (AI→BP measurement), or almost simultaneously using both arms (AI+BP simultaneous dual-arm measurement). (Refer to Section 18.3.)

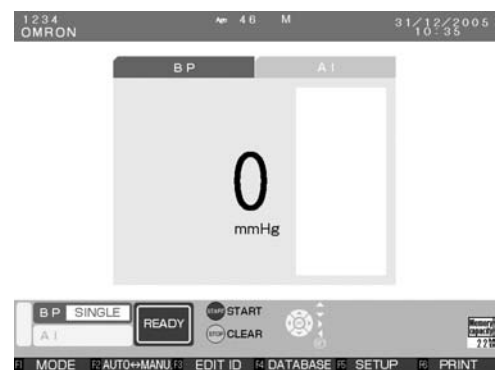


[Fig. 29]



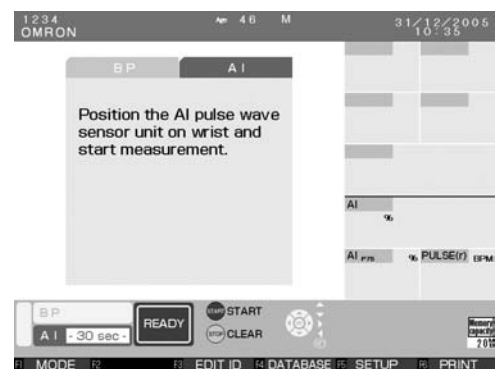
[Fig. 30]

2. Measuring Blood Pressure Only. (Refer to Section 13.1.)



[Fig. 31]

3. Measuring AI Only. (Refer to Section 14.1.)



[Fig. 32]

12.AI + Blood Pressure Measurement

12.1. Measuring AI + Blood Pressure Together

This section explains how to simultaneously measure AI and blood pressure using both arms.

To measure AI and blood pressure alternately, follow the instructions in Section 18.3. to change the AI measurement sequence.

1. Apply the AI pulse wave sensor unit to the left wrist and the cuff to the right arm. (Refer to Section 9.)

Make sure the patient's name and ID are displayed at the upper left corner of the screen. [Fig. 1]

2. If nothing is displayed, follow the instructions in Section 17. to register or retrieve the ID information.

If the ID information is not registered, only the date, time and results will be saved.

Check that the BP and AI measurement methods in the lower-left part of the screen are both displayed.

3. Press the START button to start measurement. [Fig. 2]

Inflation of the sensor unit will begin.

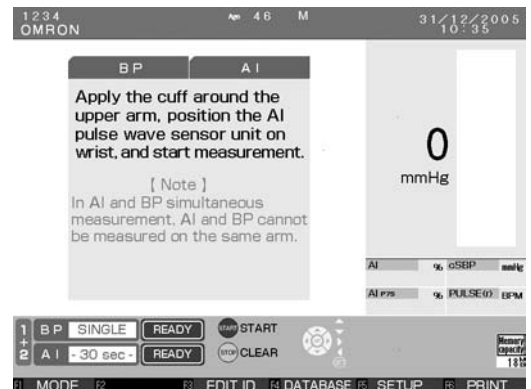
Inflation of the cuff will begin after AI pulse wave sensor pressure becomes stable.

Do not press the START (Start measurement) button without applying the AI pulse wave sensor unit. In addition, do not press the START (Start measurement) button without wrapping the blood pressure cuff. Do not allow the AI pulse wave sensor unit to slip during AI pulse wave measurement.

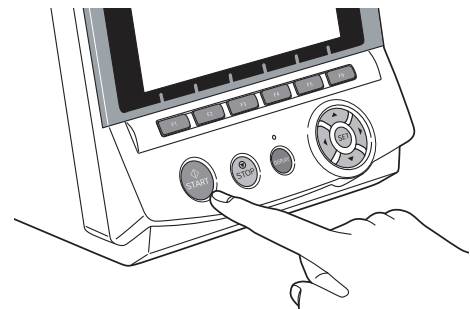
- * If you wish to stop during measurement, press the STOP button. Deflation will occur rapidly.
- * When measurement takes more than 5 minutes, the device will automatically stop.
- * Pressing the DISPLAY button during measurement will stop the measurement and turn off the screen.

4. Make sure the tonogram in the top middle of the screen rises and forms a triangle. [Fig. 3]

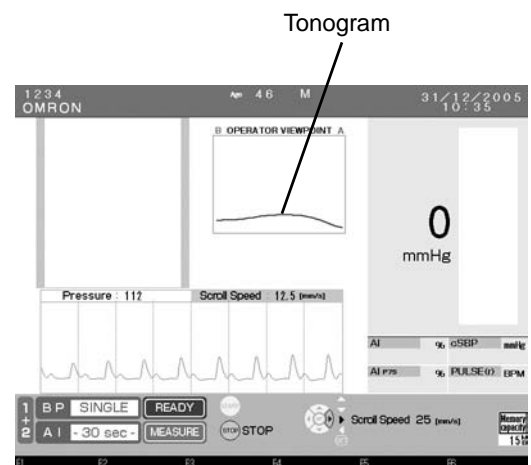
(The continuous pulse waves are displayed at the lower left corner of the screen.)



[Fig. 1]



[Fig. 2]

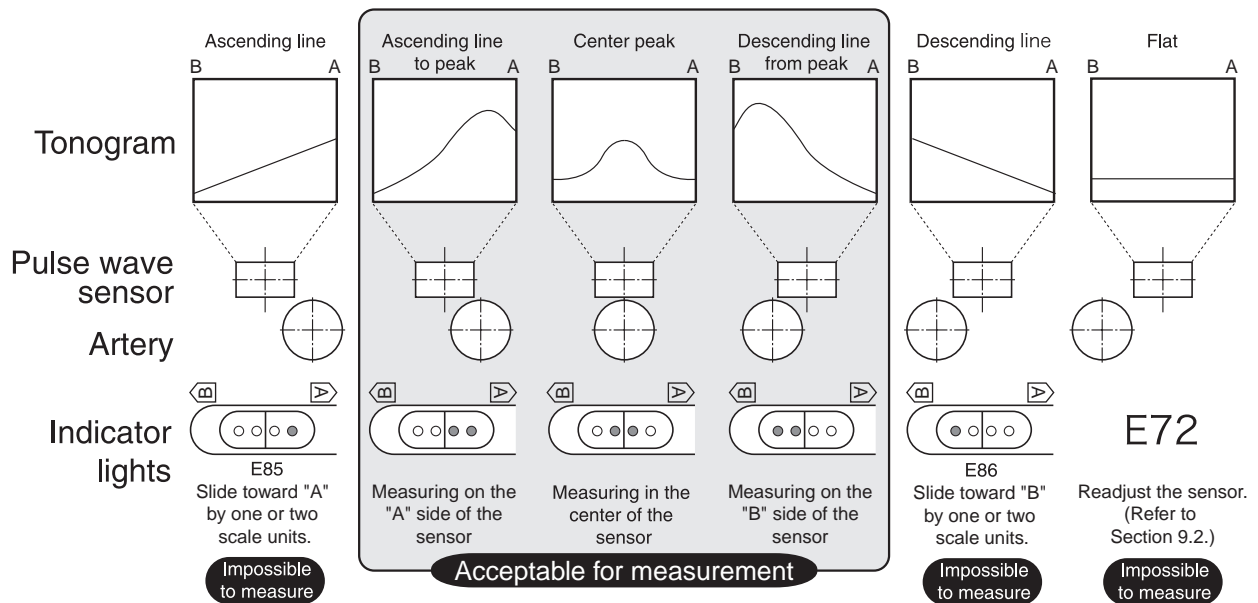


[Fig. 3]

How to incorporate the Tonogram display for a more accurate measurement: A tonogram shows the output of an AI pulse wave sensor. The positional relationship of the AI pulse wave sensor and an artery can be estimated from a tonogram. [Fig. 4]

The values around the peak of the tonogram (around the centre of an artery) are calculated.

[Fig. 4]



The centre peak represents the ideal measurement. Measurement is also possible with an ascending line to peak or a descending line from peak (see above); however, it is also possible that an accurate pulse wave may not be taken. If only one outer indicator light is on, reattach the AI pulse wave sensor and measure again.

Measurement is impossible if the tonogram shows an ascending, descending or flat line (see above). When re-measuring with an ascending or descending line, it is possible to adjust the position of the AI pulse wave sensor by sliding it instead of having to remove and reattach the unit. The artery is located in the direction of the LED lights that are lit. While pressing in the slide stoppers, adjust the pulse wave sensor by one or two scale units (black lines on the casing) in that direction.

* The Tonogram display has two options; Operator View and Patient View. (Operator View is selected by default). You can change the setting depending on which way the monitor is facing. Refer to section 18.3. for more detail.

5. As the AI pulse wave sensor pressure becomes stable, the pulse wave will be displayed in the upper left corner of the screen, and the actual measurement will begin. [Fig. 5]

Instruct the patient not to move during measurement. A measurement error will occur as a result of body movement or vibration.

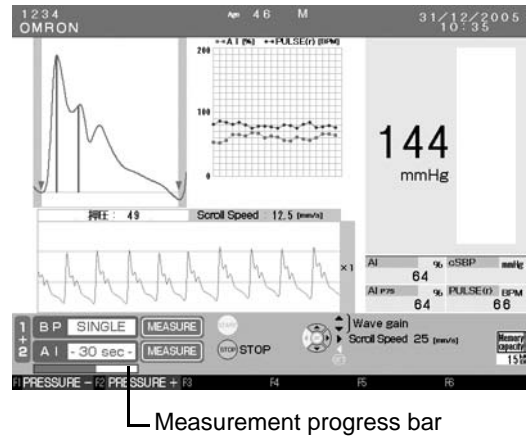
If the AI value goes outside of the 30%-150% range, the AI measurement results will not be displayed for that beat. Check to make sure that there is no abnormality in the pulse waveform. This will also cause a break in the graph of the AI values plotted for each pulse wave.

If the pulse is irregular or too faint, the device may not detect the pulse wave, in which case there will be no pulse waveform and nothing will be displayed on the graph.

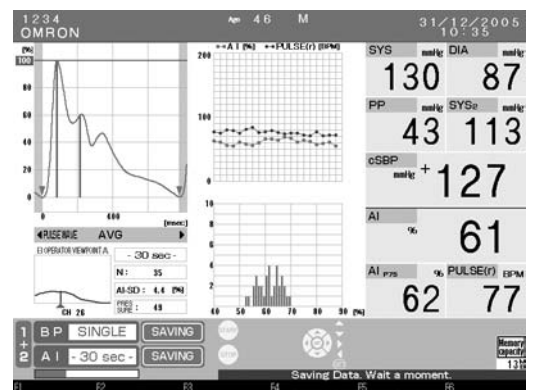
A green bar in the lower-left part of the screen shows the measurement progress toward completion.

6. Once measurement is complete the results will appear, along with a light blue "complete" message at the lower left corner of the screen. Next, the green message [SAVING] will be displayed at the lower left corner of the screen. Measurement data will be stored in the memory card. [Fig. 6]

Do not insert or remove the memory card during the save operation. This will result in device failure.



[Fig. 5]



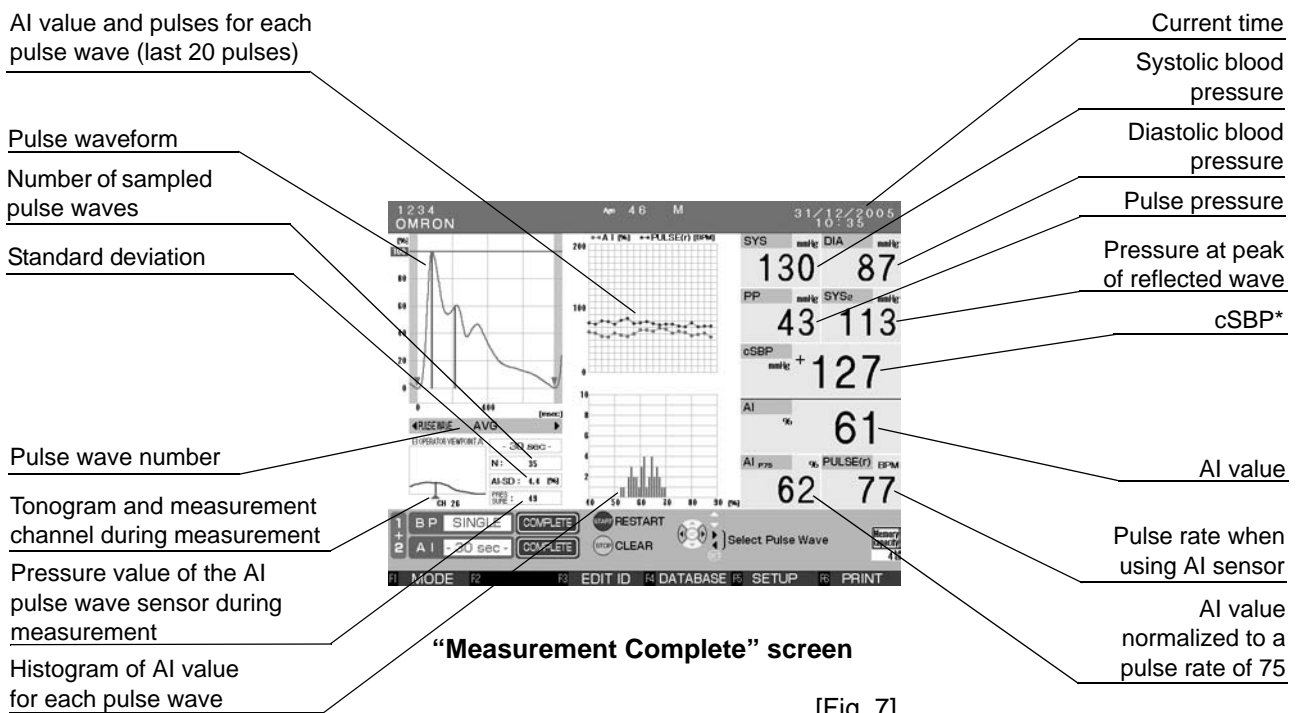
[Fig. 6]

7. A beep will sound* when the data has been saved.

The dark blue message [COMPLETE] will be displayed at the lower left corner of the screen. [Fig. 7]

The representative pulse wave (AVG) displayed on the screen is selected among all detected pulse waves. It has a stable pulse wave and the closest AI value to the average. Still, there may be some difference between AVG and the average.

* The beep will not sound if it is set to OFF using the settings menu.



[Fig. 7]

* The symbols displayed on the left side of cSBP are defined as follows:

- [+] AI and blood pressure are simultaneously measured.
- [#] A blood pressure fluctuation is detected. Measurement results may be compromised.
- [*] The BP value has been manually entered or edited.

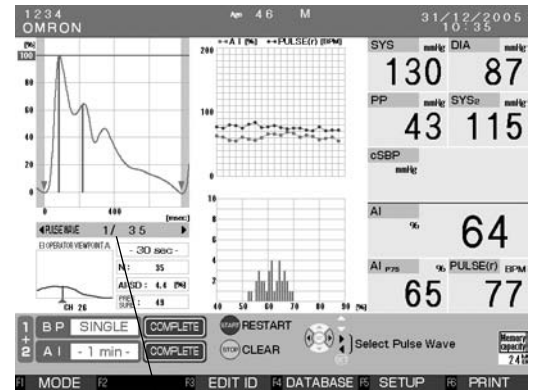
* cSBP is displayed only when AVG (representative pulse wave) is selected to display.

Press the [◀ ▶] buttons to display results from each pulse wave measurement.

Example: If 35 waveforms are measured:
34/35 ← 35/35 ← AVG → 1/35 → 2/35

The pulse wave number is displayed below the waveform (in the left centre part of the screen).
[Fig. 8]

cSBP is displayed only when AVG is selected to display.



[Fig. 8]

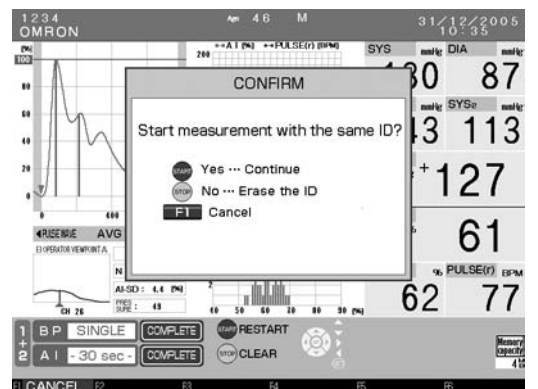
Pulse wave number

8. Press the START button to continue measuring. At this time, the message “Start measurement with the same ID?” will be displayed. Select “Yes” or “No”.

Select the START button [Yes] to begin measurement.

Select the STOP button [No] to erase the ID and return to the default screen. Enter the ID for the next patient.

Select the F1 key [CANCEL] to return to the previous screen and change the measurement mode. [Fig. 9]



[Fig. 9]

When the waveform is deformed or inflation is judged to be incorrect, an error message will appear on screen (E04 - E08, E73 - E82). In this case, measure again. Refer to Section 21.

An error message window appearing in the middle of the screen can be closed by pressing any button.

13. Blood Pressure Measurement

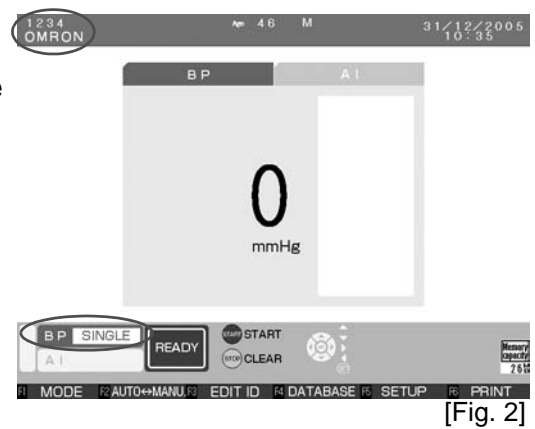
13.1. Blood Pressure Measurement

This mode is for using the device solely as a blood pressure monitor. There are three blood pressure measurement options: [SINGLE], [AVERAGE - 2 TIMES], [AVERAGE - 3 TIMES]. Refer to Section 18.3. [SINGLE]: Measures blood pressure only once and displays the results. [AVERAGE - 2 TIMES]: After the results of the first measurement are displayed, the second measurement will be performed automatically after the set time interval has elapsed. After measurement is complete, the average value is displayed. [AVERAGE - 3 TIMES]: Three sequential measurements are taken and the average value is displayed. *Please note - when average mode is used, only the average can be saved to the database/memory card. If you stop measurement before the average is reached, no measurement will be saved to the database/memory card.*

1. Apply the cuff.

(Reference to Section 9.1.)

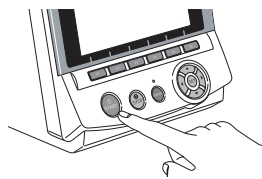
2. Make sure that the number of blood pressure measurements displayed at the lower left corner of the screen (see Fig. 2 - BP Single stands for a single BP measurement) is the same as the number of measurements you selected (in the case below, the user selected a single measurement). Make sure that the patient's name and ID are displayed at the upper left corner of the screen. If they are not displayed, enter or retrieve the patient's ID data according to the description starting in Section 17.



[Fig. 2]

3. Press START button and start measuring. [Fig. 1]

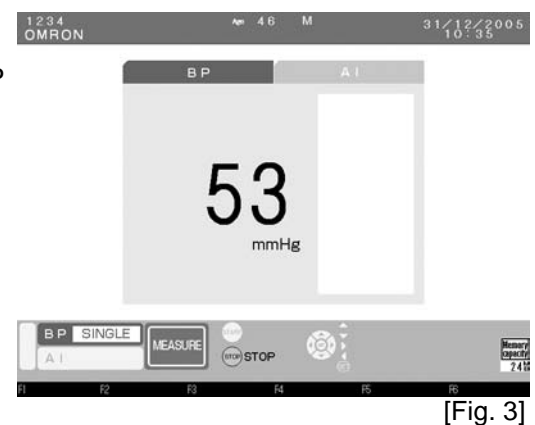
- * Do not press the START (Start measurement) button without wrapping the cuff.
- * When you want to stop during measurement, press the STOP button. The cuff will rapidly deflate.



[Fig. 1]

Manual Inflation.

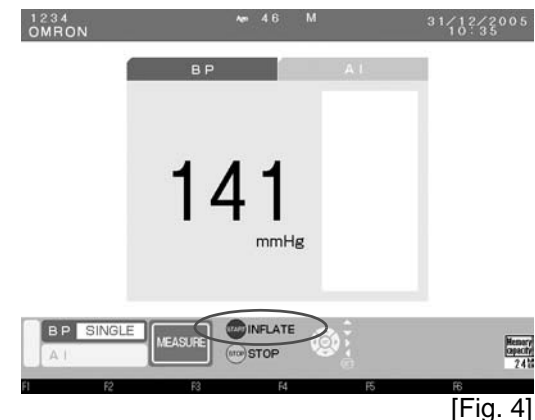
- * Holding the START button down during inflation switches to manual inflation. During manual inflation, inflation only occurs while the START button is pressed. [Figs. 2 - 4]
- * Pressing the DISPLAY button during measurement will stop the measurement and turn off the screen.



[Fig. 3]

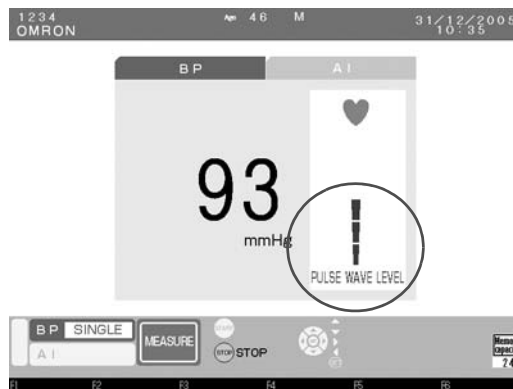
4. The pressure will begin to decrease once the optimal pressurization value is reached.

After the pressure begins to decrease and [INFLATE] is displayed, re-inflation will occur only while the START button is held down.



[Fig. 4]

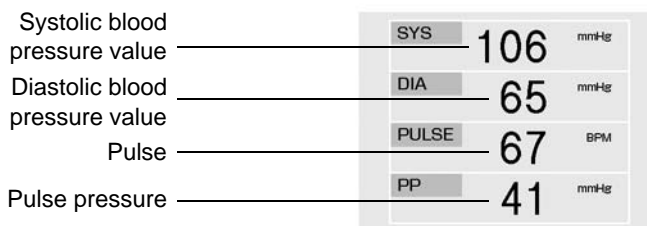
5. The pulse wave level is displayed with a bar during measurement. [Fig. 5]



[Fig. 5]

6. Once measurement is complete the buzzer will sound* and the results will appear. [Fig. 6]

Deflation is automatic. Upon completion, a “COMPLETE” message will appear in the lower-left part of the screen. The buzzer will not sound* if it is set to OFF in the settings menu.



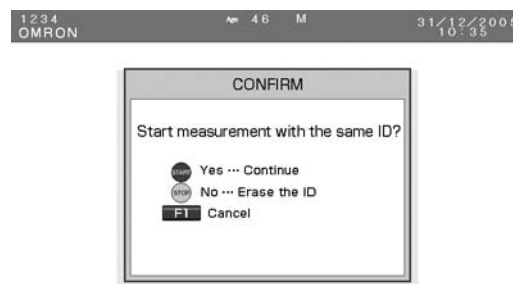
[Fig. 6]

7. Press the START button to continue measuring. At this time, the message “Start measurement with the same ID?” will be displayed. Select “Yes” or “No”.

Select the START button [Yes] to begin measurement.

Select the STOP button [No] to erase the ID and return to the default screen. Enter the ID for the next patient.

Select the F1 key [CANCEL] to return to the previous screen and change the measurement mode. [Fig. 7]



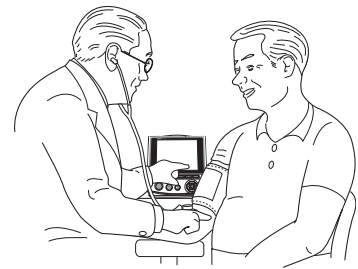
[Fig. 7]

When the measurement or inflation are judged to be incorrect, an error message (E04 – E08) will be displayed.
 In this case, measure again. Refer to Section 21.
 An error message window appearing in the middle of the screen can be closed by pressing any key.

13.2. Auscultation

When selecting blood pressure measurement, it is possible to take the reading using auscultation.

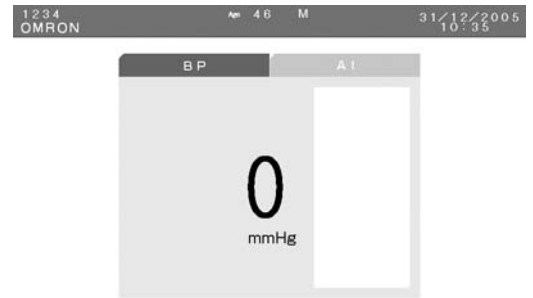
1. Apply the blood pressure cuff around the patient's arm. [Fig. 1]



[Fig. 1]

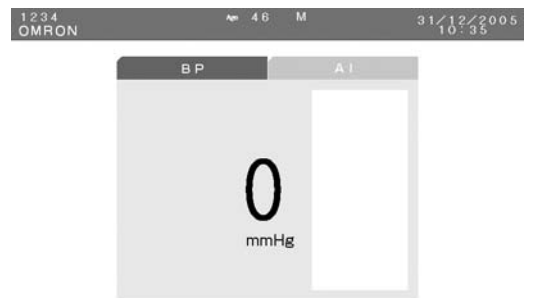
2. Press the F2 key [AUTO ↔ MANU] on the blood pressure measurement screen to bring up [MANUAL] on the display. [Figs. 2 and 3]

Check that the measurement method display in the lower-left part of the screen is set to [MANUAL].



[Fig. 2]

3. Place the stethoscope on the patient's arm.



[Fig. 3]

4. Press the START button. Inflation begins. [Fig. 4]

* Do not press the START button without applying the cuff.
 * When you want to stop during measurement, press the STOP button. The cuff rapidly deflates.



Operator - controlled (Manual) Inflation.

* Holding the START button down during inflation switches to manual inflation. During manual inflation, inflation only takes place while the START button is pressed.



[Fig. 4]

5. The pressure will begin to decrease once the optimal pressurization value is reached. [Fig. 5]

- * Once deflation has started, you can reinflate by pressing START (Start measurement) button.
- * If you wish to facilitate deflation after deflation has started, press the F1 key [DEFLATE]. It facilitates deflation by approximately 5 - 10 mmHg each time it is pressed.



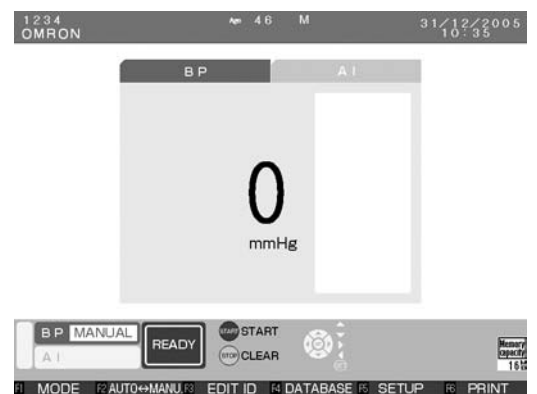
[Fig. 5]

6. The strength of the pulse wave is displayed (Pulse Wave Level) with a bar during measurement. [Fig. 6]



[Fig. 6]

7. Deflation continues until finished, followed by a return to the initial screen. [Fig. 7]



[Fig. 7]

14.AI Measurement

14.1. AI Measurement

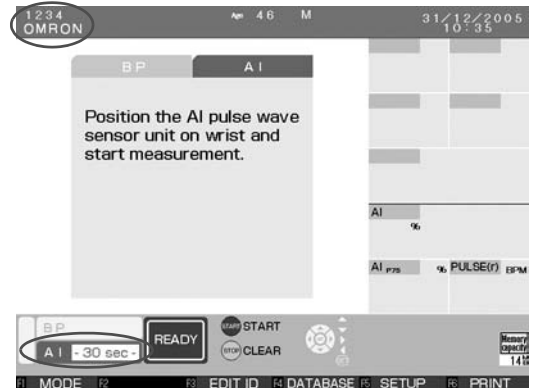
This mode measures only AI.

1. Attach the AI pulse wave sensor unit to the left wrist. (Refer to Section 9.2.)
2. Check that the patient's name and ID appear in the upper-left part of the screen. [Fig. 1]

If nothing is displayed, follow the instructions in Section 17. to register or retrieve the ID.

If the ID information is not registered, only the time and results will be saved. Check that the measurement method in the lower-left part of the screen is set to AI measurement.

- * Do not press the START button without first attaching the AI pulse wave sensor unit.
- * Do not slide the AI pulse wave sensor unit while AI measurement is in progress.



[Fig. 1]

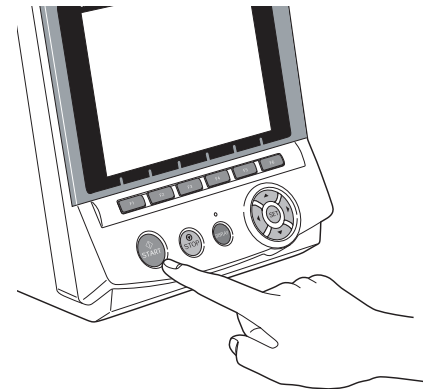
3. Press the START button. [Fig. 2]

The AI pulse wave sensor unit will begin applying pressure.

To stop the device once measurement has begun, press the STOP button. Rapid deflation will occur.

If measurement takes more than five minutes, the device will stop automatically.

Pressing the DISPLAY button during measurement will stop the measurement and turn off the screen.

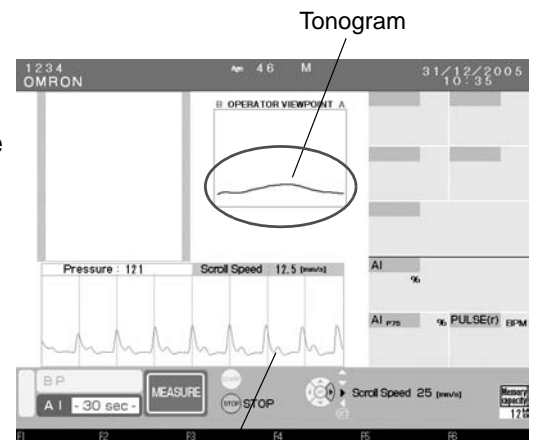


[Fig. 2]

4. Check that the tonogram in the upper-centre part of the screen is rising and forming a mound shape. [Fig. 3]

(Refer to Section 12.1.)

(A continuous pulse wave is displayed on the graph in the lower-left part of the screen.)



[Fig. 3]

Continuous Pulse Wave Graph

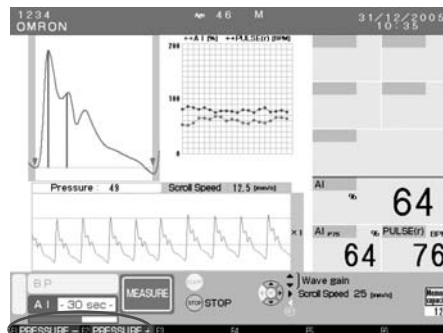
- The applied pressure will become constant and a pulse wave will form in the upper-left part of the screen. Instruct the patient not to move while the measurement is in progress. Body movements and vibrations can cause a measurement error to occur. [Fig. 4]

If body movement or vibrations cause a measurement error the measurement will automatically stop. (Refer to Section 21.)

If the AI value goes outside of the 30%-150% range, the AI [Fig. 4] measurement results will not be displayed for each beat. Check to make sure that there is no abnormality in the pulse waveform. This will also cause a break in the graph of the AI values plotted for each pulse wave.

If the pulse is irregular or too faint, the device may not detect the pulse wave, in which case there will be no pulse waveform and nothing displayed on the graph.

A green bar in the far lower-left part of the screen shows measurement progress toward completion.

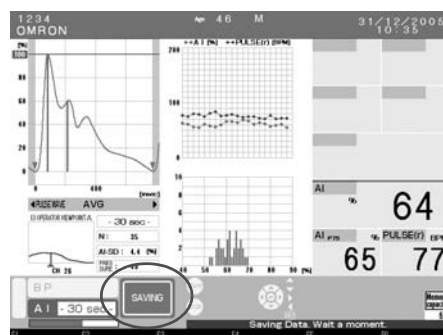


[Fig. 4]

- Once measurement is complete the results will appear. [Fig. 5]

The green "SAVING" message will appear in the lower-left part of the screen and the data will be recorded on the memory card.

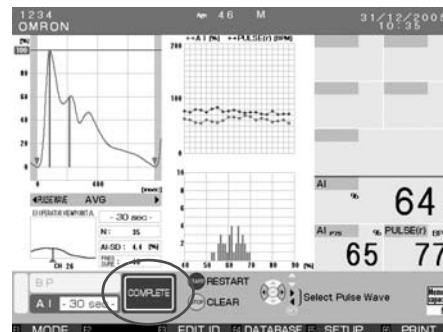
Do not eject the memory card while save is in progress. This could result in damage to the device.



[Fig. 5]

- The beep to indicate that the data has been saved will sound and the dark blue message "COMPLETE" will appear in the lower-left part of the screen. [Figs. 6 and 7]

The representative pulse wave (AVG) displayed on the screen is selected among all detected pulse waves. It has a stable pulse wave and the closest AI value to the average. Still, there may be some difference between AVG and the average.



[Fig. 6]

AI value and pulses for each pulse wave (last 20 pulses)

Pulse waveform

Number of sampled pulse waves

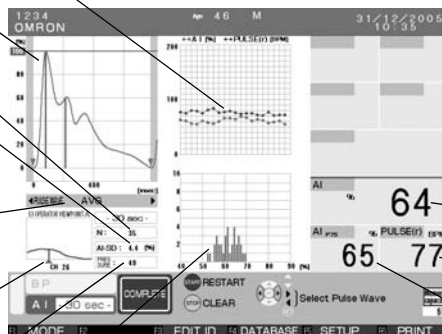
Standard deviation

Pulse wave number

Tonogram and measurement channel during measurement

Pressure value of the AI pulse wave sensor during measurement

Histogram of AI value for each pulse wave



"Measurement Complete" screen

AI value

Pulse rate when using AI sensor

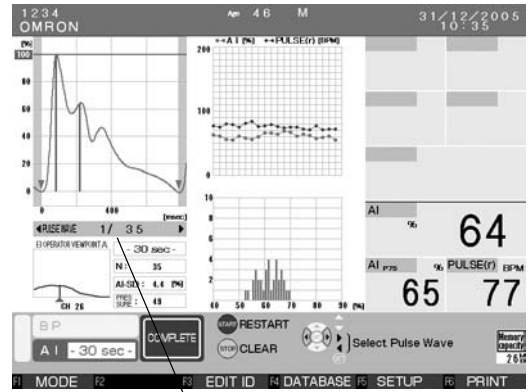
AI value normalized to a pulse rate of 75

[Fig. 7]

Press the [◀ ▶] buttons to display results from each measurement.

Example: If 35 waveforms are measured:
 34/35 ← 35/35 ← AVG → 1/35 → 2/35

The pulse wave number is displayed below the waveform (in the centre lower-left part of the screen). [Fig. 8]



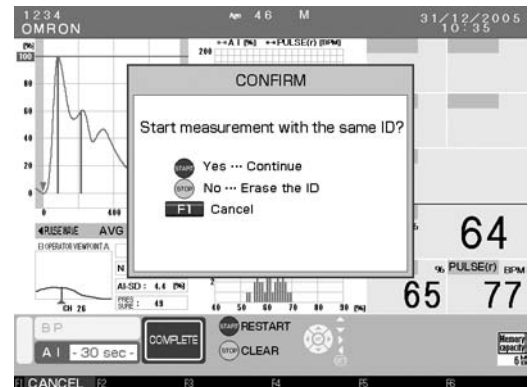
[Fig. 8] — Pulse wave number

8. Press the START button to continue measuring. At this time, the message “Start measurement with the same ID?” will be displayed. Select “Yes” or “No”.

Select the START button [Yes] to begin measurement with the current ID.

Select the STOP button [No] to erase the ID and return to the default screen. Enter the ID for the next patient.

Select the F1 key [CANCEL] to return to the previous screen and change the measurement mode. [Fig. 9]



[Fig. 9]

If during measurement the waveform becomes irregular or it is determined that the pressurization value is incorrect, an error message will appear on screen (E73 - 82). In this case, measure again. Refer to Section 21. An error message window appearing in the middle of the screen can be closed by pressing any button.

14.2. Changing Magnification and Scroll Speed

Changing the Continuous Pulse Wave Graph Magnification during AI Measurement: Press the [▲ ▼] keys to change the continuous pulse wave graph magnification.

The default display is standard magnification [x1] The setting can be switched from among four options.

Once magnification is changed, subsequent data will be displayed with the new magnification.

Magnification	x2	x1	x2/3	x1/2
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Changing Scroll Speed during AI Measurement.

The default continuous pulse wave scroll speed is 12.5 mm/sec.

Press the [◀ ▶] button to change the scroll speed. The setting can be switched from among two options. When changing scroll speed, subsequent data will be displayed with the new scroll speed.

Scroll speed	25 mm/s	12.5 mm/s
Display time Full Scale (sec)	4	8

15.Print

15.1. Printing Measurement Results

When [F6 PRINT] is displayed as a function key, you can print the contents of the screen by pressing the F6 key. You can print measurement results after each measurement is completed, or after retrieving the measurement results.

Storing Printed Results

If the printed results need to be stored for a long period of time, it is best to make and store a photocopy of the printout.

Since the main unit printer uses thermal paper, printed results may fade partially or completely over time.

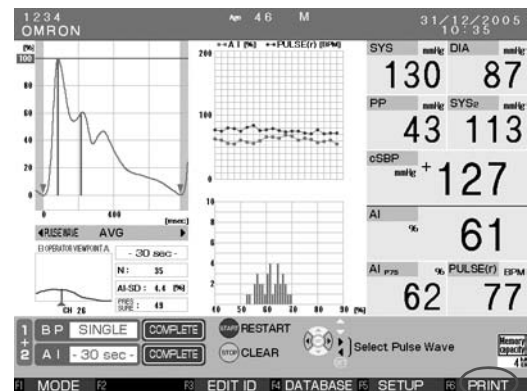
A red line appears on the printer paper when only 50 cm are left (about 2 measurements of AI+BP). Prepare a new roll of paper.

Automatic printing after measurement is an option. (Refer to Section 5.2. for printing option.)

1. After completing a measurement, press the F6 key [PRINT] while the screen displays the measurement results. [Fig. 1]

To retrieve data from memory, press the F4 key [DATABASE] and use the [◀ ▼ ▲ ▶] buttons to select the data to print. After pressing the SET button to display the measurement results, press the F6 key [PRINT] to print. (Refer to Section 16.)

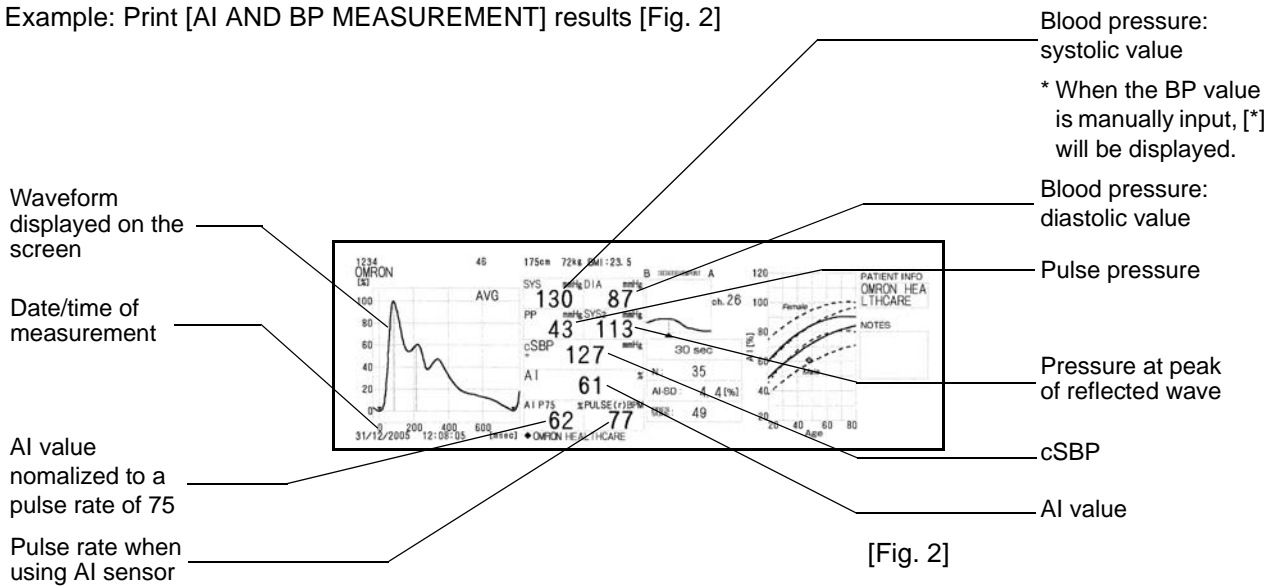
The paper will automatically be fed and cut.



Screen displaying the measurement result by [AI AND BP MEASUREMENT].

[Fig. 1]

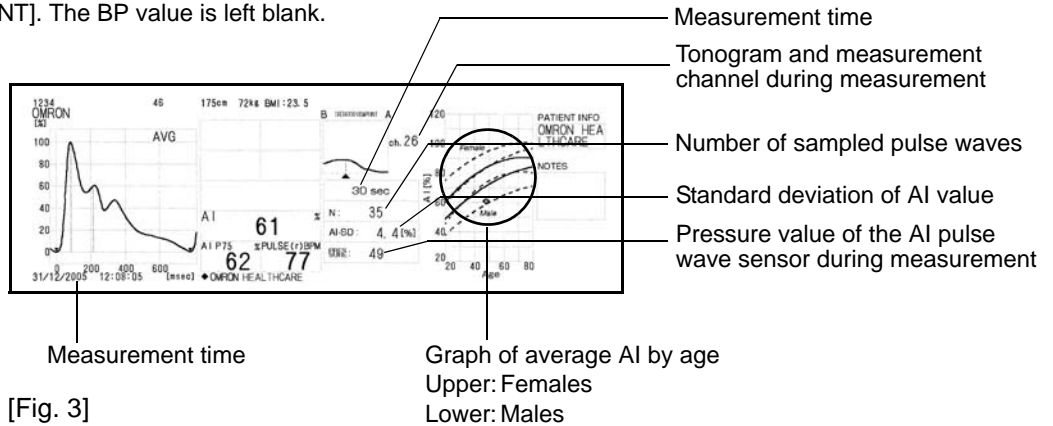
Example: Print [AI AND BP MEASUREMENT] results [Fig. 2]



[Fig. 2]

Example: Print [AI measurement] results [Fig. 3]

* The print format is the same as [AI AND BP MEASUREMENT]. The BP value is left blank.



[Fig. 3]

Graph of average AI by age
Upper: Females
Lower: Males

Note: If the patient's gender has been entered, only the appropriate line will be displayed.

Note: The dotted line shows the standard deviation.

Note: If the patient's birth date has not been entered, the patient's data will not be plotted.

Note: If the data to be plotted on the graph is out of range, [◀ ▶] will be displayed.

Example: Print [Single blood pressure measurement] results [Fig. 4]



Hospital Name

[Fig. 4]

16.Memory Retrieval

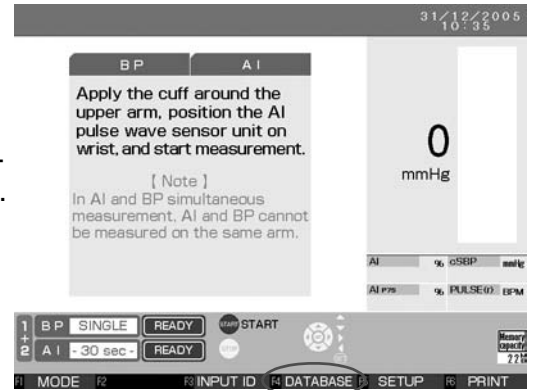
16.1. Show All Data List

It is possible to retrieve saved results. Also, trend graphs for each patient can be displayed and blood pressure measurement results can be added and modified. These functions can be used to manage data for a patient undergoing multiple examinations.

1. Press the F4 key [DATABASE]. [Fig. 1]

The screen of [ALL DATA] will be displayed. [Fig. 2]

It is sorted in the ascending order of the measurement date. [DATABASE] is displayed on the F4 key on the pre-measurement screens or the measurement result screen.



[Fig. 1]

2. The latest 5 data items are displayed.

The total amount of data and the current data number are displayed on the lower left of the screen.

Use the [▲ ▼] keys to scroll up or down among individual data entries.

Use the [◀ ▶] keys to scroll through data in blocks of five entries at a time.


Align the [▶] cursor with the data to be retrieved and press the SET button to show details.

It is possible to replace the ID associated with the measured data. Align the [▶] cursor with the data to which the ID is to be replaced and press the F3 key [REPLACE ID]. If data does not already have an ID, it is possible to add an ID to the data. (Refer to Section 17. for details on how to enter the ID.)



[Fig. 2]

F1 key	EXIT	Return to the pre-measurement screen.
F2 key	ID SEARCH	Enter the ID search screen.
F3 key	REPLACE ID	Enter the ID replacement screen.
F4 key	TREND GRAPH	Display trend graphs.
F5 key	EDIT BP	Enter the BP value edit screen.
F6 key	DELETE DATA	Delete data from database.
SET button	Data Detail	Display the Details screen.
STOP button	CANCEL	Return to the default screen.



To move the [▶] cursor up (newer data), use the [▲] button.
 To move the [▶] cursor down (older data), use the [▼] button.
 To move to the next page (older data), press the [▶] button.
 To return to the previous page (newer data), press the [◀] button.
 Pressing the [▶] key on the last page will not display the top page.

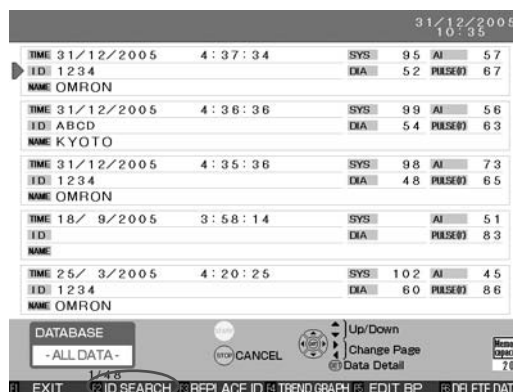
3. Pressing the F1 key [EXIT] returns the user to a pre-measurement screen.

16.2. ID Search

The registered ID numbers can be used to search for a specific patient's measurement results.

1. Press the F2 key [ID SEARCH] on the [DATABASE-ALL DATA-] screen. [Fig. 3]

As a result, the ID search screen will be displayed. [Fig.4]

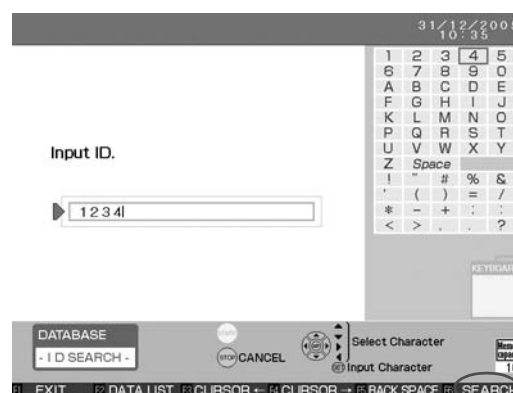


[Fig. 3]

2. Input the ID number of the patient that you wish to find and press the F6 key [SEARCH]. [Fig. 4]

(Refer to “How to Enter Text” in Step 2, Section 17.1. for details on text entry.)

[SEARCHING...] is displayed at the lower left hand corner of the screen.



[Fig. 4]

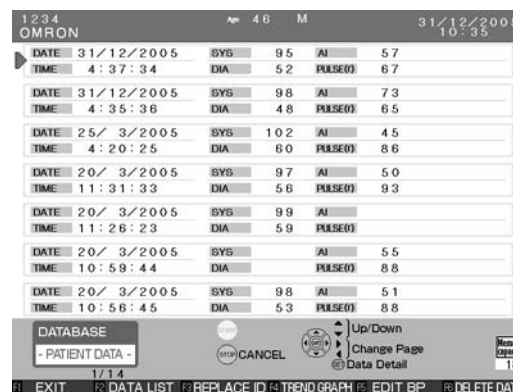
3. [PATIENT DATA] Up to seven measurement results for a patient who has the specified ID will be displayed per page. [Fig. 5]

[PATIENT DATA] is sorted in the ascending order of the measurement date.

Use the [▼ ▲] keys to scroll up or down among individual data entries.

Use the [◀ ▶] keys to scroll through data in blocks of seven entries at a time.

Align the [▶] cursor with the data to be retrieved and press the SET button to show details.



[Fig. 5]

4. When the specific ID number is not registered or when there is no measurement result, the following message is displayed: [ID not found]. In such a case, repeat from step 2.

16.3. Delete Data

Stored measurement results can be selected and deleted.

1. Move the [▶] cursor to a data entry you wish to delete on the [DATABASE-ALL DATA-] or [DATABASE-PATIENT DATA-]. [Fig. 6]

The total number of data entries and the current data number are displayed below the data list.

Use the [▲ ▼] keys to scroll up or down among individual data entries.

Use the [◀ ▶] keys to scroll through data in blocks of five or seven entries at a time.



[Fig. 6]

2. Press the F6 key [DELETE DATA]. [Fig. 7]



[Fig. 7]

F1 key CANCEL

Cancel deleting

F3 key DELETE

Delete the selected data entry.

STOP button CANCEL

Cancel deleting

16.4. Data Detail

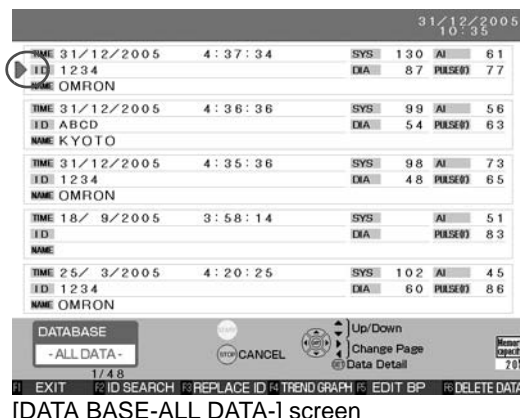
Displays patient's detailed measurement results.

1. On the [DATA BASE-ALL DATA-] or [PATIENT DATA] List screens, move the [▶] cursor to a data entry to access more detailed data from that measurement. [Fig. 8]

The total number of data entries and the current data number displayed are shown in the lower left.

Use the [▲ ▼] keys to scroll up or down among individual data entries.

Use the [◀ ▶] keys to scroll through data in blocks of five or seven entries at a time.



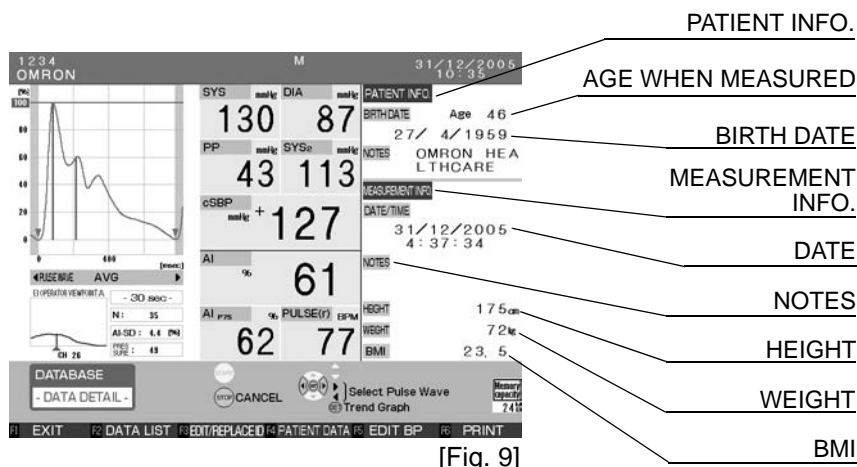
[DATA BASE-ALL DATA-] screen

[Fig. 8]

2. Press the SET button to display the single measurement data in detail. [Fig. 9]

F1 key	EXIT	Return to the pre-measurement screen.
F2 key	DATA LIST	Enter the Data List screen.
F3 key	EDIT/REPLACE ID	Edit or replace the ID information (Refer to Section 17.2. for "Edit" and Section 17.3. for "Replace".)
F4 key	PATIENT DATA	Return to the Patient Data List screen.
F5 key	EDIT BP	Opens the Blood Pressure Modification screen.
F6 key	PRINT	Print the measurement results. Refer to Section 15.1. for details on printing results.
SET button	Trend Graph	Display the trend graph.
STOP button	CANCEL	Return to the default screen.

Use the [◀ ▶] keys to display the results of each measurement pulse wave.
This will be displayed only if pulse wave data is stored.



[Fig. 9]

3. Press the F1 key [EXIT] to return to the initial screen.
Pressing the other function keys results in the actions listed above.

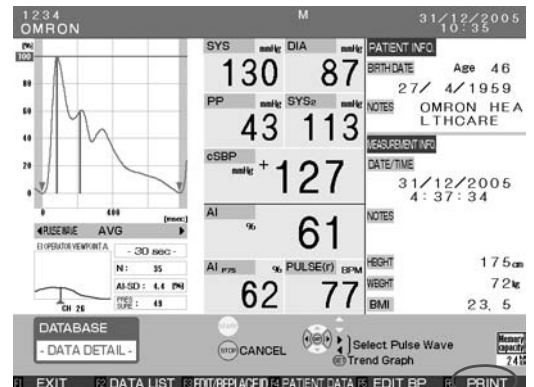
16.5. Print Continuous Pulse Waves

To print continuous pulse waves from patient's detailed measurement results, follow the steps below.

Continuous pulse waves can be printed only if pulse wave data is stored.
(Refer to Section 18.7.)

1. Press the F6 key on the [-DATA DETAIL-] screen.
[Fig. 10]

At this time, "Select print contents" will be displayed.
[Fig.11]



[Fig. 10]

F1 key CANCEL

Return to the previous screen.

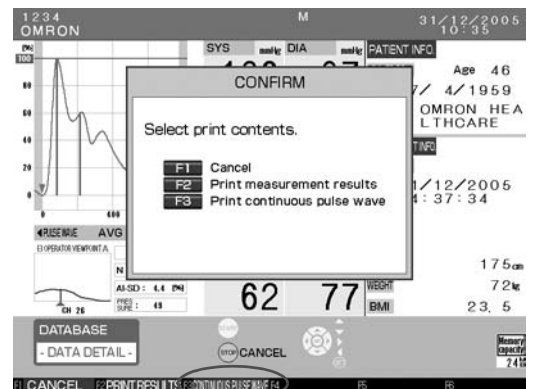
F2 key PRINT RESULT

Print the measurement result. (Refer to Section 15.1.)

F3 key PRINT CONTINUOUS PULSE WAVE

Print the continuous pulse wave.

2. Press the F3 key [CONTINUOUS PULSE WAVE].
[Fig. 11]



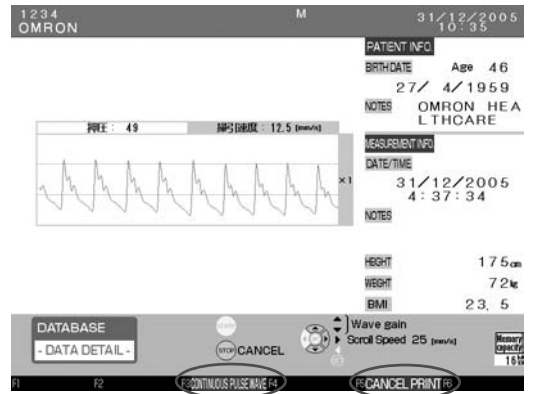
[Fig. 11]

EN

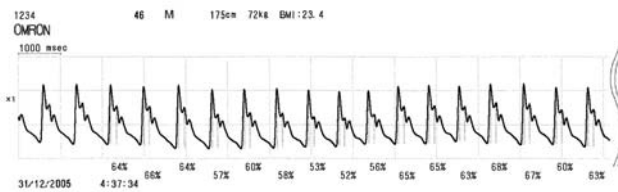
3. Change the magnification and scroll speed on the preview screen if necessary. (Refer to Section 14.2.) Then press the F3 key [CONTINUOUS PULSE WAVE]. [Fig. 12]

To stop printing before it has finished, press the F5 key [CANCEL PRINT].

The paper is fed and cut automatically. Do not pull the paper until it is cut automatically.



[Fig. 12]



Printed result of an example continuous pulse wave.

[Fig. 13]

16.6. Trend Graph

Identifies trends within an individual patient's multiple measurements.

1. Press the F4 key [TREND GRAPH] on the [ALL DATA] or [PATIENT DATA] screens, or press the SET button on the [DETAILS] screen. A trend over a 1-day time will be displayed. [Fig. 14]

* Data that can be used to display a trend graph is limited to those patients with IDs.

Press the F5 key [SELECT GRAPH] to change the display from 1 DAY to 30 DAYS to 360 DAYS to cSBP-SBP contrast graph.

* When the number of measurements in a day is quite large and you display the [DAY] trend graph, the device will thin out measurement values for you. [Fig. 14]
The [30 DAYS] shows a graph of the measurement results for the previous 30 days starting from the date of the selected result. [Fig. 15]

The [360 DAYS] shows a graph of the measurement results for the previous 360 days starting from the date of the selected result. [Fig. 16]

Press the [▶]* key to show a graph that is newer than the date/time of the selected results.

Press the [◀]* button to view a graph that is further in the past. This will work only if there are measurement results recorded from before and after the date/time of the selected results.

When several measurements are taken for a certain period of time, the data with higher priority will be displayed on the graph. Only one piece of data every 10 minutes on [1 DAY] graph, one piece of data every 6 hours on [30 DAYS] graph and one piece of data every 3 days on [360 DAYS] graph are automatically selected and displayed, respectively.

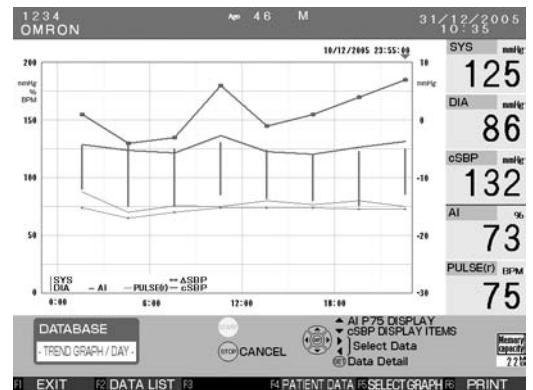
Data is selected in the following priority.

- 1) data containing a measurement of both blood pressure and AI.
- 2) data containing a measurement of AI.
- 3) data containing a measurement of blood pressure.

When multiple pieces of data contain the same type of data, the newest one will be selected.

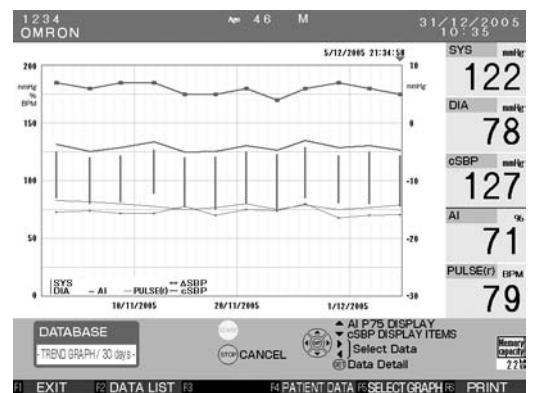
When the data contains a measurement of high blood pressure with more than 200 mmHg, it will be displayed with ▲ on the graph.

1 DAY



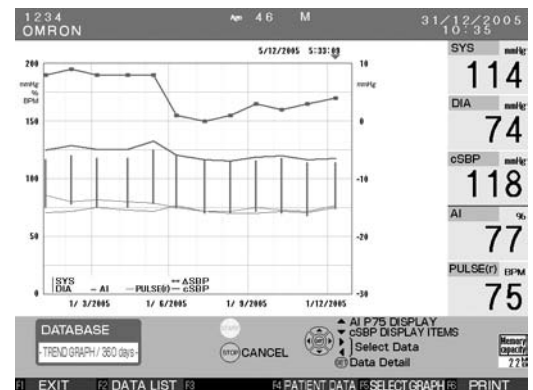
[Fig. 14]

30 DAYS



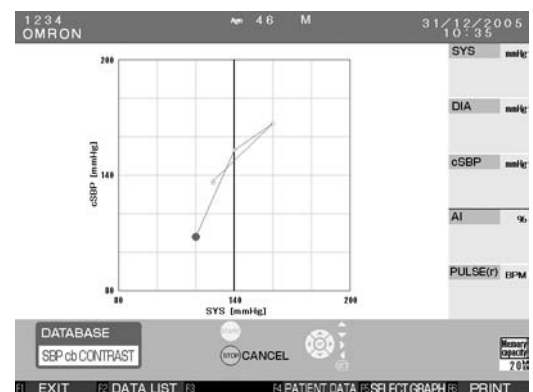
[Fig. 15]

360 DAYS



[Fig. 16]

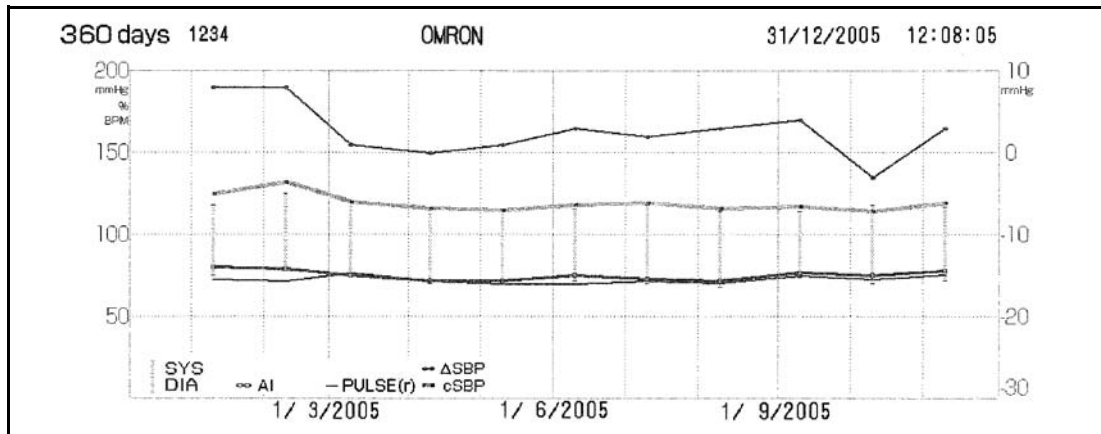
cSBP-SBP contrast graph



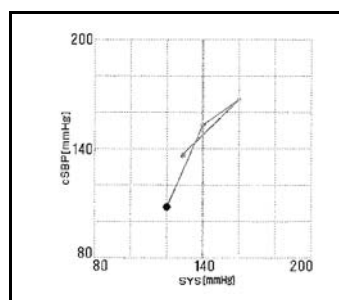
[Fig. 17]

- | | | |
|---------------------|--------------|--|
| F1 key | EXIT | Return to the pre-measurement screen. |
| F2 key | DATA LIST | Return to the Data List screen. |
| F4 key | PATIENT DATA | Return to the Patient Data List screen. |
| F5 key | SELECT GRAPH | Change the scale of the trend graph or select PRINT SBP
cb CONTRAST GRAPH |
| F6 key | PRINT | Print the trend graph. |
| * ▲ key | | For selecting from [AI] or [AI P75] |
| * ▼ key | | For selecting from [cSBP], [cSBP + ΔSBP] or [ΔSBP] |
| * SET button | Data Detail | Display the Details screen. |
| STOP button | CANCEL | Return to the default screen. |
- * These keys will not show for the cSBP-SBP contrast graph.

2. Press the F6 key to print the trend graph or the cSBP-SBP contrast graph. [Fig. 18]



[Fig. 18]



[Fig. 19]

3. Press the SET button to return to the Data Details screen.

4. Press the F1 key to return to the default screen.

You can select whether the trend graph or the cSBP-SBP contrast graph is included every time a measurement result is printed.

(Refer to Section 18.4.)

16.7. Adding and Modifying Blood Pressure Measurement Values

It is possible to modify blood pressure measurement results from AI blood pressure measurements or add blood pressure measurement results to AI measurements.

1. When F5 [EDIT BP] is displayed, it is possible to enter and modify blood pressure measurement values. [Fig. 20]

Select the data, using the cursor and press the F5 key [EDIT BP].

However, it is not possible to modify blood pressure measurement results obtained in blood pressure measurement mode. It is not possible to modify AI measurement results either.

2. Input values for each field on the Manual Blood Pressure Entry screen. [Fig. 21]

(Refer to “How to Enter Text” in Step 2, Section 17.1. for details on text entry.)

Each item can be input in the following ranges.

SYS 1-299

DIA 0-298

* If an inappropriate value is input, [This value is out of range] is displayed. For example, if SYS<DIA the value is out of range.

3. When you have finished entering data, press the F1 key [SAVE AND EXIT].

(The confirmation message [Do you want to save data?] will be displayed.) [Fig. 22]

TIME	ID	NAME	SYS	AI	DIA	PULSE
31/12/2005 12:11:30	1234	OMRON	114	4.5	57	62
31/12/2005 11:57:49	1234	OMRON	112	4.1	58	65
31/12/2005 11:51:16	1234	OMRON	112	AI	58	PULSE
31/12/2005 3:22:51	1234	OMRON	E04	AI		
31/12/2005 3:21:35	1234	OMRON	112	AI	57	62

Screen for [ALL DATA LIST BY ID]

[Fig. 20]

Input BP values.

SYS mmHg

DIA mmHg

[Fig. 21]

CONFIRM

Do you want to save data?

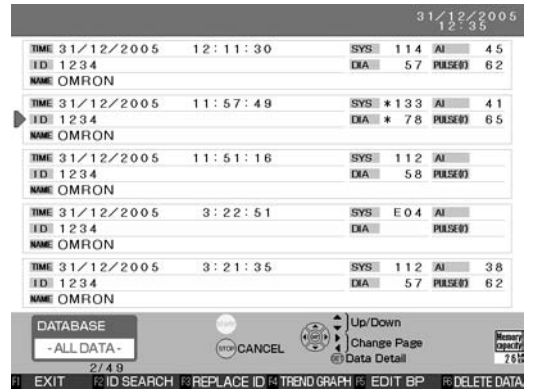
F1 Cancel
F2 Yes... Save and exit
F3 No... exit without saving

[Fig. 22]

EN

- To complete the entry, press the F2 key [YES]. If you do not want to save the data, press the F3 key [NO].

To return once again to the Manual Blood Pressure Entry screen, press the F1 key [CANCEL]. Once you have pressed the F2 [YES] or F3 [NO], you will be returned to the DATA BASE - ALL DATA. [Fig. 23] Manually-input blood pressure values will be asterisked



[Fig. 23]

17. Registering ID Information

17.1. ID Registration

The patient's [ID], [NAME], [BIRTH DATE], [GENDER] and [NOTES] can be registered in the ID information screen.

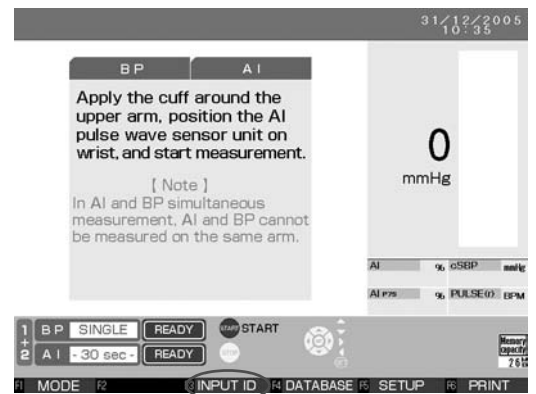
[HEIGHT], [WEIGHT] and [NOTES] can be also added as measurement information.

Once the patient's ID information is registered, changes in the measurement results can be tracked continuously.

Register the ID information before taking measurements.

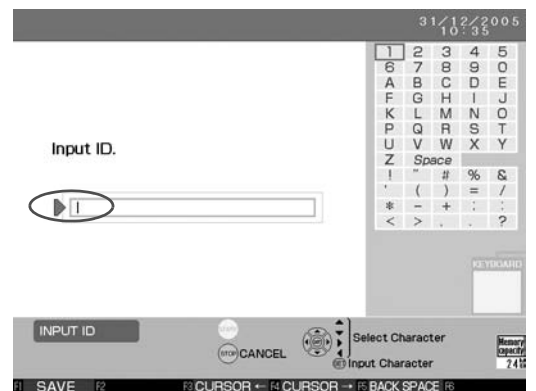
Only one patient is assigned to a specific ID. It is not possible to register two or more patients under the same ID.

1. Press the F3 key [INPUT ID] on a screen where this button is displayed. [Fig. 1]



[Fig. 1]

2. The ID Entry screen will appear.
The [] cursor will appear next to ID in the left part of the screen. [Fig. 2]



[Fig. 2]

How to Enter Text

Press the [◀ ▼ ▲ ▶] buttons to select the desired characters.

Press the [▲] button to move the selector up.

Press the [▼] button to move the selector down.

Press the [◀] button to move the selector to the left.

Press the [▶] button to move the selector to the right.

Press the SET button to accept the selected character.

To correct entered text, press the F3 key [CURSOR ←] or the F4 key [CURSOR →] to move the cursor to the right of the character to be corrected. Press the F5 key [BACK SPACE] to delete the incorrect character and then retype it correctly.



[Fig. 3]

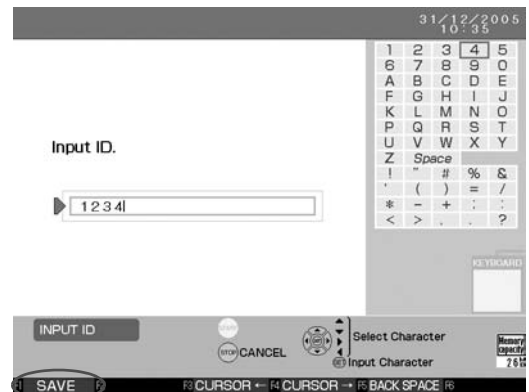
3. How to Register an ID [Fig. 4]

A text selection box will appear in the upper-right part of the screen. The ID field can be entered using capital letters, numbers, symbols or spaces. The field can contain up to 20 characters. You may choose any combination of characters to create an ID as long as that ID has not previously been registered.

Once entry is complete, press the F1 key [SAVE] and enter the name.

If the ID has already been registered, the cursor will move the cursor to the name field and the screen will display the name and other information that has been registered under that ID.

Check to see if the ID needs to be changed or if registration needs to be redone or corrected. If not, press the F1 key [SAVE] to go back. If a change is necessary, proceed to the next field and make the necessary changes.



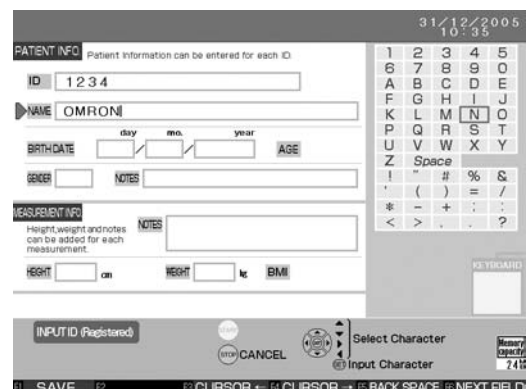
[Fig. 4]

4. How to Register a Name [Fig. 5]

A text selection box will appear in the upper-right part of the screen. The name field can be entered using capital letters, numbers, symbols and spaces. The field can contain up to 25 characters.

Hereafter, entry automatically moves to the next field when the maximum number of characters is input.

Once entry is complete, press the F6 key [NEXT FIELD] to move to the date of birth registration.



[Fig. 5]

5. How to Register a Birth Date [Fig. 6]

Enter the month, day and year from the text selection box.

PATIENT INFO Patient information can be entered for each ID

ID 1 2 3 4

NAME OMRON

BIRTHDATE 1 / 4 / 1959 AGE

SEX NOTES

MEASUREMENT INFO Height, weight and notes can be added for each measurement.

HEIGHT cm HEIGHT lb BMI

31/12/2005 10:35

1 2 3
4 5 6
7 8 9
0

INPUT ID (Registered) CANCEL Select Character Input Character

F1 SAVE F2 F3 CURSOR ← F4 CURSOR → F5 BACK SPACE F6 NEXT FIELD

[Fig. 6]

The cursor will not move to the age field. [Fig. 7]

After entering month, day and year and moving to the next field, the age will automatically be calculated based on the current date and the date of birth entered.

The earliest possible date of birth that can be entered is January 1, 1900.

Once entry is complete, press the F6 key [NEXT FIELD] and enter the gender.

PATIENT INFO Patient information can be entered for each ID

ID 1 2 3 4

NAME OMRON

BIRTHDATE 27 / 4 / 1959 AGE 46

SEX NOTES

MEASUREMENT INFO Height, weight and notes can be added for each measurement.

HEIGHT cm HEIGHT lb BMI

31/12/2005 10:35

1 2 3
4 5 6
7 8 9
0

INPUT ID (Registered) CANCEL Select Character Input Character

F1 SAVE F2 F3 CURSOR ← F4 CURSOR → F5 BACK SPACE F6 NEXT FIELD

[Fig. 7]

6. How to Register a Gender [Fig. 8]

For the gender field, select either “Male” or “Female” from the text selection box area in the upper-right part of the screen. Press the SET button to accept the entry and move onto the next field.

PATIENT INFO Patient information can be entered for each ID

ID 1 2 3 4

NAME OMRON

BIRTHDATE 27 / 4 / 1959 AGE 46

SEX M NOTES

MEASUREMENT INFO Height, weight and notes can be added for each measurement.

HEIGHT cm HEIGHT lb BMI

31/12/2005 10:35

M F

INPUT ID (Registered) CANCEL Select Character Input Character

F1 SAVE F2 F3 F4 F5 BACK SPACE F6 NEXT FIELD

[Fig. 8]

7. How to Register Notes [Fig. 9]

The PATIENT INFO field can be used for one patient only. When the entry is modified, it will be reflected in all other related data including previously measured data.

The notes field can be used as a space for adding miscellaneous information.

An entry in the notes field is optional.

The text selection box will appear in the upper-right part of the screen.

The notes field can be entered using capital letters, numbers, symbols and spaces. The field can contain up to 18 characters.

If corrections need to be made in any of the fields, press the F6 key [NEXT FIELD] repeatedly and move the cursor until it goes to the field that need to be edited.

PATIENT INFO Patient information can be entered for each ID

ID 1 2 3 4

NAME OMRON

BIRTHDATE 27 / 4 / 1959 AGE 46

SEX M NOTES OMRON HEALTHCARE

MEASUREMENT INFO Height, weight and notes can be added for each measurement.

HEIGHT cm HEIGHT lb BMI

31/12/2005 10:35

1 2 3 4 5
6 7 8 9 0
A B C D E
F G H I J
K L M N O
P Q R S T
U V W X Y
Z Space
, ' () = /
* - + : ;
< > . - ?

INPUT ID (Registered) CANCEL Select Character Input Character

F1 SAVE F2 F3 CURSOR ← F4 CURSOR → F5 BACK SPACE F6 NEXT FIELD

[Fig. 9]

EN

8. How to Register measurement information [Fig. 10]

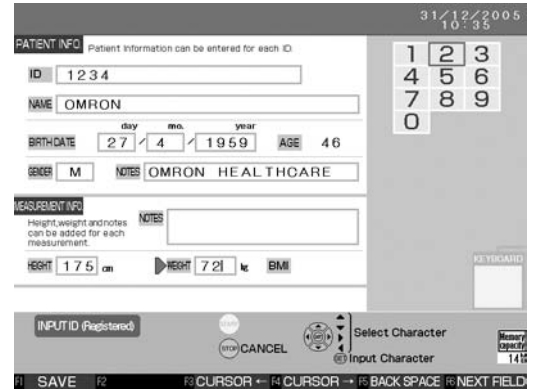
[HEIGHT], [WEIGHT] and [NOTES] can be entered as measurement information. You may change to either metric or English measurements as preferred. Refer to Section 18.5. for details.

The cursor will not move to the BMI field.

After entering height and weight and moving to the next field, the BMI will be automatically calculated based on the height and weight information entered.

Measurement information can be entered for each measurement.

The field can contain up to 32 characters.



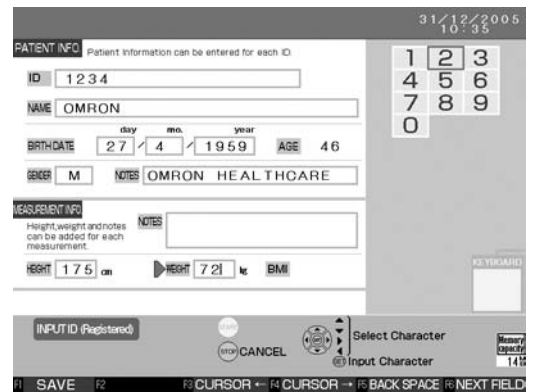
[Fig. 10]

9. Completing Registration

Once the data has been entered for each field, press the F1 key [SAVE]. [Fig. 11]

Once registration is complete, the default screen appears and the name displayed in the upper-left part of the screen will change to the ID that was just registered.

* If the birth date or gender is blank, the confirmation message will be displayed as the norm table will not be plotted properly.



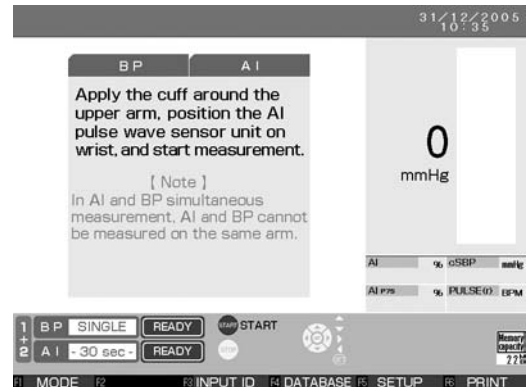
[Fig. 11]

17.2. Retrieval / Edit ID

It is possible to use a patient's ID to retrieve registration information if their registration is already complete.

1. Press the F3 key [INPUT ID] on a screen where this button is displayed to enter the ID Input screen. [Fig. 12]

When the F3 key [EDIT ID] is pressed on a screen where this button is displayed, you will be proceeded to [3].



[Fig. 12]

2. Input the ID and press the F1 key [SAVE]. [Fig. 13]

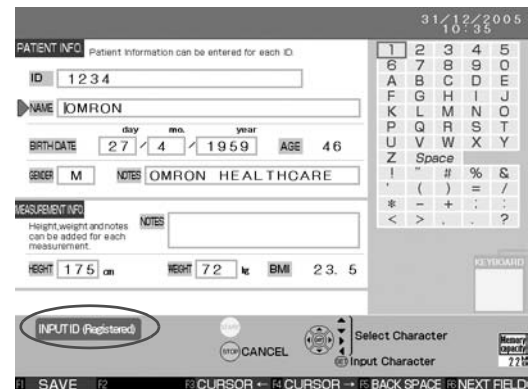


[Fig. 13]

3. The registration information will be displayed.

When the ID is already registered, [INPUT ID (Registered)] will be displayed.

If it is not necessary to edit the registration information, press the F1 key [SAVE]. [Fig. 14]



[Fig. 14]

4. Follow the registration procedure to edit the registration information. (Refer to Section 17.1.)

If the ID number is changed while the existing registration information is displayed on the screen, a new ID needs to be registered. The existing registration information will remain with the old number.

When the registration information has been edited, press the F1 key [SAVE]. [Fig. 15]



[Fig. 15]

5. Confirm the dialog if it appears and press the F2 key [SAVE] to register. [Fig. 16]

The screen returns to Step 1, and the ID number will be shown on the upper-left part of the screen.

The screenshot displays a patient registration interface. At the top right, the date is 31/12/2005 and the time is 10:35. The main area is titled 'PATIENT INFO' with the subtitle 'Patient information can be entered for each ID'. The form contains the following fields: ID (1234), NAME (OMRON), BIRTHDATE (27/4/1959), AGE (46), GENDER (M), and NOTES (OMRON HEALTHCARE II). Below this is a 'MEASUREMENT' section with a 'NOTES' field and measurement data: HEIGHT (175 cm), WEIGHT (72 kg), and BMI (23.5). A 'CONFIRM' dialog box is overlaid on the right, asking 'Existing patient information has been edited. Do you wish to overwrite and save it? It will affect all data associated with the ID in the memory.' The dialog offers three options: F1 EDIT (Re-edit the information), F2 SAVE (Save the information and exit), and F3 EXIT (Return to beginning), along with a CANCEL button. At the bottom of the screen, a status bar shows 'INPUT ID Registered' and a 'CANCEL' button. A bottom navigation bar includes F1 EDIT, F2 SAVE (highlighted with a circle), F3 EXIT, F4, F5, and F6.

[Fig. 16]

17.3. Replace ID

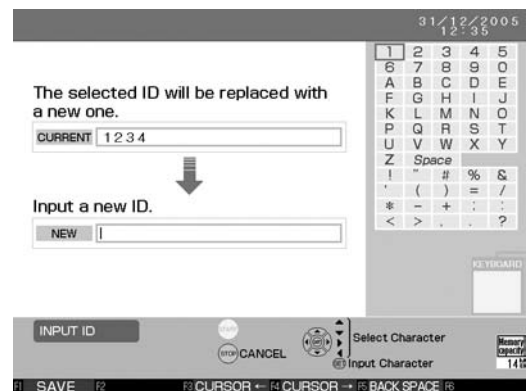
It is possible to select the saved measurement results and replace the ID number.

1. Move the [] cursor to a data entry you wish to replace on the [DATABASE-ALL DATA-] or [DATABASE-PATIENT DATA-], and press the F3 key [REPLACE ID]. [Fig. 17]



[Fig. 17]

2. The ID Entry screen will appear. [Fig. 18]



[Fig. 18]

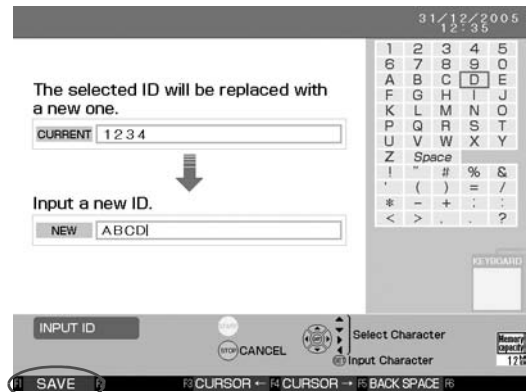
3. Press the F1 key [SAVE] after an ID is input. [Fig. 19]

F3 key move one character back

F4 key move one character forward

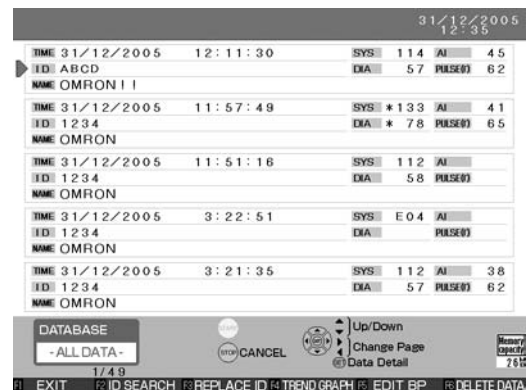
F5 key delete the previous character

If it is a new ID, it will proceed to ID Registration. Input ID information. (Refer to Section 17.1.)



[Fig. 19]

4. The screen goes back to [DATABASE-ALL DATA-] or [DATABASE-PATIENT DATA-], and the new ID number will be displayed. [Fig. 20]



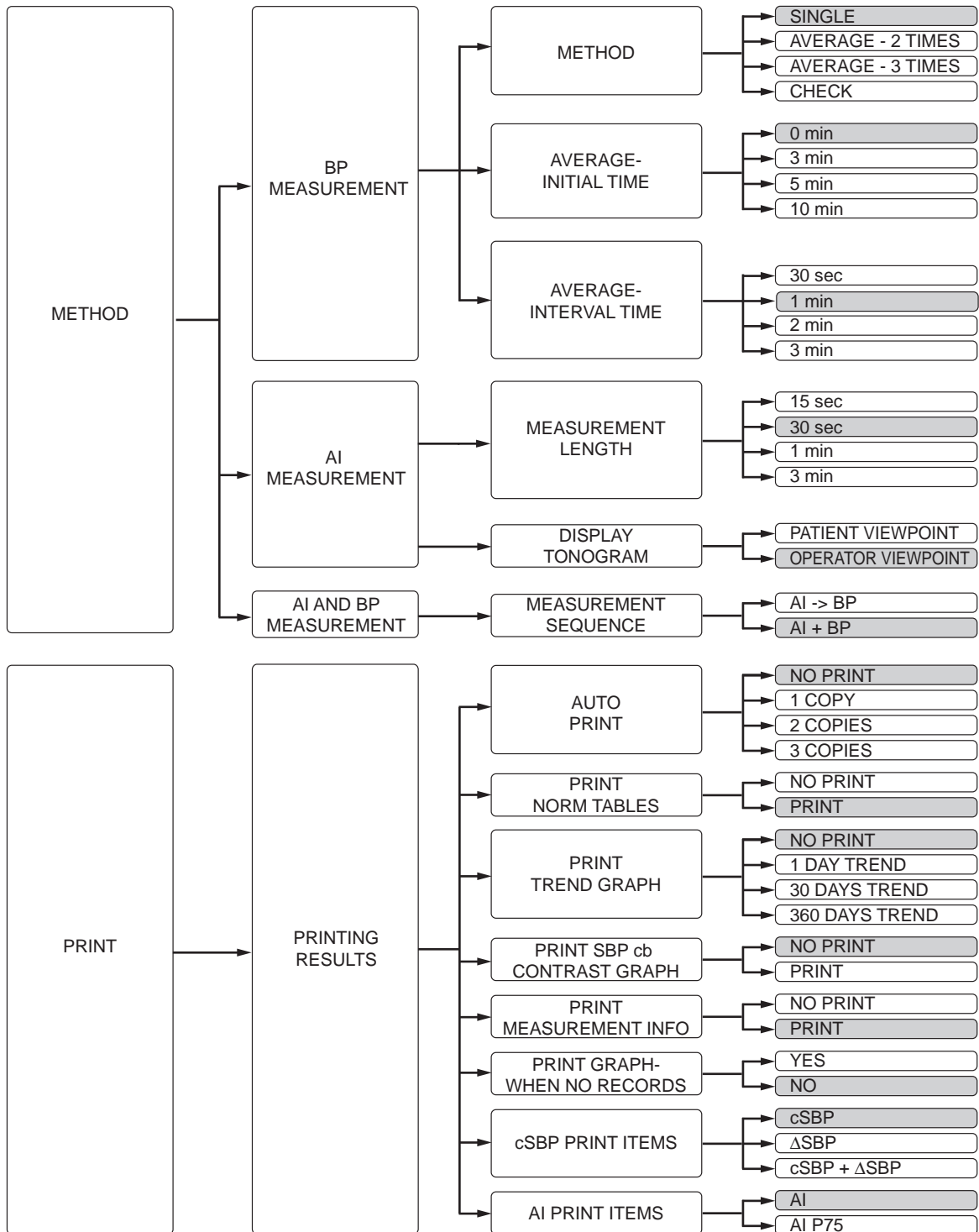
[Fig. 20]

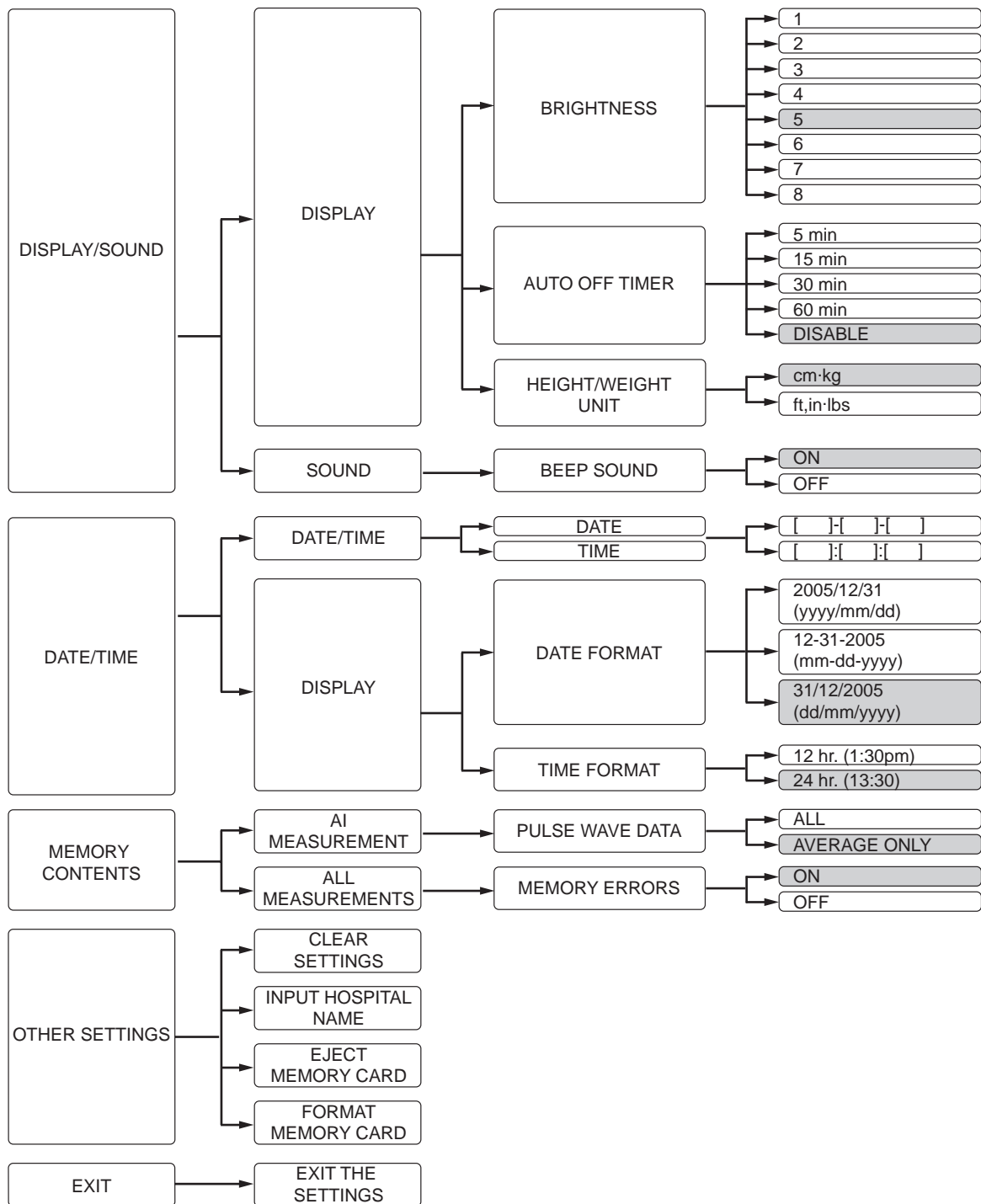
EN

18. Configuration Options

18.1. How to Change the Settings

The default settings are in the shaded boxes.

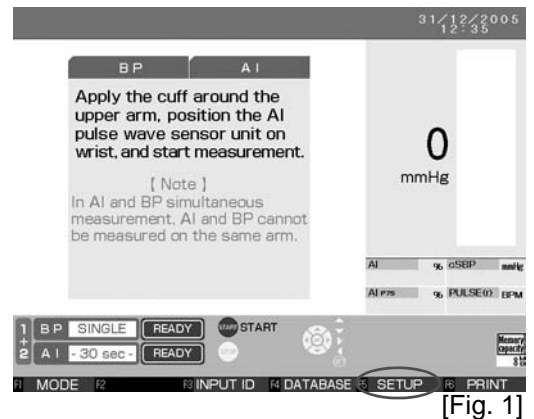




18.2. How to Change the Setup

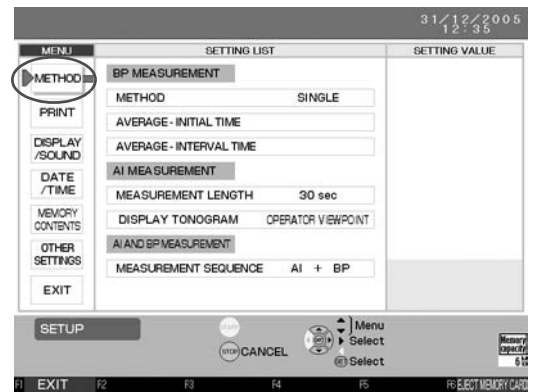
You can change the HEM-9000AI's initial setup according to your needs. Memory card ejection and initialization can also be performed under this setup process.

1. Press the F5 key to enter the [SETUP] screen. [Fig. 1]



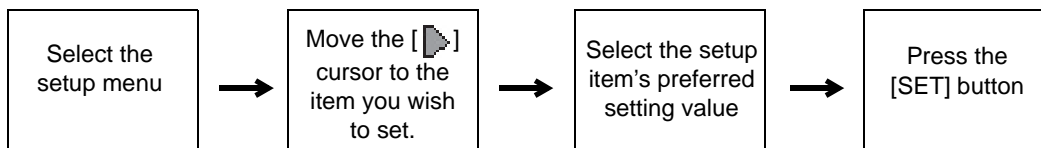
[Fig. 1]

2. The [SETUP] screen is displayed. [Fig. 2]
Move the [D] cursor using the [▲ ▼] buttons to select from the menu column then press the SET button or the [▶] button.



Screen of [AI AND BP MEASUREMENT]

[Fig. 2]



When the F1 key [EXIT] or [EXIT] on the menu is pressed, all the changes will be completed. If the STOP key [CANCEL] is pressed, the changed will be cancelled except the date and hospital name.

18.3. How to Change the Measurement Settings

Blood pressure measurements, AI measurements, AI + blood pressure measurements and results printouts can be changed.

1. Press the F5 key to enter the [SET UP] screen. (Refer to Section 18.2.)

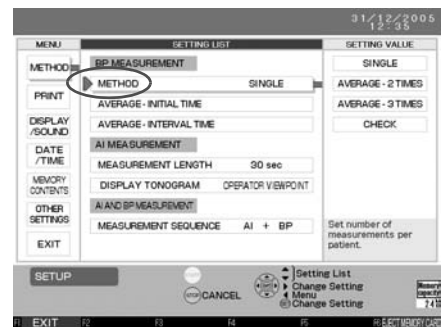
2. Move the [▶] cursor to [METHOD] under the [MENU] column and press the SET or [▶] button. Move the [▶] cursor to [SETTING LIST] column. [Fig. 1]



[Fig. 1]

3. To change the [METHOD] under [BP MEASUREMENT]:

1. Move the [▶] cursor to [METHOD]. [Fig. 2]
[SINGLE], [AVERAGE - 2 TIMES], [AVERAGE - 3 TIMES], and [CHECK] will appear as options under [SETTING VALUE] column.
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE] column. [Fig. 3]



[Fig. 2]

3. Move the [▶] cursor to the desired setting value, selecting from the options [SINGLE], [AVERAGE - 2 TIMES], or [AVERAGE - 3 TIMES] under [SETTING VALUE].
The default setting is [SINGLE].
Select [CHECK] as the setting value to calibrate the pressure. (Refer to Section 19.)



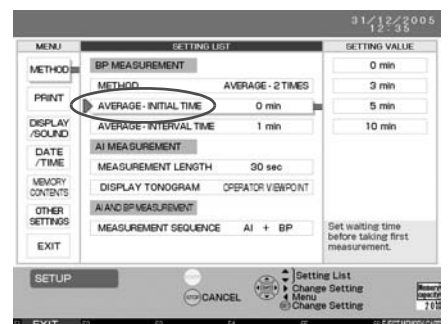
[Fig. 3]

4. Press the SET button to accept the setting value.
5. Press the F1 key [EXIT] to return to the default screen.

4. To change the [AVERAGE - INITIAL TIME] under [BP MEASUREMENT]: [Fig. 4]

When selecting Average - 2 times or Average - 3 times, it is possible to set a delay period between the time when the START button is pressed and the blood pressure is measured.

1. Move the [▶] cursor to [AVERAGE - INITIAL TIME].
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].
3. Move the [▶] cursor to the desired delay period, selecting from [0 min], [3 min], [5 min] or [10 min]. [Fig. 5]
The default setting is [0 min].
4. Press the SET button to accept the set value.
5. Press the F1 key [EXIT] to return to the default screen.



[Fig. 4]

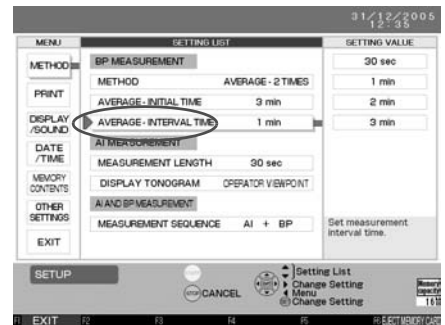


[Fig. 5]

5. To change the amount of time between blood pressure measurements.

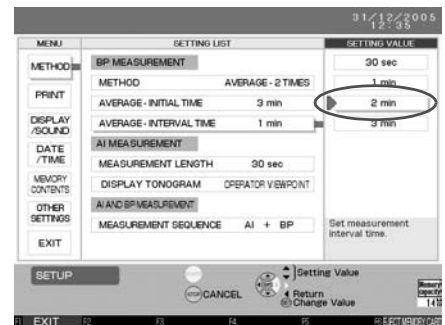
When selecting [AVERAGE - 2 TIMES] or [AVERAGE - 3 TIMES], it is possible to set the interval between blood pressure measurements.

1. Move the [▶] cursor to [AVERAGE - INTERVAL TIME]. [Fig. 6]
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].



[Fig. 6]

3. Move the [▶] cursor to the desired interval, selecting from [30 sec], [1 min], [2 min] or [3 min]. The default setting is [1 min]. [Fig. 7]
4. Press the SET button to accept the setting value.
5. Press the F1 key [EXIT] to return to the default screen.



[Fig. 7]

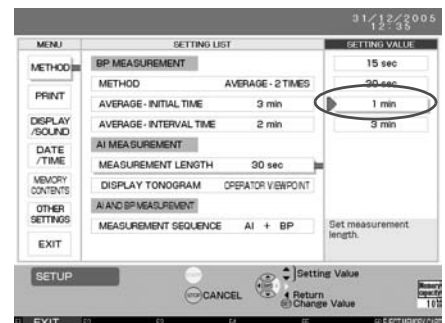
6. To change the [MEASUREMENT LENGTH] under [AI MEASUREMENT]:

1. Move the [▶] cursor to [Measurement Length]. [Fig. 8]
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].



[Fig. 8]

3. Move the [▶] cursor to the desired measurement time, selecting from [15 sec], [30 sec], [1 min] or [3 min]. [Fig. 9]
The default setting is [30 sec].
The measurement time set here is the duration of the pulse wave sampling.
The total time required for measurement is slightly longer.

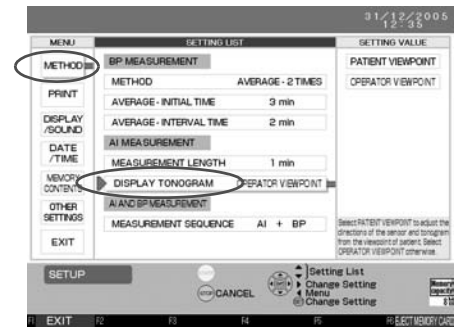


[Fig. 9]

4. Press the SET button to accept the setting value.
5. Press the F1 key [EXIT] to return to the default screen.

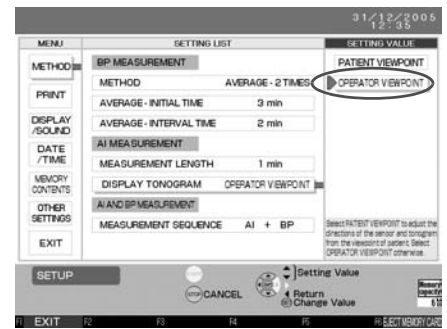
7. To change the [DISPLAY TONOGRAM] under [AI MEASUREMENT]:

1. Move the [▶] cursor to [DISPLAY TONOGRAM].
[Fig. 10]
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].



[Fig. 10]

3. Move the [▶] cursor to the desired setting, selecting from [PATIENT VIEWPOINT] or [OPERATOR VIEWPOINT]. [Fig. 11]
The default setting is [OPERATOR VIEWPOINT].



[Fig. 11]

4. Press the SET button to accept the setting value.
5. Press the F1 key [EXIT] to return to the default screen.

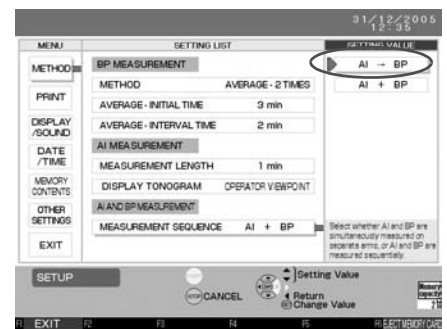
8. To change the [MEASUREMENT SEQUENCE] under [AI AND BP MEASUREMENT]:

1. Move the [▶] cursor to [MEASUREMENT SEQUENCE].
[Fig. 12]
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].
3. Move the [▶] cursor to the desired setting, selecting from [AI → BP] or [AI + BP] under [SETTING VALUE].
[Fig. 13]
The default setting is [AI + BP].



[Fig. 12]

4. Press the SET button to accept the set value.
5. Press the F1 key [EXIT] to return to the default screen.

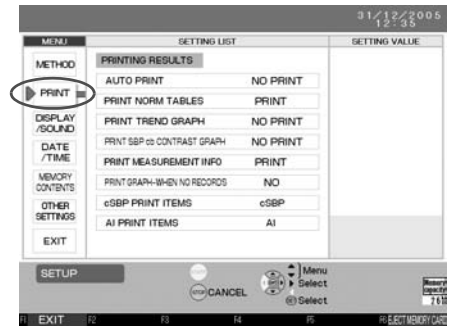


[Fig. 13]

18.4. How to Change Settings for Printing

It is possible to change the content of data to be printed and saved.

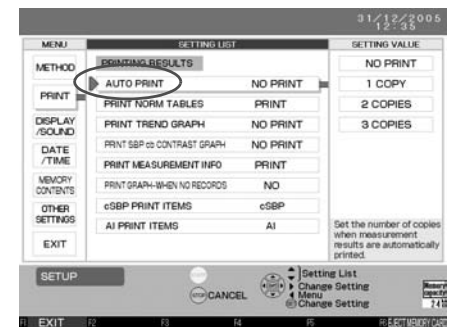
1. Press the F5 key to enter the [SET UP] screen.
(Refer to Section 18.2.)
2. Move the [▶] cursor to [PRINT] under the [MENU] column and press the SET or [▶] button to move the [▶] cursor to [SETTING LIST]. [Fig. 1]



[Fig. 1]

3. To print the result automatically after measurement: Move the [▶] cursor to [AUTO PRINT]. [Fig. 3]

1. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].

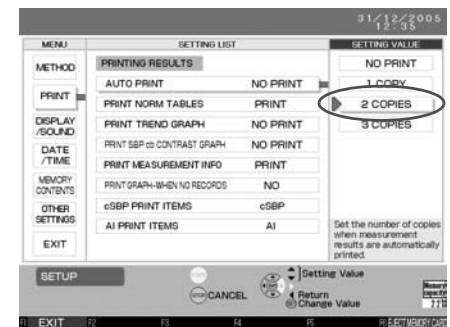


[Fig. 2]

2. Move the [▶] cursor to the desired setting, selecting from [NO PRINT], [1 COPY], [2 COPIES] or [3 COPIES] under [SETTING VALUE].
The default setting is [NO PRINT].

3. Press the SET button to accept the setting value

4. Press the F1 key [EXIT] to return to the default screen.

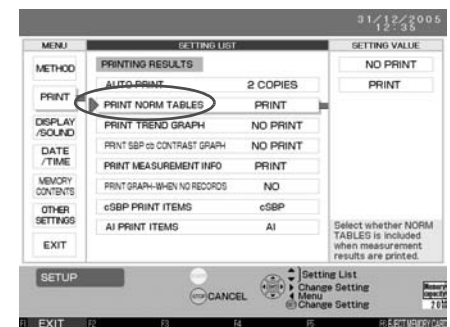


[Fig. 3]

4. To print the norm table with measurement results:

1. Move the [▶] cursor to [PRINT NORM TABLES].

2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].

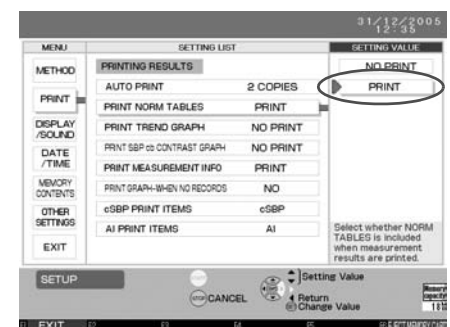


[Fig. 4]

3. Move the [▶] cursor to the desired setting, selecting from [NO PRINT] or [PRINT] under [SETTING VALUE].
The default setting is [PRINT].

4. Press the SET button to accept the setting value.

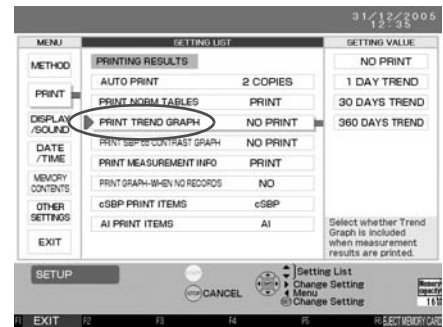
5. Press the F1 key [EXIT] to return to the default screen.



[Fig. 5]

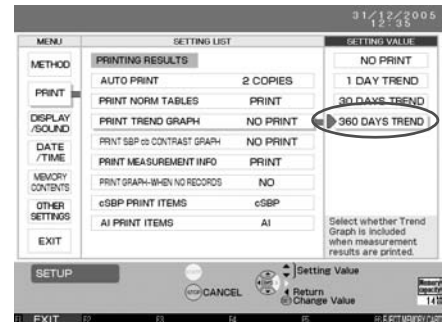
5. To print a trend graph with measurement results:

1. Move the [▶] cursor to [PRINT TREND GRAPH].
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].



[Fig. 6]

3. Move the [▶] cursor to the desired setting, selecting from [NO PRINT], [1 DAY TREND], [30 DAYS TREND] or [360 DAYS TREND] under [SETTING VALUE]. The default setting is [NO PRINT].



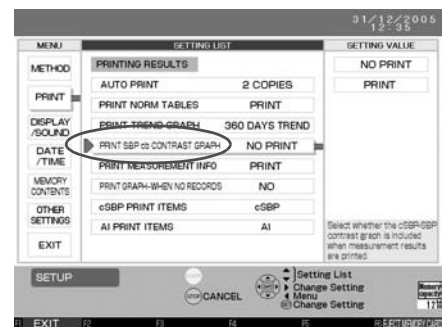
[Fig. 7]

4. Press the SET button to accept the setting value.

5. Press the F1 key [EXIT] to return to the default screen.

6. To include the cSBP-SBP contrast graph when printing after measurement:

1. Move the [▶] cursor to [PRINT SBP cb CONTRAST GRAPH].
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].

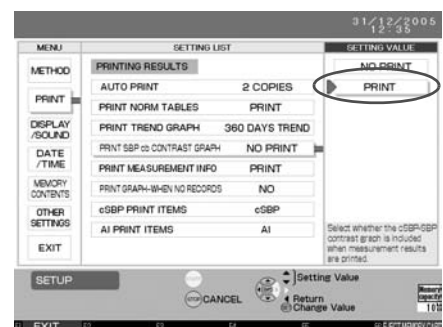


[Fig. 8]

3. Move the [▶] cursor to the desired setting, selecting from [NO PRINT] or [PRINT] under [SETTING VALUE]. The default setting is [NO PRINT].

4. Press the SET button to accept the setting value.

5. Press the F1 key [EXIT] to return to the default screen.



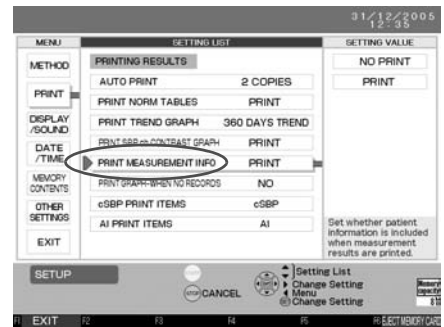
[Fig. 9]

7. To print measurement information with measurement results:

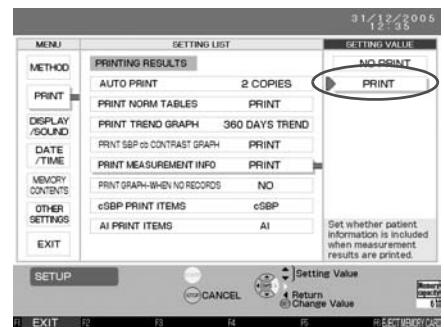
What is measurement information includes the following.

- Tonogram and measurement channel during measurement
- Measurement time
- Number of sampled pulse waves
- Standard deviation of AI value
- Pressure value of the AI pulse wave sensor during measurement

1. Move the [▶] cursor to [PRINT MEASUREMENT INFO].
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].
3. Move the [▶] cursor to the desired setting, selecting from [NO PRINT] or [PRINT] under [SETTING VALUE]. The default setting is [PRINT].
4. Press the SET button to accept the setting value.
5. Press the F1 key [EXIT] to return to the default screen.



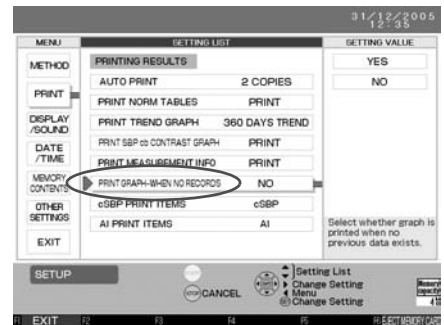
[Fig. 10]



[Fig. 11]

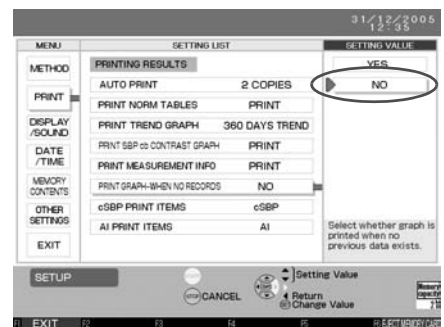
8. To select whether graph is printed when no previous data exists.

1. Move the [▶] cursor to [PRINT GRAPH - WHEN NO RECORDS].
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].



[Fig. 12]

3. Move the [▶] cursor to the desired setting, selecting from [YES] or [NO] under [SETTING VALUE]. The default setting is [NO].
- [YES]: Print even when only one piece of data will be added on the graph.
- [NO]: Print only when more than one piece of data will be added on the graph.



[Fig. 13]

4. Press the SET button to accept the setting value.
5. Press the F1 key [EXIT] to return to the default screen.

9. To select cSBP items to print on the trend graph:

1. Move the [▶] cursor to [cSBP PRINT ITEMS].
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].

3. Move the [▶] cursor to the desired setting, selecting from [cSBP], [ΔSBP] or [cSBP+ΔSBP] under [SETTING VALUE].

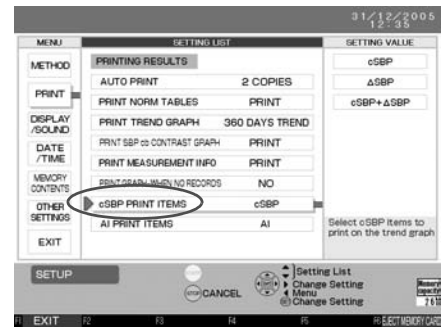
The default setting is [cSBP].

[cSBP]: Display cSBP calculated from measurement result

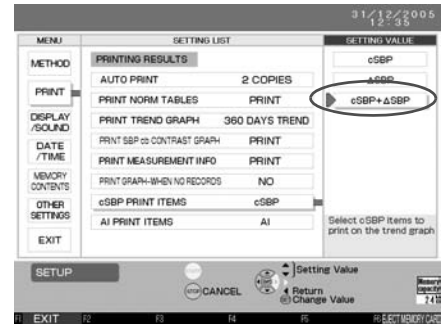
[ΔSBP]: Display the difference between cSBP and SBP

[cSBP+ΔSBP]: Display both cSBP and ΔSBP

4. Press the SET button to accept the setting value.
5. Press the F1 key [EXIT] to return to the default screen.



[Fig. 14]



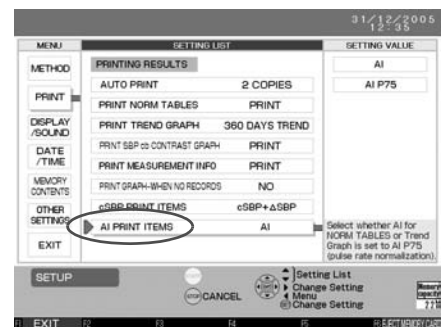
[Fig. 15]

10. To print the norm table or a trend graph with AI value normalized to a pulse rate or 75:

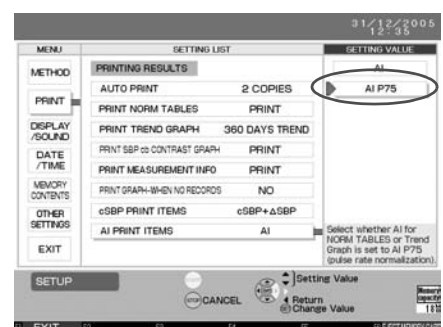
1. Move the [▶] cursor to [AI PRINT ITEMS].
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].

3. Move the [▶] cursor to the desired setting, selecting from [AI] or [AI P75] under [SETTING VALUE].
- The default setting is [AI].

4. Press the SET button to accept the setting value.
5. Press the F1 key [EXIT] to return to the default screen.



[Fig. 16]



[Fig. 17]

18.5. How to Change Display/Sound Settings

You can change the settings for the display and sound.

1. Press the F5 key to enter the [SET UP] screen. (Refer to Section 18.2.)

2. Move the [▶] cursor to [DISPLAY/SOUND] under the [MENU] column and press the SET or [▶] button to move the [▶] cursor to [SETTING LIST]. [Fig. 1]



[Fig. 1]

3. To change the [BRIGHTNESS] under [DISPLAY]

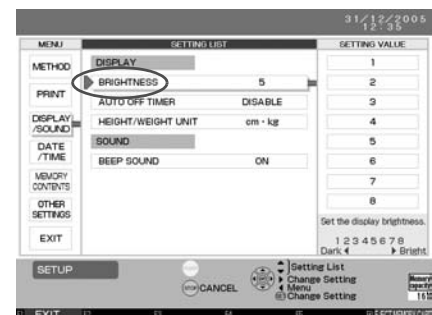
1. Move the [▶] cursor to [BRIGHTNESS]. [Fig. 2]

2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].

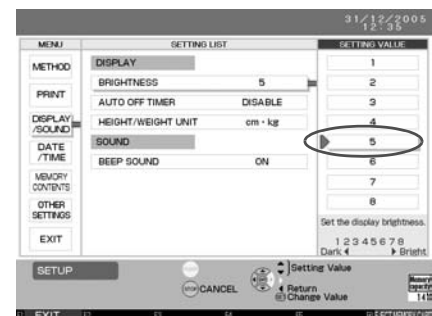
3. Move the [▶] cursor to the desired setting, selecting from [1] - [8] under [SETTING VALUE]. 1 is darkest. 8 is brightest. (The default setting is [5].)

4. Press the SET button to accept the setting value.

5. Press the F1 key [EXIT] to return to the default screen.



[Fig. 2]



[Fig. 3]

4. Changing the [AUTO OFF TIMER] under [DISPLAY] sets the time before the display automatically turns off when buttons have not been pressed.

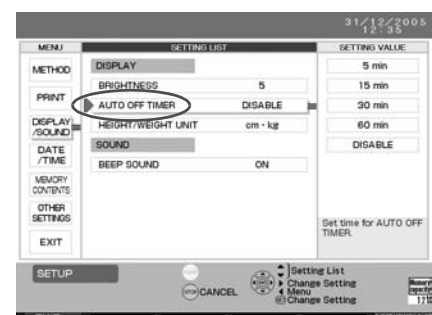
1. Move the [▶] cursor to [AUTO OFF TIMER]. [Fig. 4]

2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].

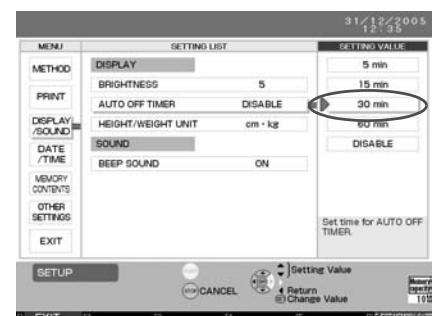
3. Move the [▶] cursor to the desired setting, selecting from [5 min], [15 min], [30 min], [60 min] or [DISABLE]. (The default setting is [DISABLE].) [Fig. 5]

4. Press the SET button to accept the setting value.

5. Press the F1 key [EXIT] to return to the default screen.



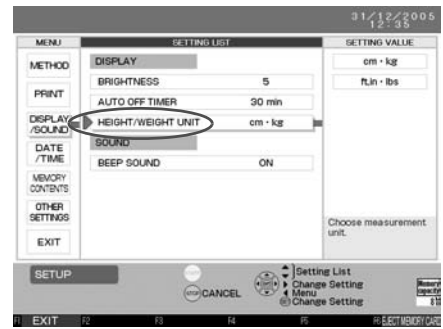
[Fig. 4]



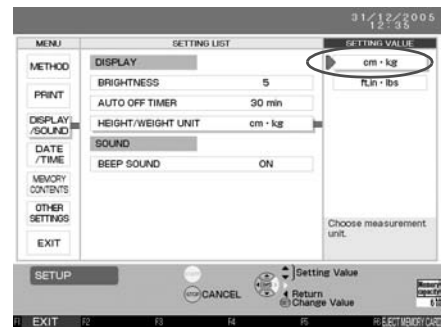
[Fig. 5]

5. To change the [HEIGHT/WEIGHT UNIT] under [DISPLAY]:

1. Move the [▶] cursor to [HEIGHT/WEIGHT UNIT]. [Fig. 6]
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE]. [Fig. 7]
3. Move the [▶] cursor to the desired setting, selecting from [cm•kg] or [ft, in.•lbs] under [SETTING VALUE]. The default setting is [cm•kg].
4. Press the SET button to accept the setting value.
5. Press the F1 key [EXIT] to return to the default screen.



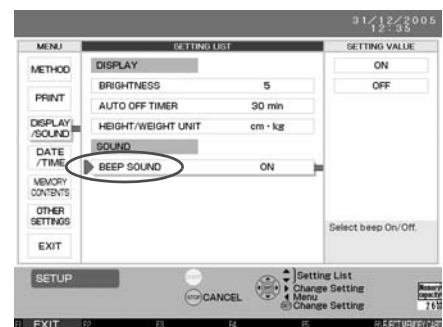
[Fig. 6]



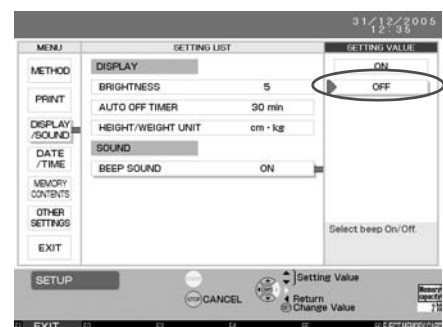
[Fig. 7]

6. To change the [BEEP SOUND] under [SOUND]:

1. Move the [▶] cursor to [BEEP SOUND]. [Fig. 8]
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].
3. Move the [▶] cursor to the desired setting, from [ON] or [OFF] under [SETTING VALUE]. [Fig. 9] (The default setting is [ON].)
4. Press the SET button to accept the setting value.
5. Press the F1 key [EXIT] to return to the default screen.



[Fig. 8]



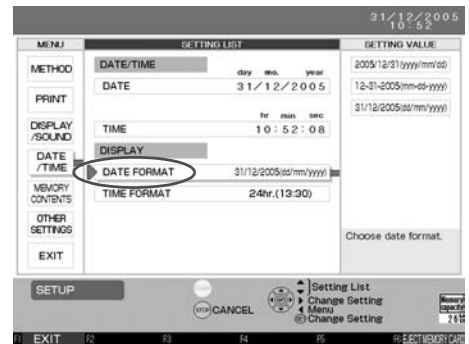
[Fig. 9]

18.6. How to Change the Clock Settings

It is possible to change the date and time settings and display.

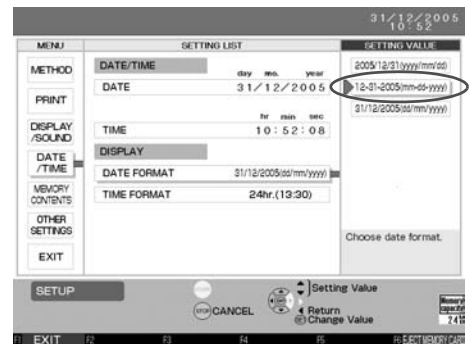
1. Press the F5 key to enter the [SET UP] screen. (Refer to Section 18.2.)
2. Move the [▶] cursor to [DATE/TIME] under the [MENU] column and press the SET or [▶] button to move the [▶] cursor to [SETTING LIST].
3. Refer to Section 8.3.
4. To change the [DATE FORMAT] under [DISPLAY]:

1. Move the [▶] cursor to [DATE FORMAT]. [Fig.1]
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE]. [Fig. 2]



[Fig. 1]

3. Move the [▶] cursor to the desired setting, selecting from [yyyy/mm/dd], [mm-dd-yyyy] or [dd/mm/yyyy] under [SETTING VALUE]. [Fig. 2]
The default setting is [dd-mm-yyyy].

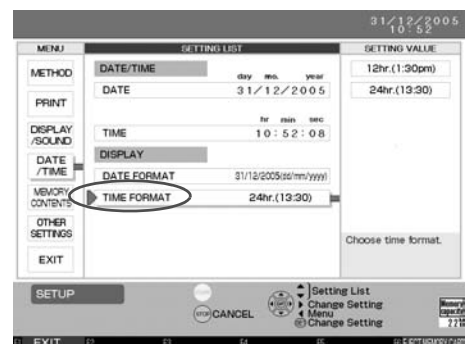


[Fig. 2]

4. Press the SET button to accept the setting value.
5. Press the F1 key [EXIT] to return to the default screen.

5. To change the [TIME FORMAT] under [DISPLAY]:

1. Move the [▶] cursor to [TIME FORMAT]. [Fig.3]
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE]. [Fig. 4]



[Fig. 3]

3. Move the [▶] cursor to the desired setting, selecting from [12hr. (1:30pm)] or [24hr. (13:30)] under [SETTING VALUE].
The default setting is [24hr. (13:30)]. [Fig 4]



[Fig. 4]

4. Press the SET button to accept the setting value.
5. Press the F1 key [EXIT] to return to the default screen.

18.7. How to Change Settings for Storing

1. Press the F5 key to enter the [SET UP] screen.
(Refer to Section 18.1. for details on “How to Change the Settings”).
2. Move the [▶] cursor to [MEMORY CONTENTS] under the menu column and press the SET or [▶] button to move the [▶] cursor to [SETTING LIST]. [Fig. 1]
3. To change the [PULSE WAVE DATA] setting under [AI MEASUREMENT]:

Set whether all pulse wave data should be saved for each measurement.

If it is set not to save all pulse wave data, only a representative piece of pulse wave data will be saved.

1. Move the [▶] cursor to [PULSE WAVE DATA].
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].

3. Move the [▶] cursor to the desired setting, selecting from [ALL] or [AVERAGE ONLY] under [SETTING VALUE].

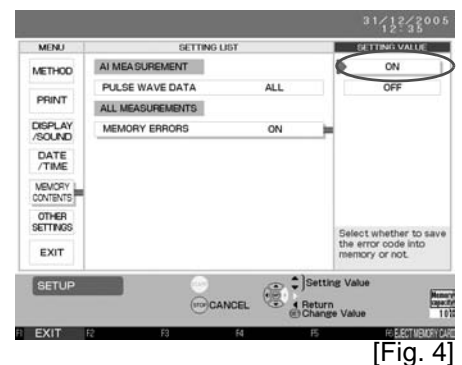
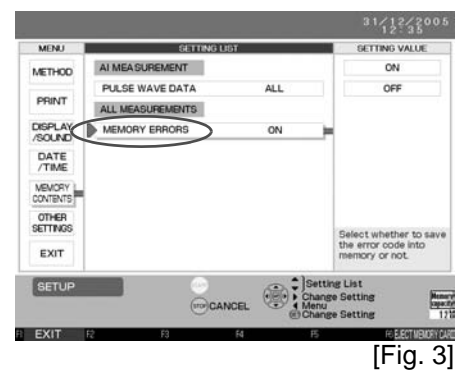
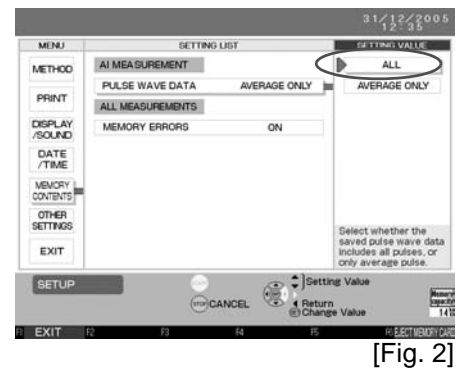
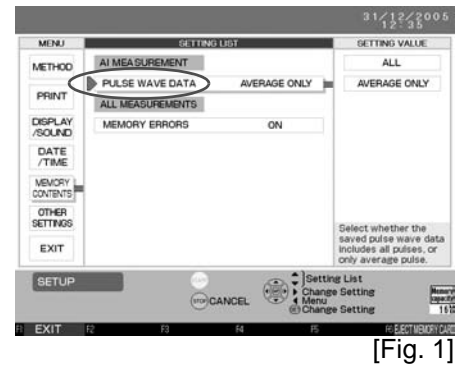
The default setting is [AVERAGE ONLY]. [Fig. 2]

4. Press the SET button to accept the setting value.
5. Press the F1 key [EXIT] to return to the default screen.
Saving all waveforms greatly reduces the number of measurements that can be saved to the memory card.
(Refer to “The Amount of Data That Can Be Stored on the Memory Card” in Step 4, Section 18.10.)

4. To change the [MEMORY ERRORS] setting under [SETTING LIST]

Set whether the status under which an error occurs is saved.

1. Move the [▶] cursor to [MEMORY ERRORS]. [Fig. 3]
2. Press the SET or [▶] button to move the [▶] cursor to [SETTING VALUE].
3. Move the [▶] cursor to the desired setting, selecting from [ON] or [OFF] under [SETTING VALUE]. [Fig. 4]
The default setting is [ON].
4. Press the SET button to accept the setting value.
5. Press the F1 key [EXIT] to return to the default screen.

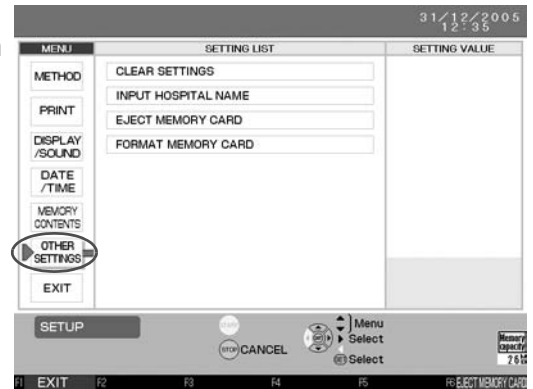


18.8. Returning to the Default Settings

It is possible to restore the system settings to the default settings.
Hospital name will remain.

1. Press the F5 key to enter the [SET UP] screen.
(Refer to Section 18.2.)

2. Move the [▶] cursor to [OTHER SETTINGS] under the [MENU] column and press the SET or [▶] button to move the [▶] cursor to [SETTING LIST]. [Fig. 1]



[Fig. 1]

3. Return to default settings.

1. Move the [▶] cursor to [CLEAR SETTINGS]. [Fig. 2]



[Fig. 2]

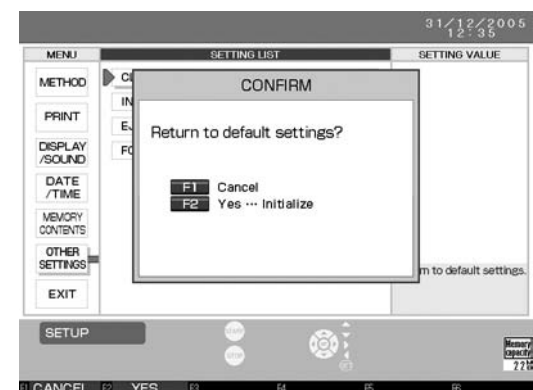
2. Press the SET button.

The confirmation “Return to default settings?” will be displayed. Press the F2 key [YES] to restore the default settings. [Fig. 3]

Press the F1 key [CANCEL] to avoid restoring the defaults settings.

The original system settings will be restored in approximately 3 seconds.

After executing [CLEAR SETTINGS], the previous settings cannot be recovered.



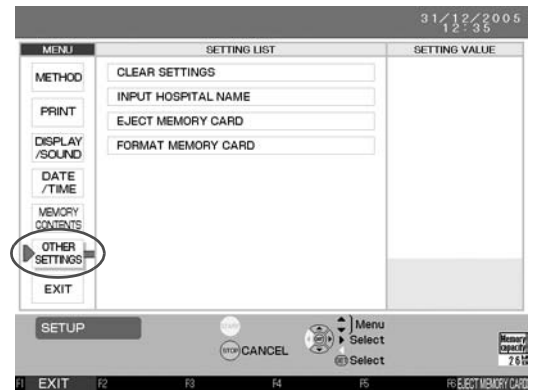
[Fig. 3]

3. Press the F1 key [EXIT] to return to the default screen.

18.9. Registering Hospital Name

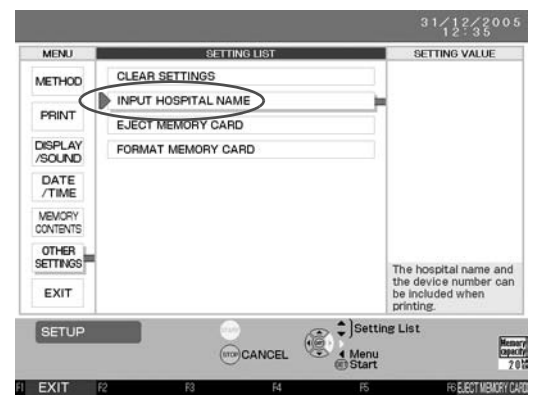
If a hospital name is registered, it is possible to store it with measurement results:
The name will be printed with measurement results when it is stored.

1. Press the F5 key to enter the [SET UP] screen.
(Refer to Section 18.2.)
2. Move the [▶] cursor to [OTHER SETTINGS] under the menu column and press the SET or [▶] button to move the [▶] cursor to [SETTING LIST].



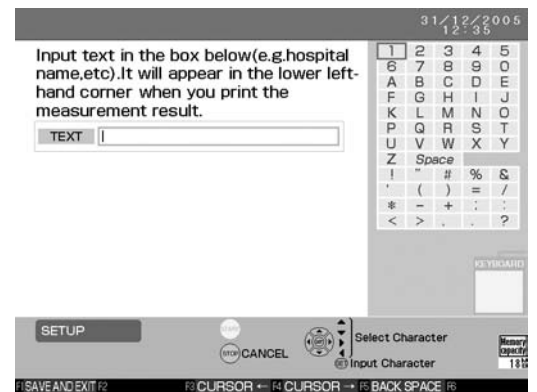
[Fig. 1]

3. Move the cursor to [INPUT HOSPITAL NAME] and press the SET key.



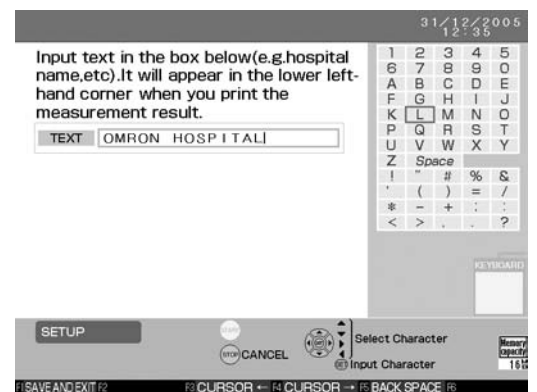
[Fig. 2]

4. Input a hospital name.
(Refer to “How to Enter Text” in step 2, Section 17.1. for details on text entry.)
The field can contain up to 20 characters.



[Fig. 3]

5. Press the F1 key [SAVE AND EXIT] to return to the default screen.
Change of hospital name does not affect measurement results.



[Fig. 4]

18.10.Memory Card

If it becomes necessary to change the memory card once it becomes nearly full, it is possible to copy patient ID information that is already registered on the old card to a new card. Only the ID information will be copied. The measurement results will not be copied.

1. Press the F5 key to enter the [SET UP] screen. (Refer to Section 18.2.)

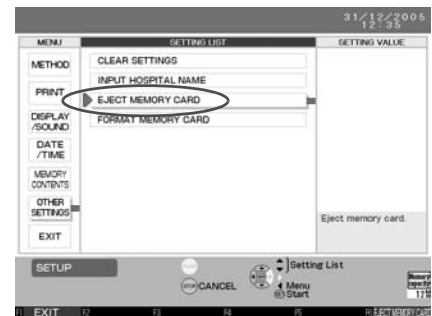
2. Move the [▶] cursor to [OTHER SETTINGS] under the [MENU] column and press the SET or [▶] button to move the [▶] cursor to [SETTING LIST]. [Fig. 1]



[Fig. 1]

3. How to eject and replace the memory card

1. Move the [▶] cursor to [EJECT MEMORY CARD]. [Fig. 2]



[Fig. 2]

2. Press the SET button.

The confirmation message [Copy ID DATA to another memory card?] is displayed. [Fig. 3]

The memory card can be also rejected by pressing the F6 key [EJECT] after step 1. Follow the steps thereafter.



[Fig. 3]

3. If you want to transfer the stored data to the next card inserted, press the F2 key [Yes].

* The message [Push eject button, remove the memory card and insert a new memory card.] will be displayed.

If not copying, press the F3 key [No].

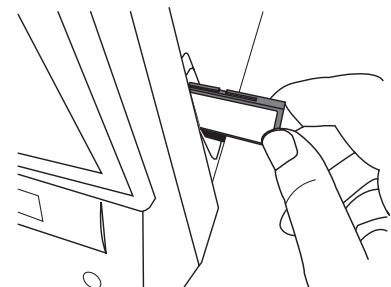
* The message [Memory card can now be ejected.] will be displayed.

4. Press the eject button on the right side of the main unit. It will unlock and eject the card.

5. Insert a new memory card. [Fig. 4]

If you selected copy above, using the F2 key [YES], the message [Now copying ID DATA. Do not touch memory card.] will be displayed.

* If the inserted memory card already has finished saving data, the confirmation message [Data is already saved on this memory card. Do you still want to format it?] will be displayed. To format the card, press the F2 key [YES]; to skip formatting, press the F1 key [CANCEL].



[Fig. 4]

Even if it is not necessary to copy ID information, be sure to execute the [Eject memory card] procedure before removing the card, or take the card out after the device has been turned off. If a card is removed improperly, the next card inserted will not be recognized. It can also cause data corruption.

6. Press the F1 key [EXIT] to return to the default screen.

4. Delete all the data in the memory card.

1. Enter the Setup Screen. (Refer to Section 18.2.)
2. Move the [▶] cursor to [OTHER SETTINGS] under the menu column and press the SET or [▶] button to move the [▶] cursor to [SETTING LIST].
3. Press the [▼] key and move the [▶] cursor to [FORMAT MEMORY CARD]. [Fig. 5].



[Fig. 5]

4. Press the SET button.

The confirmation message “All data will be deleted. Do you wish to format?” will be displayed. Press the F2 key to start formatting. [Fig. 6]

To stop formatting, press the F1 key [CANCEL].

Formatting the memory card will take approximately 3 seconds.



[Fig. 6]

* Back up the data memory card on a computer regularly. Refer to the instruction manual of your computer if you have questions regarding how to save memory card data to your computer.

The Amount of Data That Can Be Stored on the Memory Card

If PULSE WAVE DATA is AVERAGE ONLY, data for approximately 6,400 measurements can be saved on the enclosed memory card (capacity 128MB). If PULSE WAVE DATA is ALL, the data for approximately 320 30 sec measurements can be saved.

* Do not use any memory cards except those recommended by OMRON.

5. Press the F1 key [CANCEL] to return to the default screen.

18.11.Keyboard

A keyboard for the HEM-9000AI is sold separately. The keyboard offers the same functionality as the buttons in front of the main unit, or the character palette on the screen.

1. How to connect the keyboard.

Connect the keyboard to USB connector 1 or 2 on the back of the main unit.

[KEYBOARD CONNECTED] is displayed on the right side of the main unit screen, and characters and signs that you can input are also displayed.

Even if you connect the keyboard, the F1 through F6 keys on the front of the main unit, the buttons on the main unit and the main character palette on the main unit can still be used.

Function keys only for keyboard

Character keys	Numbers, character, symbols
F1 - F6	Display function keys
← key	Move the cursor 1 character to the left
→ key	Move the cursor 1 character to the right
BackSpace key	Delete a previous character and leave it blank
Space key	Input a space
Tab key, Enter key, ↓ key	Move to the next item/field
Shift+Tab key, ↑ key	Move to the previous field
Delete key	Delete the character in front of the cursor
M key	Male is selected at the gender selection
F key	Female is selected at the gender selection

Do not connect any device other than a keyboard to the main unit USB connectors and use only an OMRON designated keyboard.

19. Calibration Measurement

It is recommended that you have the monitor inspected every two years to ensure it is accurate and functioning correctly.

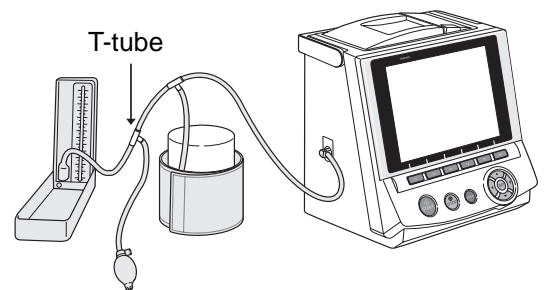
19.1. How to Execute a Test Measurement

You will need:

- (1) A mercury blood pressure monitor that is accurately adjusted (including a rubber bulb)*.
- (2) 2 T-tubes
- (3) 2 air tubes
- (4) Something to wrap a cuff around such as a sturdy tube (strong material that is not damaged or deformed by inflation)

* Even a mercury blood pressure monitor might cause an error in measurement due to a lack of mercury in the mercury tank, dirt on the glass tube or clogging of the glass tube cap.

1. Connect the mercury blood pressure monitor, the rubber bulb, the main unit and the T-tube as shown in [Fig. 1], to the right



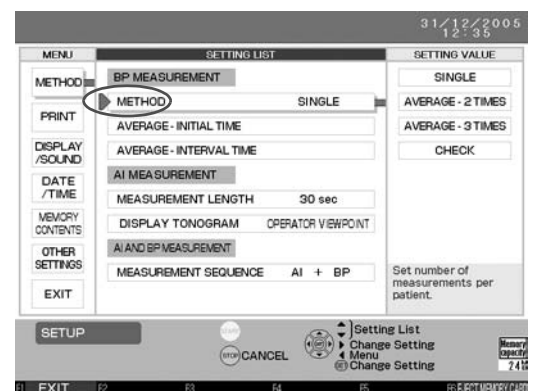
[Fig. 1]

2. Press the F5 key to enter the [SETUP] screen. [Fig. 2]



[Fig. 2]

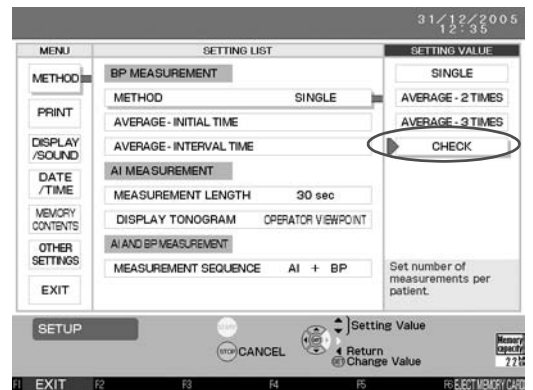
3. Move the [] cursor to [METHOD] under [BP MEASUREMENT] in the [SETTING LIST] column. [Fig. 3]



[Fig. 3]

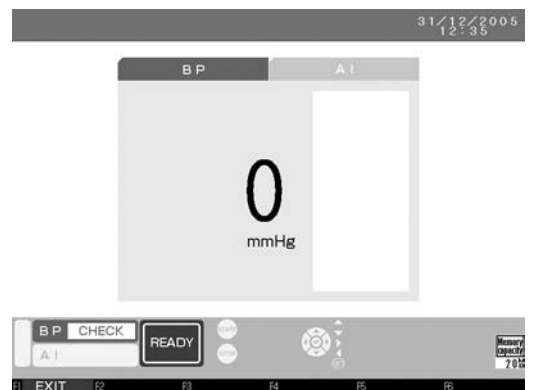
EN

4. Move the [▶] cursor to [CHECK] under [SETTING VALUE]. [Fig. 4]



[Fig. 4]

5. Press the SET button.
(The [CHECK] screen will be displayed.) [Fig. 5]



[Fig. 5]

6. Firmly wrap the cuff on a strong tube-like material.
7. Close the exhaust valve of the rubber bulb, and inflate to an appropriate value (target pressure). The pressure value is displayed.
8. Compare values of the main unit and the mercury blood pressure monitor.
9. Open the exhaust valve of the rubber bulb, and deflate.
10. Press the F1 key to return to the default screen.

Check result

- (1) In the measuring rule, the test tolerance of blood pressure monitor (accuracy of pressure when shipped from the factory) should not exceed 3 mmHg.
- (2) If the CHECK result is +/- 3 mmHg or above, contact the dealer where you purchased this unit or OMRON.

20.Introduction to Troubleshooting

How to deal with malfunctions

Use the following procedure when a malfunction or error occurs.

- (1) Remove the AI sensor unit and the cuff from the patient.
- (2) Turn off and unplug the power cord from the outlet.
- (3) Display "Out of Order, Do Not Use" on this device, and stop using the device.
- (4) Contact OMRON.

The HEM-9000AI will identify several operator or user errors.

As the display screen notifies users of errors, the errors will be categorized on screen as blood pressure measurement errors or AI errors.

Blood pressure measurement errors and AI errors are separately listed in Error List. (Refer to Section 21.)

21. Error List

Error Codes for Blood Pressure Measurement

Error No.	Error Name	Error Message on Display	Error Content	Action
E01	Inflation Error	The cuff was not inflated properly. Blood pressure was not measured.	Required cuff pressure was not achieved within the allotted time after inflation began.	<ul style="list-style-type: none"> • Is the air tube connecting the cuff and the main unit loose? Make sure that it is properly connected before measuring.
E02	Deflation Error	The cuff was not deflated properly. Blood pressure was not measured.	Measurement was not possible due to one of the following errors. <ul style="list-style-type: none"> • The speed of deflation was too fast during measurement. • The speed of deflation was too slow during measurement. • The measurement was not finished in the allotted time after starting measurement. 	<ul style="list-style-type: none"> • Is the air tube connecting the cuff and the main unit bent or kinked? Make sure that it is pulled straight before measuring. • Inflation will take longer than normal if the cuff is wrapped loosely around the arm. Make sure that the cuff is wrapped properly around the arm when taking a measurement. • Is air leaking from the cuff bladder? If yes, replace the cuff.
E03	Overpressure Error	The cuff pressure exceeded 299 mmHg. Measurement was interrupted.	The device cannot measure. <ul style="list-style-type: none"> • The cuff pressure exceeded 299 mmHg. 	<ul style="list-style-type: none"> • Is the air tube connecting the cuff and the main unit bent or kinked? Make sure that it is pulled straight before measuring.
E04	Insufficient Inflation Error	Measurement was not possible due to insufficient inflation.	The device cannot measure. <ul style="list-style-type: none"> • The cuff is not inflating sufficiently. 	<ul style="list-style-type: none"> • Check to make sure that the range, index and the artery position marks on the cuff are aligned properly. • Make sure that the patient does not move their arm or body during measurement.
E05	Indeterminable Blood Pressure Error	Blood pressure was not measured due to an irregular pulse wave or similar problem.	An irregular pulse wave or similar problem prevented the blood pressure from being measured.	<ul style="list-style-type: none"> • Measurement cannot be taken properly if the cuff is wrapped too loosely around the arm. • Make sure that the cuff is wrapped properly (snug) around the arm when taking a measurement.
E06	Low Pulse Level Error	The pulse wave is too weak to detect. Measurement was not possible.	The pulse wave was too weak to measure the blood pressure.	<ul style="list-style-type: none"> • Measurement cannot be taken properly if the cuff is wrapped too loosely around the arm. • Make sure that the cuff is wrapped properly around the arm (snug) when taking a measurement. • Do not wrap the cuff around the arm over clothing. Measurement cannot be taken properly if the cuff is wrapped around bulky clothing or a rolled-up sleeve.

Error No.	Error Name	Error Message on Display	Error Content	Action
E07	Blood Pressure Error	The reading was not accurately taken. The result of blood pressure measurement will not be displayed.	An abnormal measurement value was calculated.	<ul style="list-style-type: none"> • Check for arrhythmia. Make sure that the patient does not move their arm or body during measurement.
E08	Pulse Rate Error	The pulse rate is out of range.	<p>The device cannot measure.</p> <ul style="list-style-type: none"> • The pulse is not in the range of 30-199 pulses per minute. 	
E09	Device Error	Main unit malfunction. Turn off main power supply switch.	Main unit malfunction.	<ul style="list-style-type: none"> • Turn off the power.

Error Codes for AI Pulse Wave Measurement

Error No.	Error Name	Error Message on Display	Error Content	Action
E50	AI Pulse Wave Sensor Unit Malfunction.	Abnormality is detected in the output of the AI pulse wave sensor unit.	An error has occurred in the AI pulse wave sensor unit.	<ul style="list-style-type: none"> • Turn the power off, turn it back on and check the pulse wave sensor unit. If this does not solve the problem, contact OMRON.
E51	AI Pulse Wave Sensor Unit Disconnected.	The signal from the AI pulse wave sensor unit cannot be detected.		
E52	AI Pulse Wave Sensor Malfunction.	Abnormality is detected in the output of the AI pulse wave sensor unit.		
E53	AI Pulse Wave Sensor Error.	The pulse wave cannot be accurately detected.	An error has occurred in the AI pulse wave sensor unit.	<ul style="list-style-type: none"> • There is a possibility the AI pulse wave sensor is not on the artery or that the wrist belt is loose. Reattach the AI pulse wave sensor unit properly. Refer to Section 9.2. Retake the measurement.
E54	AI Pulse Wave Sensor Error.	Abnormality is detected in the output of the AI pulse wave sensor unit.	An error has occurred in the AI pulse wave sensor unit.	<ul style="list-style-type: none"> • Turn the power off and check the pulse wave measurement unit connection. If the error cannot be solved by the suggested action, contact OMRON.
E55	AI Pulse Wave Sensor Error.			
E56	AI Pulse Wave Sensor Unit Malfunction.		There is a circuit failure in the AI pulse wave sensor unit.	<ul style="list-style-type: none"> • Turn off the main unit.
E60	Air Leakage Error.	There is air leaking in the AI pulse wave measurement unit.	An error has occurred in the AI pulse wave measurement unit pressure control system.	<ul style="list-style-type: none"> • Turn off the power and check the AI pulse wave measurement unit air tube connection.
E61	Deflation Error.	The cuff was not deflated properly. Pulse wave was not measured.		
E62	Rapid Exhaust Error.	Pulse wave was not measured.		
E63	Inflation Pump Error.	The cuff was not inflated properly. Pulse wave was not measured.		
E64	Intake Pump Error.	There is air leaking in the AI pulse wave measurement unit.	An error has occurred in the AI pulse wave measurement unit pressure control system.	<ul style="list-style-type: none"> • Check the AI pulse wave measurement unit air tube connection.
E65	AI Pulse Wave Measurement Unit Sensor Error.	AI pulse wave measurement unit malfunction.	An error has occurred in the AI pulse wave measurement unit pressure control system.	<ul style="list-style-type: none"> • Turn off the power and check the AI pulse wave measurement unit air tube connection.

Error No.	Error Name	Error Message on Display	Error Content	Action
E66	Overpressure Error.	Excessive pressure was applied to the AI pulse wave sensor unit.	Measurement error Too much pressure is on the sensor.	<ul style="list-style-type: none"> There is a possibility that the AI pulse wave sensor hit against bone or something hard. After reviewing Section 9.2., retake the measurement.
E67	Flash ROM Aberration.	AI pulse wave measurement unit malfunction.	The AI pulse wave measurement unit has failed.	<ul style="list-style-type: none"> Turn off the power. Turn the power back on. If the problem is not solved, contact OMRON.
E70	AI Pulse Wave Sensor is stored.	Measurement started while the AI pulse wave sensor was still in the storage clip.	Measurement began while the AI pulse wave sensor was stored.	<ul style="list-style-type: none"> Follow the instructions for measurement preparation. Refer to Section 9.
E71	AI Pulse Wave Sensor is out of storage.	Put the AI pulse wave sensor back in the storage clip.	The AI pulse wave sensor has been out of storage for an extensive period of time.	<ul style="list-style-type: none"> While holding down the slide stoppers on both sides, place the AI pulse wave sensor in its original position.
E72	No Pulse Wave Found.	The pulse wave cannot be accurately detected.	The pulse wave is not detectable.	<ul style="list-style-type: none"> There is a possibility that the AI pulse wave sensor is not on the artery. Reattach the AI pulse wave sensor unit properly. Refer to Section 9.2. Retake the measurement.
E73	Body Movement Error.	The pulse wave was not accurately detected due to body movement or vibration.	The pulse wave was not accurately detected due to body movement.	<ul style="list-style-type: none"> Check for arrhythmia. Make sure that the patient does not move their arm or body during measurement.
E74	Operation Aberration.	Abnormal operation is detected. Hold down pressure was manually set outside the range.	Measurement Error / Detect abnormal operation.	<ul style="list-style-type: none"> After reviewing Section 14., retake the measurement.
E75	Too Much Time for Measurement.	Measurement was interrupted due to time-out failure. Measurement time exceeded 5 minutes.	Measurement Error / Inflation time exceeds 5 minutes.	<ul style="list-style-type: none"> Reattach the AI pulse wave sensor unit properly. Refer to Section 9.2. Retake the measurement.
E76	Communication Error.	Communication error is detected between the main unit and the AI pulse wave measurement unit.	The AI pulse wave measurement unit is not communicating with the main unit.	<ul style="list-style-type: none"> The main unit might not be properly connected. After double-checking the cable connection, retake the measurement.
E77	Communication Error.	AI pulse wave measurement unit.	The AI pulse wave measurement unit was not communicating with the main unit.	<ul style="list-style-type: none"> Retake the measurement.
E80	Best Pressure Uncalculated.	The AI pulse wave sensor unit could not detect a pulse.	An irregular pulse wave or similar problem prevented the AI from being measured.	<ul style="list-style-type: none"> There is a possibility that the AI pulse wave sensor is not on the artery. After reviewing Section 9.2., retake the measurement.

Error No.	Error Name	Error Message on Display	Error Content	Action
E81	Measurement Value Aberration.	The reading was not accurately taken. The result of the pulse wave measurement will not be displayed.	Detect an abnormal measurement value.	<ul style="list-style-type: none"> There is a possibility that the AI is less than 30% or larger than 150%. Confirm the measured pulse waveform. After reviewing Section 9.2. and Section 14., retake the measurement.
E82	Abnormal average value calculation.		An irregular pulse wave or similar problem prevented the average value from being measured.	<ul style="list-style-type: none"> There is a possibility that the AI pulse wave sensor is not on the artery. After reviewing Section 9.2. and Section 14., retake the measurement.
E85	Position Error.	The AI pulse wave sensor is not positioned on the artery. Slide the AI pulse wave sensor unit in direction 'A' and restart measurement.	An artery is not under the sensor.	<ul style="list-style-type: none"> Slide the AI pulse wave sensor unit one or two scales in the indicated direction and restart the measurement. For complete information refer to Section 12.1.
E86	Position Error.	The AI pulse wave sensor is not positioned on the artery. Slide the AI pulse wave sensor unit in direction 'B' and restart measurement.	An artery is not under the sensor.	<ul style="list-style-type: none"> Slide the AI pulse wave sensor unit one or two scales in the indicated direction and restart the measurement. For complete information refer to Section 12.1.
E87	Unstable Blood Pressure Measurement - Reliability Compromised	Unstable blood pressure measurement. Measurement results may be compromised.	The pulse wave sensor detected a blood pressure fluctuation.	<ul style="list-style-type: none"> Ensure that the patient is at rest and retake the measurement.
E88	Unstable Blood Pressure Measurement - Invalid Measurement	Unstable blood pressure measurement. Measurement results may be compromised. cSBP cannot be calculated.	The pulse wave sensor detected a blood pressure fluctuation.	<ul style="list-style-type: none"> Ensure that the patient is at rest and retake the measurement.
E89	Body Movement - Invalid Measurement	Unstable blood pressure measurement due to body or device movement, Measurement results may be compromised. cSBP cannot be calculated.	Body movement is detected.	<ul style="list-style-type: none"> Ensure that the patient is at rest and retake the measurement.

General Error Codes

Message Dialog		Action
E10	Main unit malfunction. Turn off main power supply switch.	Turn off the power. Turn the power back on. If the problem is not resolved, contact OMRON.
E19	End of Calendar. Unable to continue. Change the date and time settings in the settings menu after power has been restored to the system.	The calendar function cannot be used after December 31, 2030.
E13 E20	Printer error. Turn off main power supply switch.	Turn off the power. Turn the power back on. If the problem is not resolved, contact OMRON.
E21	No printer paper. Load paper.	Open the printer cover and load paper. (Refer to Section 8.5.)
E22	Printer cover is open. Close cover.	Close the printer cover.
E23	Printer jam. Remove jammed paper.	Open the printer cover and remove the paper. (Refer to Section 8.5.)
E42	This memory card has not been formatted. Push the eject button, remove the memory card and insert a new memory card.	Obtain a new memory card and insert it into the memory card slot on the main unit.
E45	The measurement data has not been saved.	Retake the measurement.
E46	This system was not properly terminated. The latest measurement data has not been saved.	Data was not saved since the power was disconnected or interrupted during measurement.
E47	There is no memory card inserted in the device. Therefore the operation was terminated.	Memory card has not been inserted. Insert a memory card into the slot on the right side of the main unit.
E48	ID DATA has not been copied.	Try to copy the information again following the procedure on Section 18.10. starting from the step on copying ID information.
Replace clock battery.		Contact OMRON.
Insert memory card.		Memory card has not been inserted. Insert a memory card into the slot on the right side of the main unit.
This memory card cannot be used.		Format the memory card (Section 18.10.) or replace it with a different memory card.
When the memory card is not properly ejected, important DATA may be lost. Turn the power off and back on in order to insert a memory card.		Turn off the power. Reinsert the memory card and turn the power back on.
Memory capacity is insufficient. Replace with empty memory card.		Eject the memory card and replace it with a new one. (Section 18.10.)
Current memory card cannot be used.		Turn off the power. Reinsert the memory card and turn the power back on.
This value is out of range.		The number just entered was not appropriate. Reenter the number.

If the errors cannot be solved by the suggested actions, contact OMRON.

22. Specifications

Name	OMRON Non - Invasive Blood Pressure Monitor with Augmentation Index
Model	HEM-9000AI
Power Supply	AC100 V - 240 V 50/60 Hz 150 VA
Electric Shock Protection Type	Class I
Operating Temperature and Humidity	+10 - +40°C / 15 – 85% RH
Storage Temperature and Humidity	-20 - +60°C / 10 – 95% RH
Weight	Main unit approx. 5.3 kg (Power plug and connection cable included; cuff, printer paper and memory card not included.) AI Measurement Unit 1.3 kg (Including the AI pulse wave sensor unit)
External Dimensions	Main unit : W 240 mm x H 260 mm x D 235 mm AI Pulse wave sensor unit : W 140 mm x H 55 mm x D 60 mm AI Pulse wave Measurement Unit : W 170 mm x H 145 mm x D 315 – 410 mm
Package Contents	Main unit, AI Pulse Wave Measurement Unit, Adult arm cuff (in 3 sizes - S, M and L with built-in air bag), air tube (1.3 m), connection cable, power cord, printer paper, memory card (128MB), instruction manual, Quick Start Instruction Manual
Options	large size adult arm cuff, medium size adult arm cuff, small size adult arm cuff, air tube (1.0 m), wheeled cart, printer paper, keyboard, memory card, power code

Basic Specifications for Blood Pressure Measurement

Display Method	8.4 inch (800 x 600 pixels) colour TFT LCD
Degree of Protection	Type BF
Measurement Method	Oscillometric Method
Measurement Range	Pressure 0 – 299 mmHg Pulse 30 – 199 pulse/minute
Accuracy	Pressure: Within ± 3 mmHg Pulse Rate: Within $\pm 5\%$ of reading
Inflation	Automatic Inflation Method by Pump
Deflation	Automatic Deflation Method by Electromagnetic Control Valve
Exhaust	Automatic Rapid Exhaust Method by Electromagnetic Control Valve
Pressure Detection	Electrostatic Capacity Method Semiconductor Pressure Sensor

Basic Specifications for Pulse Wave Measurement

Measurement Method	Applanation Tonometry
Degree of Protection	Type BF
Measurement Range	Pulse 30 – 199 pulse/minute
Inflation	Automatic Inflation Method by Pump
Deflation	Automatic Deflation Method by Electromagnetic Valve
Exhaust	Automatic Rapid Exhaust Method By Electromagnetic Valve

Included Memory Card (128MB)

Storable Data Amount	Without PULSE WAVE DATA: approximately 6,400 measurements With PULSE WAVE DATA: approximately 320 measurements (for 30-second measurements)
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* Please understand that specifications may be changed without prior notice.

This device fulfills the provisions of the EC directive 93/42/EEC (Medical Device Directive). The blood pressure monitor unit is designed according to the European Standard EN1060, Non invasive sphygmomanometers Part1: General requirements and Part 3: Supplementary requirements for electromechanical blood pressure measuring systems.



CE 0197

Important information regarding Electro Magnetic Compatibility (EMC)

With the increased number of electronic devices such as PC.s and mobile (cellular) telephones, medical devices in use may be susceptible to electromagnetic interference from other devices. Electromagnetic interference may result in incorrect operation of the medical device and create a potential unsafe situation. Medical devices should also not interfere with other devices.

In order to regulate the requirements for EMC (Electro Magnetic Compatibility) with the aim to prevent unsafe product situations, the IEC60601-1-2 standard has been implemented. This standard defines the levels of immunity to electromagnetic interferences as well as maximum levels of electromagnetic emissions for medical device.

This medical device manufactured by OMRON Healthcare conforms to this IEC60601-1-2:2001 standard for both immunity and emissions.

Nevertheless, special precautions need to be observed:

- Do not use mobile (cellular) telephones and other devices which generate strong electrical or electromagnetic fields, near the medical device.

This may result in incorrect operation of the unit and create a potentially unsafe situation.

Recommendation is to keep a minimum distance of 7 m. Verify correct operation of the device in case the distance is shorter.

Further documentation in accordance with IEC60601-1-2:2001 is available at OMRON Healthcare Europe at the address mentioned in this instruction manual.

Documentation is also available at www.omron-healthcare.com.

Correct Disposal of This Product (Waste Electrical & Electronic Equipment)

This marking shown on the product or its literature, indicates that it should not be disposed with other household wastes at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this from other types of wastes and recycle it responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can make this item for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract. This product should not be mixed with other commercial wastes for disposal.

This product does not contain any hazardous substances.



This device uses a lithium battery and a mercury-contained lamp. When disposing, follow the national regulations for the disposal of them.

Subsidiary	OMRON HEALTHCARE UK LTD. Opal Drive Fox Milne, Milton Keynes MK 15 0DG, United Kingdom
Subsidiary	OMRON Medizintechnik Handelsgesellschaft m.b.H. Windeckstr. 81a, 68613 Mannheim, Germany www.omron-medizintechnik.de
Subsidiary	OMRON SANTÉ FRANCE SAS 14, rue de Lisbonne, 93561 Rosny-sous-Bois Cedex, France
Manufacturer	OMRON HEALTHCARE CO., LTD. 24, Yamanouchi Yamanoshita-cho, Ukyo-ku, Kyoto, 615-0084 Japan 
EU-representative	OMRON HEALTHCARE EUROPE B.V. Kruisweg 577, 2132 NA Hoofddorp, The Netherlands www.omron-healthcare.com 

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