BM1 User's Manual

Patient Monitor

Rev. 1.4

Bionet

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Note
The information in this manual only applies to BM1 patient monitor software version 1.034 . Due to continuing product innovation, specifications in this manual are subject to change without notice.

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1.1 CE Standard Information

Electromechanical safety standards met:

Information supplied by the manufacturer of medical devices

1. **EN 60601-1:1990+A1:1993+A2:1995+A13:1996 (IEC 60601-1:1988+A1:1991+A2:1995)**

   Medical electrical equipment Part1: General requirements for safety

2. **EN 60601-1-2:2001 + A1:2006 (IEC 60601-1-2:2001+A1:2004)**

   Electromagnetic Compatibility Requirement and tests

3. **EN 55011:2007+A2:2007 Group 1 Class B(CISPR11)**

   Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment

4. **IEC 60601-1-4:1996+A1:1999**

   Part 1-4 General requirements for safety Collateral standard: Programmable electrical medical system

5. **IEC 60601-1-6:2006**

   Part 1-6 General requirements for safety Collateral standard: Usability

6. **IEC 60601-1-8:2006**

   Part 1-8 General requirements for safety Collateral standard: General requirements, tests and guidance for alarm systems in medical electrical equipment and medical electrical systems

7. **EN 60601-2-30:2000 (IEC 60601-2-30:1999)**

   Part 2-30: Particular requirements for the safety, including essential performance of automatic cycling non-invasive blood pressure monitoring equipment

8. **EN 60601-2-49:2001 (IEC 60601-2-49:2001)**

   Part 2-49: Particular requirements for the safety of multifunction patient monitoring equipment.

9. **EN 12470-4:2000+A1:2009** : Performance test for Temperature

   Clinical thermometers - Part 4: Performance of electrical thermometers for continuous measurement

10. **EN 1060-1:1995+A2:2009, EN 1060-3:1997+A2:2009**: Performance test for NIBP

    Non-invasive sphygmomanometers- Part 1: General requirements, Part 3: Supplementary requirements for electro-mechanical blood pressure measuring systems

11. **EN ISO 14971:2012**

    Medical devices - Application of risk management to medical devices

12. **EN ISO 9919:2009**

    Particular requirements for the basic safety and essential performance of pulse oximeter equipments for medical use.

13. **EN ISO 21647:2009** : EtCO2 test

    Medical electrical equipment -- Particular requirements for the basic safety and essential performance of respiratory gas monitors

14. **EN ISO 15223-1**

    Symbols for use in the labeling of medical devices

15. **EN 1041:2008**

1.2 Read before Use

BIONET services are always available to you.

The following are addresses and phone numbers for information, services, and product supplies.

How to Contact Us

Product Supply Information	**Bionet Ltd.** Address : #1101 11F E&C Venture Dream Tower3 38-21, Digital-Ro 31-Gil, Guro-Gu, Seoul , REPUBLIC OF KOREA 152-719 Overseas sales dept. Tel:+82-2-6300-6413 Fax : +82-2-6499-7788 E-mail : sales@ebionet.com URL : http:// www.ebionet.com

※ In the event of malfunction or failure, contact us along with the model name, serial number, and product name of the equipment.

※ If you need the supply circuit diagram, component list, description and calibration instruction etc. you can contact us and we will provide you with it.

Warranty Period

- This product is manufactured and passed through strict quality control and through inspection.

- Compensation standard concerning repair, replacement, refund of the product complies with "Consumer's protection law" noticed by Economic Planning Dept.

- We provide a 1-year warranty period.
- We will repair or replace any part of the BM1 found to be defective in usual operating circumstance for free to you.

- This warranty does not apply to any defect caused by improper use, misuse or abuse.

Warning, Caution, Note

For special emphasis on agreement, terms are defined as listed below in user's manual. Users should operate the equipment according to all the warnings and cautions.

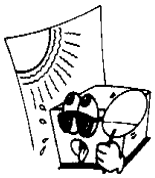
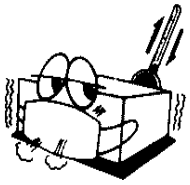
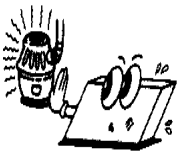
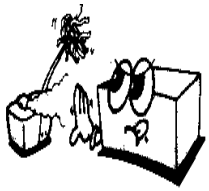
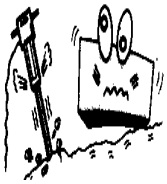
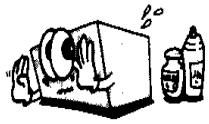
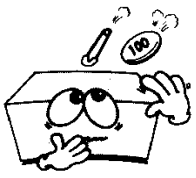
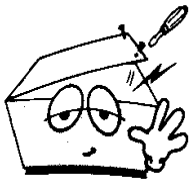
Warning
To inform that it may cause serious injury or death to the patient, property damage, material losses against the "warning" sign

Caution
To inform that it may cause no harm in life but lead to injury against the "caution" sign

Note
To inform that it is not dangerous but important "note" sign for proper installation, operation, and maintenance of the equipment.

General Precaution on Environment

- Do not keep or operate the equipment in the environment listed below.

	Avoid placing in an area exposed to moisture. Do not touch the equipment with wet hands.		Avoid exposure to direct sunlight
	Avoid placing in an area where there is a high variation of temperature. Operating temperature ranges from 10(C to 40(C. Operating humidity ranges from 30% to 85%.		Avoid using or storing in the vicinity of Electric heater
	Avoid placing in an area where there is an excessive humidity rise or ventilation problem.		Avoid placing in an area where there is excessive shock or vibration.
	Avoid placing in an area where chemicals are stored or where there is danger of gas leakage.		Avoid inserting dust and especially metal materials into the equipment
	Do not disjoint or disassemble the equipment. We take no responsibility for your actions.		Keep the power off when the equipment is not fully installed. Otherwise, equipment could be damaged.

CAUTIONS

Before Installation

Compatibility is critical to safe and effective use of this device. Please contact your local sales or service representative prior to installation to verify equipment compatibility.

Defibrillator Precaution

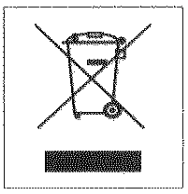
Patient signal inputs labeled with the CF and BF symbols with paddles are protected against damage resulting from defibrillation voltages. To ensure proper defibrillator protection, use only the recommended cables and lead wires.

Proper placement of defibrillator paddles in relation to the electrodes is required to ensure successful defibrillation.

Disposables

Disposable devices are intended for single use only. They should not be reused as performance could degrade or contamination could occur.

Disposal of your old appliance



1. When this crossed out wheeled bin symbol is attached to a product it means the product is covered by the European Directive 2002/96/EC.
2. All electrical and electronic products should be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or the local authorities.
3. The correct disposal of your old appliance will help prevent potential negative consequences for the environment and human health.
4. For more detailed information about disposal of your old appliance, please contact your city office, waste disposal service or the shop where you purchased the product.

Electrocute Precautions

To prevent skin burns, apply electrocute electrodes as far as possible from all other electrodes, a distance of at least 15 cm/6 in. is recommended.

EMC

Magnetic and electrical fields are capable of interfering with the proper performance of the device.

For this reason make sure that all external devices operated in the vicinity of the monitor comply with the relevant EMC requirements. X-ray equipment or MRI devices are possible sources of interference as they may emit higher levels of electromagnetic radiation.
Also, keep cellular phones and other telecommunication equipment away from the monitor.

CAUTIONS

Instruction for Use

For continued safe use of this equipment, it is necessary that the instructions are followed. However, instructions listed in this manual in no way supersede established medical practices concerning patient care.

Loss of Data

Should the monitor at any time temporarily lose patient data, the potential exists that active monitoring is not being done. Close patient observation or alternate monitoring devices should be used until monitor function is restored.

If the monitor does not automatically resume operation within 60 seconds, power cycle the monitor using the power on/off switch. Once monitoring is restored, you should verify correct monitoring state and alarm function.

Maintenance

Regular preventive maintenance should be carried out annually (Technical inspections). You are responsible for any requirements specific to your country.

MPSO

The use of a multiple portable socket outlet (MPSO) for a system will result in an enclosure leakage current equal to the sum of all individual earth leakage currents of the system if there is an interruption of the MPSO protective earth conductor. Do not use an additional extension cable with the MPSO as it will increase the chance of the single protective earth conductor interruption.

Negligence

BIONET does not assume responsibility for damage to the equipment caused by improperly vented cabinets, improper or faulty power, or insufficient wall strength to support equipment mounted on such walls.

NOTES

Power Requirements

Before connecting the device to the power line, check the voltage and frequency. Ratings of the power line are the same as those indicated on the unit's label. If this is not the case, do not connect the system to the power line until you adjust the unit to match the power source. In U.S.A, if the installation of this equipment will use 240V rather than 120V, the source must be a center-tapped, 240V, single-phase circuit.

Restricted Sale

U.S.A federal law restricts this device to sale by or on the order of a physician.

Supervised Use

This equipment is intended for use under the direct supervision of a licensed health care practitioner.

Ventilation Requirements

Set up the device in a location which affords sufficient ventilation. The ventilation openings of the device must not be obstructed. The ambient conditions specified in the technical specifications must be ensured at all times.

·Put the monitor in a location where you can easily see the screen and access the operating controls.

·This product is protected against the effects of cardiac defibrillator discharges to ensure proper recovery, as required by test standards. (The screen may blank during a defibrillator discharge but recovers within second as required by test standards.)

Interpretive Results

Interpretive results are intended only as guidance for the qualified physicians and must not be relied upon as diagnoses.

Reference Literature

Medical Device Directive 93/42/EEC

EN 60601-1/1990 +A1: 1993 +A2 : 1995 : Medical electrical equipment.

General requirements for safety

EN 60601-1-1/9. 1994 +A1 12.95: General requirements for safety.

General Precautions on Electrical Safety

Warning
Check the item listed below before operating the equipment.

1. Be sure that AC power supply line is appropriate to use. (AC100 - 240V)
2. Be sure that the power source is the one supplied from Bionet. (DC15V, 2.0A)
3. Be sure that the entire connection cable of the system is properly and firmly fixed.
4. Be sure that the equipment is completely grounded. (If not, this might cause a problem to occur in the product.)
5. The equipment should not be placed in the vicinity of electric generator, X-ray, broadcasting apparatus to eliminate electrical noise during operation. Otherwise, it may cause incorrect result.

Note
The Equipment should be placed far from generators, X-ray equipment, broadcasting equipment or transmitting wires, so as to prevent electrical noises from being generated during the operation, When these devices are near the Equipment, it can produce inaccurate measurements. For BM1, both independent circuit and stable grounding are essentially required. In the event that the same power source is shared with other electronic equipment, it can also produce inaccurate output.

Warning
Do not have contact with the patient while operating the machine It may cause serious danger to the users. Use only the provided cable.

Warning
In case the Equipment does not operate as usual or is damaged, do not use on patient, and contact a medical equipment technician of the hospital or the equipment supply division.

Note
BM1 is classified as follows: - BM1 classifies as Class **I,** BF **&** CF concerning electric shock. It is not proper to operate this Equipment around combustible anesthetic or dissolvent. - Safety level is class I regarding IEC/EN 60601-1 and the Limit of Nose is Class B concerning IEC/EN60601-1-2.

Equipment Connection

For measurements in or near the heart we recommend connecting the monitor to the potential equalization system. Use the green and yellow potential equalization cable and connect it to the pin labeled with the symbol  .

Caution
In the hospital, doctors and patients are exposed to dangerous, uncontrollable compensating currents. These currents are due to the potential differences between connected equipment The safety solution to the problem is accomplished with EN60601-1;1993.

Biocompatibility

When used as intended, the parts of the product described in this operator manual, including accessories that come in contact with the patient during the intended use, fulfill the biocompatibility requirements of the applicable standards. If you have questions about this matter, please contact BIONET or its representatives.

Maintenance and Washing Equipment Connection

There are various methods to clean the BM1 and its accessories. Please follow the methods mentioned below to avoid unnecessary damage or contamination to the Equipment.

We do not repair free of charge regardless of warranty period if it is contaminated or damaged with using dangerous material not approved for washing.

Cleaning Applied Parts

Do not permit any liquid to enter the monitor case and avoid pouring it on the monitor while cleaning. Do not allow water or cleaning solution to enter the connectors of jack cover.

Recommended cleaning agents:

Alcohol (Ethanol 70%, Iosopropanol 70%, Window cleaner)

Ammonias (Dilution of ammonia <3%, Window cleaner)

Tensides (dishwasher detergents) (Edisonite schnellreiniger®, Alconox®)

Cables and Leadwires

CAUTION
Do not use acetone or ketone solvents for cleaning; do not use an autoclave or steam cleaner.

Cables and leadwires can be cleaned with a warm, damp cloth and mild soap, or isopropyl alcohol wipes. For more intensive disinfecting (near sterile) Ethylene Oxide (ETO) is acceptable but will reduce the useful lifetime of the cable or leadwire.

CAUTION
The decision to sterilize must be made per your institution's requirements with an awareness of the effect on the integrity of the cable or lead wire.

Note
The Equipment needs a safety inspection once a year. Please refer to user's guide or service manual for the examine specifications.

Please check carefully both frame and sensor, after cleaning the Equipment, Do not use equipment that is worn out or damaged.

At least once a month, clean and wipe off the frame by using a soft cloth after wetting it with water and alcohol. Do not use lacquer, thinner, ethylene, or oxidizer which may lead to damage to the equipment.

Make sure both cables and accessories are free of dust or contaminants, and wipe them off with soft cloth wetted with warm water (40°), and at least once a week, clean them by using the clinical alcohol.

Do not submerge the accessories under any liquid or detergent. Also, make sure that no liquid penetrate into the Equipment or probes.

Disinfecting

Do not mix disinfecting solutions (such as bleach and ammonia) as hazardous gases may result.
Clean equipment before disinfecting.
Recommended disinfecting agents:
Aldehyde based (Cidex® activated dialdehyde solution, Gigasept)
Alcohol base (Ethanol 70%, Isopropanol 70%, Spitacid®, Streilium fluid®, Cutasept®, Hospisept®, Tinktur forte, Sagrosept®, Kodan®

Caution
Do not dispose of single use probe in any hazard place, Always think about environmental contamination.

Caution
There is back-up battery on board inside system. When users dispose this battery, Please conform to all local laws and regulations.

Warning
Check the electrodes of batteries before changing them.

· Operate BM1 with internal electric power supply when unsure of external ground connection or installation occur.
· Remove the 1st battery when not using equipment for a while to avoid any damage.

For other applied parts such as temperature sensors, pulse oximetry probes, and NIBP cuffs, you must consult the manufacturer for cleaning, sterilization, or disinfecting methods.

1.3 Product Components

Product Outline

BM1 monitor is a product used for monitoring biological information and occurrence of a patient. Main functions of the product include displaying information such as SpO2, NIBP and temperature, EtCO2 on its LCD screen and monitoring parameter, and alarming.

Principal Characters of Product

BM1 is a small-size multifunctional monitoring device for a patient designed to for easy usage during movement. It features DC power supply (Bridgepower,JMW128,DC 15V,2.0A). The equipment also measures major parameters such as SpO2, NIBP, temperature and pulse rate, EtCO2 displaying it on a 4.3-inch color TFT LCD screen. It also enables users to check waves and parameters and other vital signs of a patient via monitor the patient by the remote-controlled alarm system. It also enables to build a central monitoring system by linking devices used for separate patients so that one can monitor several patients at a time.

Warning
You may have distortion or signal noise when you use nonstandard or other brand's accessories. We strongly recommend you use only the authorized accessories which we supply.
Warning
BEFORE USE — Before putting the system into operation visually inspect all connecting cables for signs of damage. Damaged cables and connectors must be replaced immediately. Before using the system, the operator must verify that it is in correct working order and operating condition. Periodically, and whenever the integrity of the product is in doubt, test all functions.

Product Configuration

1. Main body of BM1 Monitor	1EA	
2. NIBP tubing (3M long)	1EA	
3. Reusable Adult cuff (25-35 Cm)		1EA
4. SpO2 sensor extension cable (2M)	1EA	
5. Reusable Adult SpO_2 Probe	1EA	
6. DC Adaptor (JMW128 made in BridgePower Corp.)	1EA	
7. IV Clamp	1EA	

Optional Products

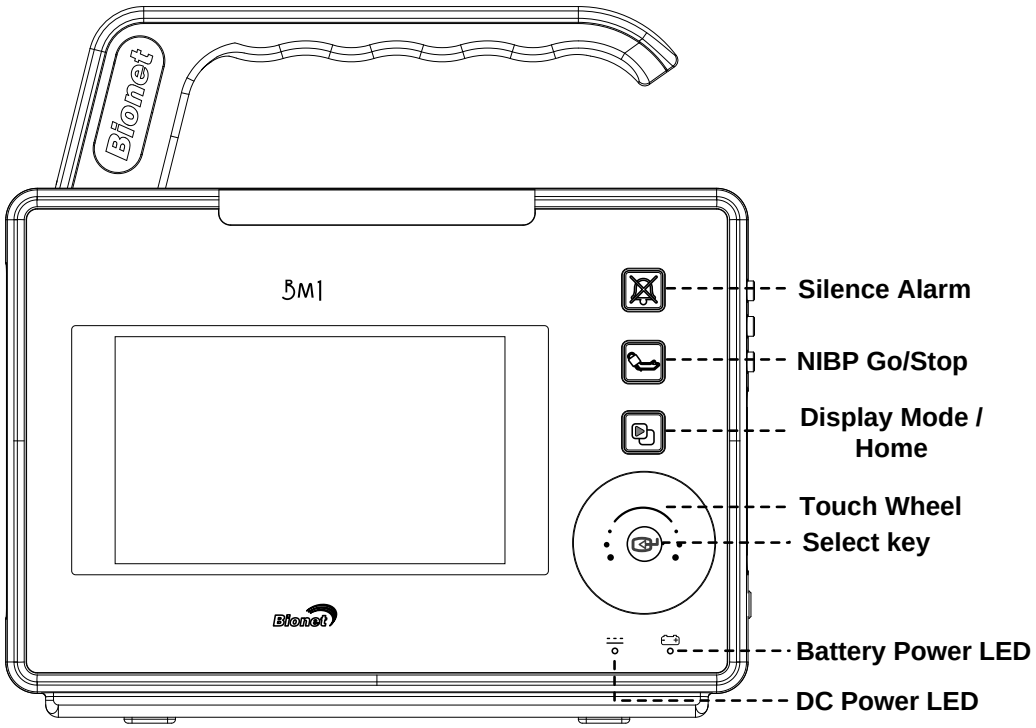
1. Temperature (YSI 400 series)
2. Temperature (Infrared Thermometer)
3. EtCO2 (LoFlo sidestream , CAPNOSTAT 5 mainstream and accessories)
4. Barcode Reader (USB)

Warning
In order to avoid electrical shock, do not open the cover. Disassembling of the equipment should be done only by the service personnel authorized by BIONET

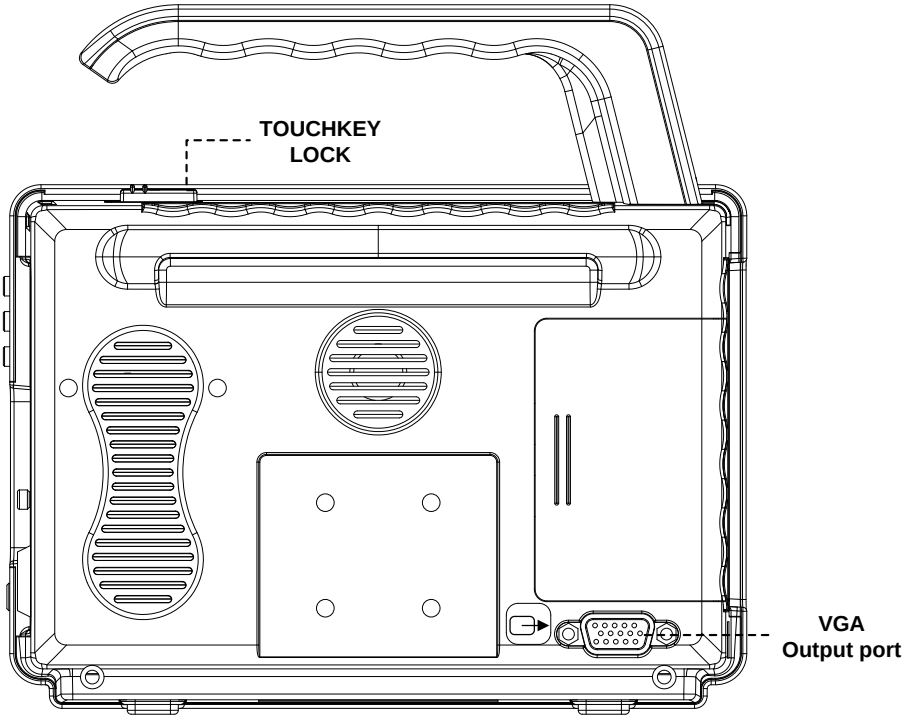
Warning
Users must pay attention on connection any auxiliary device via LAN port or nurse calling. Always consider about summation of leakage current, please check if the auxiliary device is qualified by IEC 60601-1, or consult your hospital biomedical engineer.

Product Body Configuration

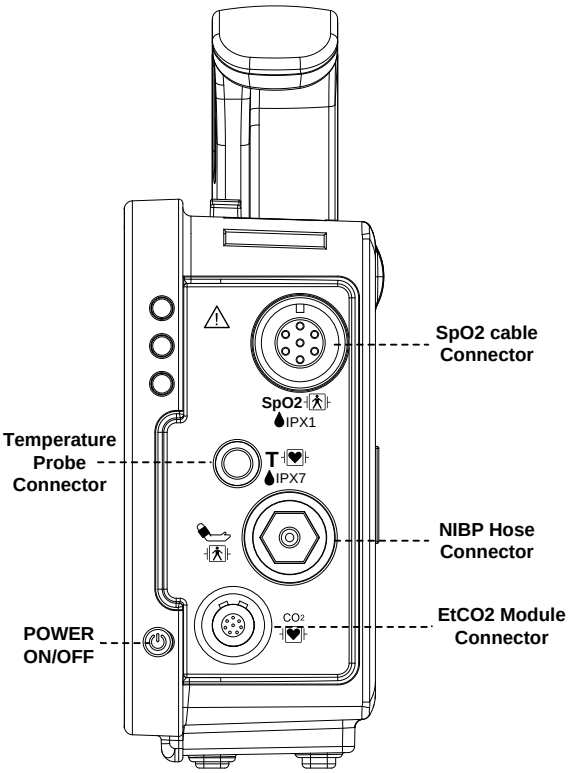
FRONT



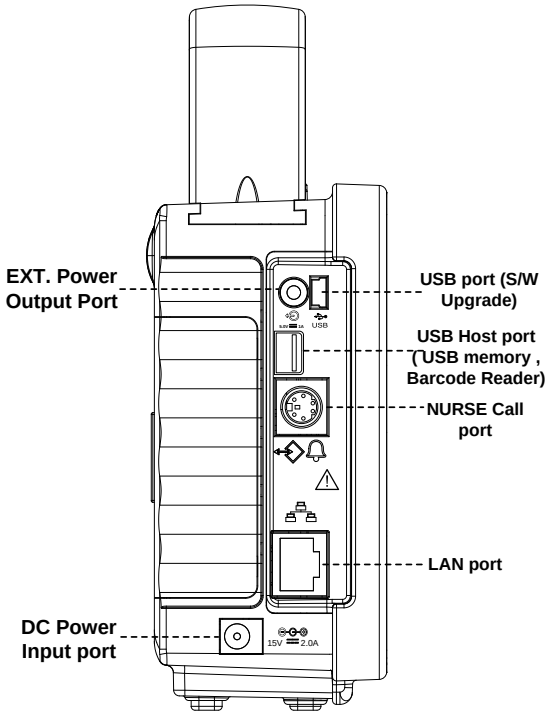
BACK



Right Side

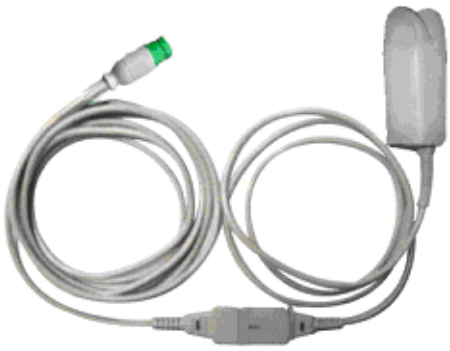


Left Side



Accessories

SpO_2 Cable +
Extension Cable

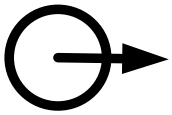
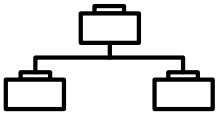
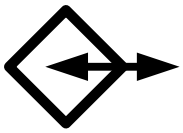
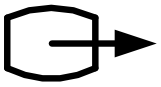
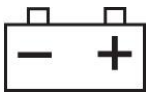


NIBP Cuff+
Extension cable

Temperature sensor
(YSI 400 series,
Option)

Equipment Sign

	ATTENTION : Consult accompanying documents
	TYPE CF APPLIED PART : Insulated (floating) applied part suitable for intentional external and internal application to the patient including direct cardiac application. "Paddles" outside the box indicate the applied part is defibrillator proof. Medical Standard Definition : F-type applied part(floating/insulated) complying with the specified requirements of IEC 60601-1/UL 2601-1/CSA 601.1 Medical Standards to provide a higher degree of protection against electric shock tan that provided by type CF applied parts.
	TYPE BF APPLIED PART : Insulated (floating) applied part suitable for intentional external and internal application to the patient excluding direct cardiac application. "Paddles" outside the box indicate the applied part is defibrillator proof. Medical Standard Definition : F-type applied part (floating/insulated) complying with the specified requirements of IEC 60601-1/UL 2601-1/CSA 601.1 Medical Standards to provide a higher degree of protection against electric shock than that provided by type BF applied parts.

	**Power On/Off**
	**USB port**
	**Output port**
	**DC Power Output**
	**LAN port**
	**Nurse Call port**
	**IN OUT PORT**
	**VGA Output**
	**DC Input Indicator**
	**Battery Input Indicator**
	**DC Power Input port**

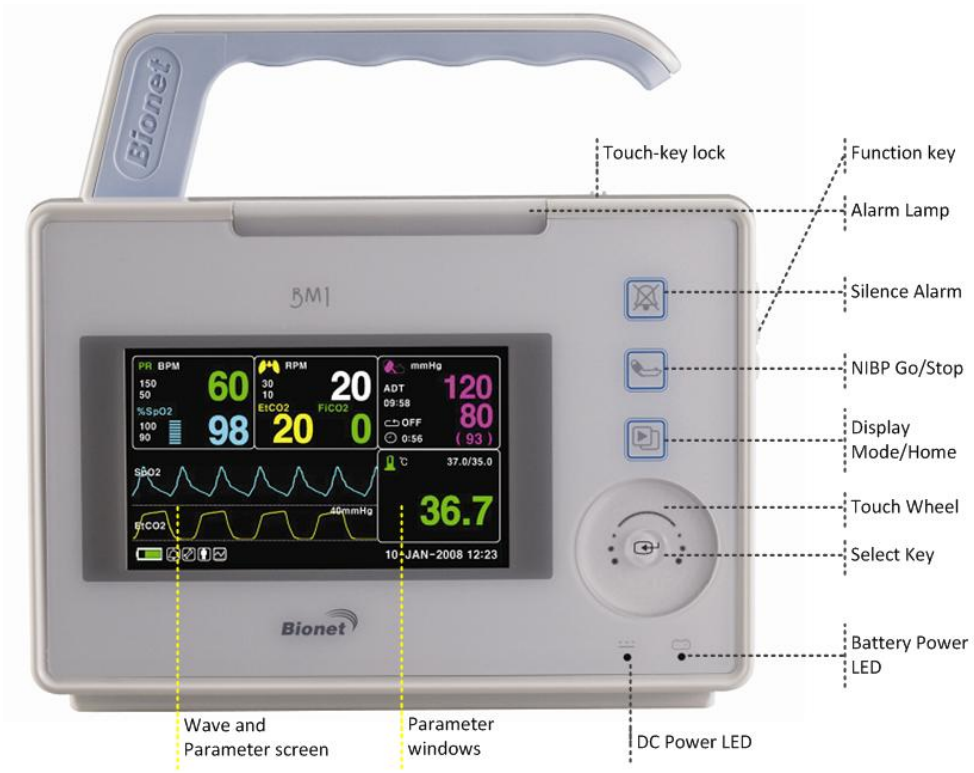
	**NIBP**
T	**Temperature**
PR	**Pulse Rate**
	**EtCO2 / Respiration**
	**Silence Alarm**
	**Display mode selection / Home**

1.4 Function and Key

External Function

The front panel of this product consists of an LCD screen and four Touch function keys and one Touch Wheel.

Operating the BM1 Patient Monitor



Operation Key

1. Alarm： Stop alarm sound.
   First press stops the current alarm for one minute
   Second press stops the all alarm for five minutes.
   Third press stops the all alarm off.
   Fourth press makes the alarm back to the original setting.
2. Blood Pressure：Manually completes measuring blood pressure.
3. Display Mode / Home : Change general display and big parametr display , and achieve Home Key function in main display in sub menu.
4. Touch Wheel Key：This key is used to select menu by turning it clock or anticlockwise to move cursors.

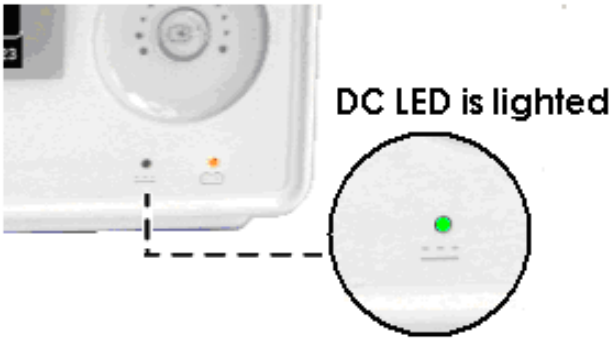
1.5 Standard Power Supply Application

DC Power

DC Power LED is lighted on when the DC Power is plugged into the inlet at the back of the product.

A press of the power key makes the machine ready for use.

DC POWER LED



Warning
This equipment must only be connected to a supply mains with protected earth.

1.6 Battery Power Supply Application

Battery power can be supplied for enabling a portable use or for use during DC power failure.

Operation

1. Battery Power LED is lighted on when the machine is in use.

2. The DC/battery power is only sustainable for 4.5 hour.

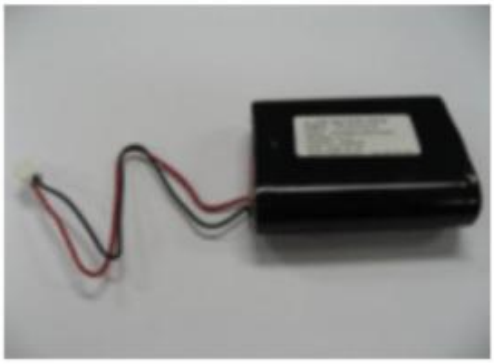
3. Battery is automatically charged when the machine is connected to DC Power Supply. Battery LED is lighted on after blinking.

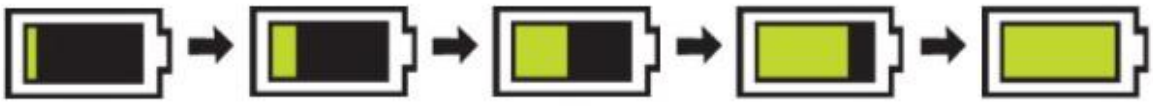
4. The charging status of the batteries is displayed with 5 green boxes, each indicating a different charging

. (0% -> 25% -> 50% -> 75% -> 100%)

- Battery: SDI1865L2203S1PMXZ(10.8V - 2200mA, Li-ion)

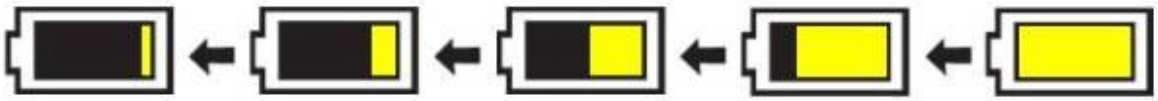
The Lithium-Ion battery is a rechargeable battery containing Lithium-Ion cells. Each battery contains an integrated electronic fuel gauge and a safety protection circuit.





5. The discharge condition of battery is indicated with on of 5 yellow boxes, each box showing a different level of charge available.

. (100% -> 75% -> 50% -> 25% -> 0%)



When the battery power remains 25%, the Low Battery icon is displayed. The power is automatically cut off after 5 minutes from the appearance of the message. The machine will no longer operate when the "Low Battery" indication is on. Charge the batteries with the power adaptor, which BIONET provided.

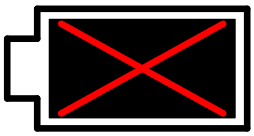
Low Battery icon : 

-Battery charging time: More than 4 hours

-Continuous battery use time: Lowest 4.5 hour to highest 5 hours continuous use (buffering)

Warning
Check the electrodes of batteries before charging them.

6. Battery status indication: When battery is disconnected from equipment or out of order, it is shown by a red `X' as shown below.



7. Low power supply: When you use the power of less than 13V, the battery indication disappears and the "LOW" indication is active.

Display of Low power supply

Note
At low power (13V or less), The charge is not working. When replacing the batteries, always remove the DC adapter and Replace.

The Impact of Lithium-Ion Battery Technology on the Battery

The following are the key points you should know about Lithium-Ion battery technology:

The battery will discharge on its own, even when it is not installed in a monitor. This discharge is the result of the Lithium-Ion cells and the bias current required for the integrated electronics.

By the nature of Lithium-Ion cells, the battery will self-discharge.

The self-discharge rate doubles for every 10°C (18°F) rise in temperature.

The capacity loss of the battery degrades significantly at higher temperatures.

As the battery ages, the full-charge capacity of the battery will degrade and be permanently lost. As a result, the amount of charge that is stored and available for use is reduced.

Conditioning Guideline

The battery in the monitor should be fully charged and discharged every six months and condition it using the battery charger.

Storage Guideline

Store the battery outside of the monitor at a temperature between 20°C to 25°C (68°F to 77°F).

When the battery is stored inside a monitor that is powered by an AC power source, the battery cell temperature increases by 15°C to 20°C (59°F to 68°F) above the room's ambient temperature. This reduces the life of the battery.

When the battery is stored inside a monitor that is continuously powered by an AC power source and is not powered by battery on a regular basis, the life of the battery may be less than 12 months. BIONET recommends that you remove the battery and store it near the monitor until it is needed for transport.

How to Recycle the Battery

When the battery no longer holds a charge, it should be replaced. The battery is recyclable. Remove the old battery from the monitor and follow your local recycling guidelines.

WARNING
EXPLOSION HAZARD — DO NOT incinerate the battery or store at high temperatures. Serious injury or death could result.

1.7 DISPLAY MODE (MONITOR OR SPOT)

You can selected display mode (Monitoring and Spot).

MONITOR : Refer to the Monitor chapter of this manual for details.

SPOT : Refer to the SPOT chapter of this manual for details.

To set the mode SETUP()>USER SERVICE>DISPLAY MODE is when you select.

MAIN MENU	SET UNIT NAME	SET BED NUMBER : 00A	W-LAN: OFF
PREV MENU	SYSTEM	AC FILTER: 60HZ	DISPLAY MODE: MONITOR

MAIN MENU	SET UNIT NAME	SET BED NUMBER : 00A	W-LAN: OFF
PREV MENU	SYSTEM	AC FILTER: 60HZ	DISPLAY MODE: SPOT

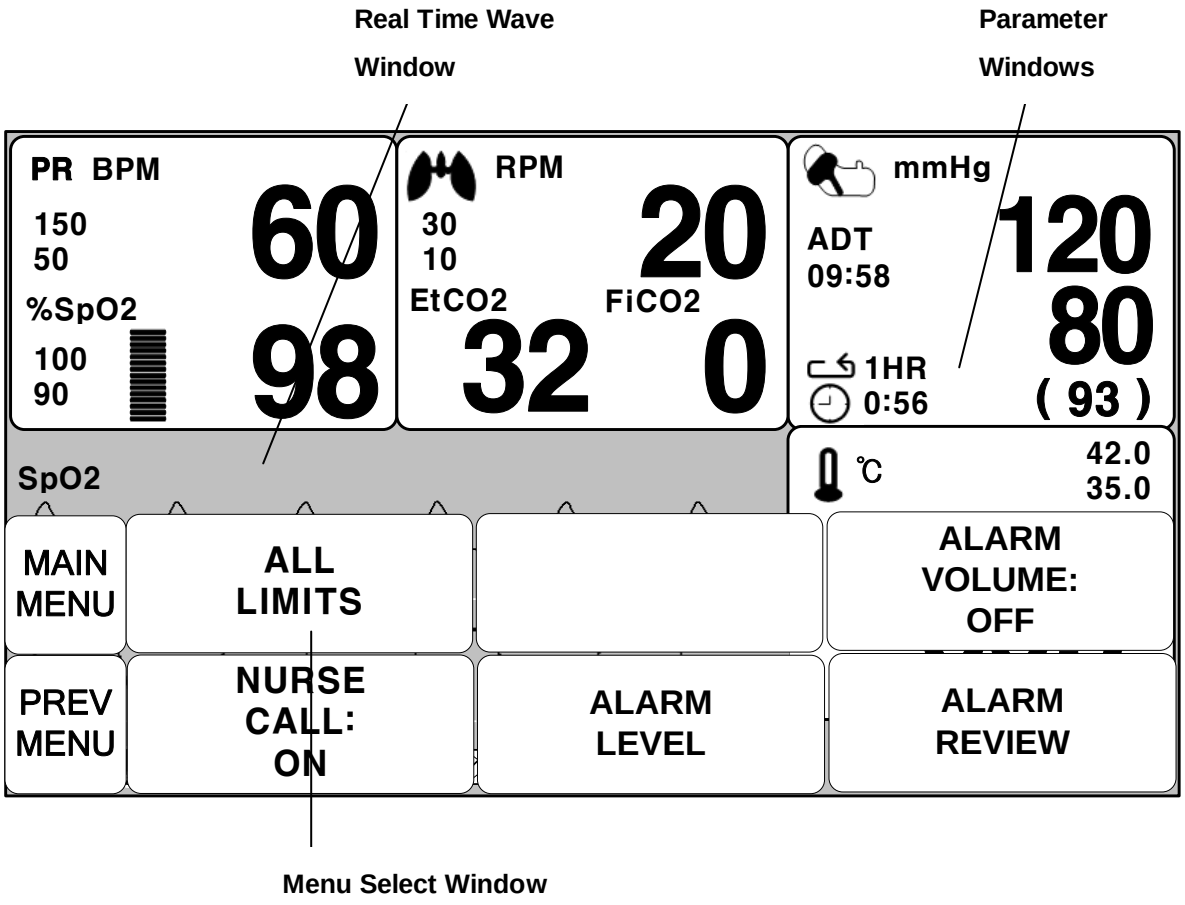
MONITORING MODE

1. General Operation
2. Patient/Data Management
3. Setup
4. Trend
5. SpO2
6. NIBP
7. Temperature
8. EtCO2
9. Default Setting Value

1. General Operation

1.1 General Manu Operation

Screen Composition

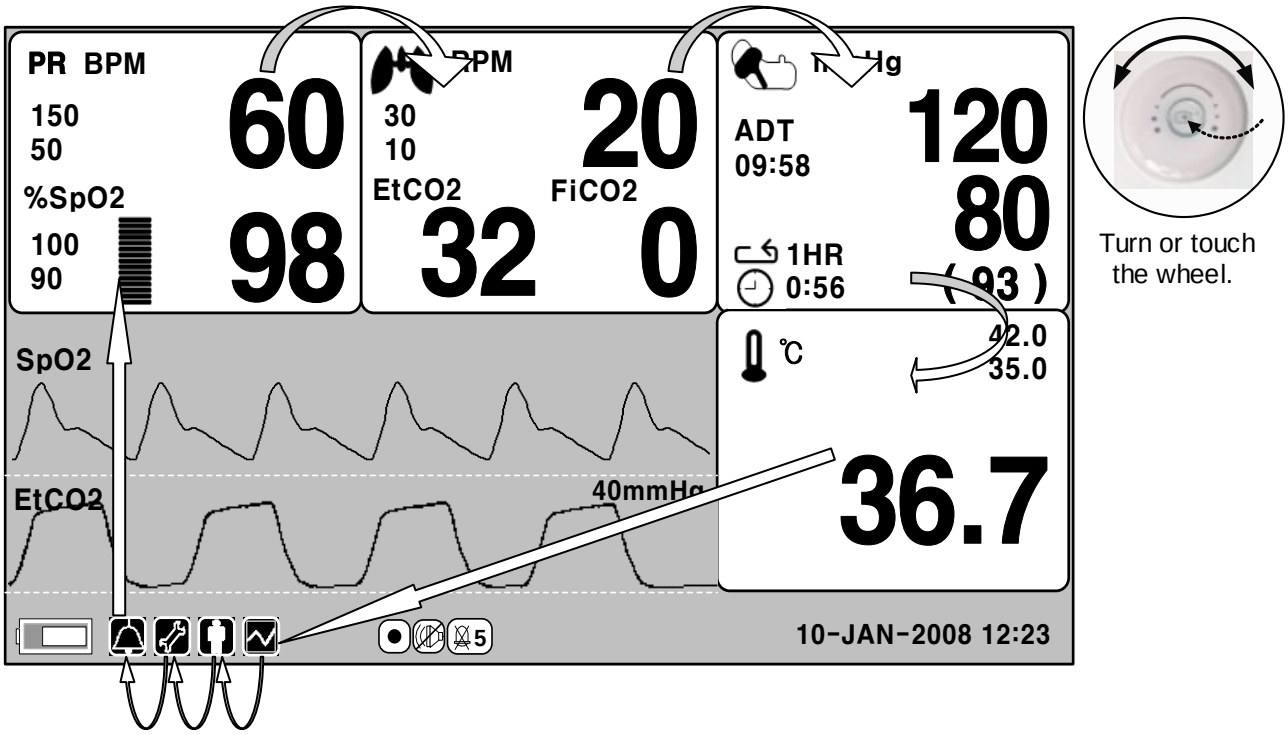


Real Time Wave Window：Displays measured results by up to three waves.

Menu Select Window：Menus appear when they are activated..

Parameter Window：Measured and setup data are displayed in five windows.

Menu Selection



When the Trim Knob Key is turned, menus are selected in the order indicated above. The above screen shows that the MORE menus is selected. The menus move to the right in the order of MENU icon (Trend → Admit → Setup → Alarm) → SpO_2 → EtCO2 → NIBP → TEMP.

Menu Composition

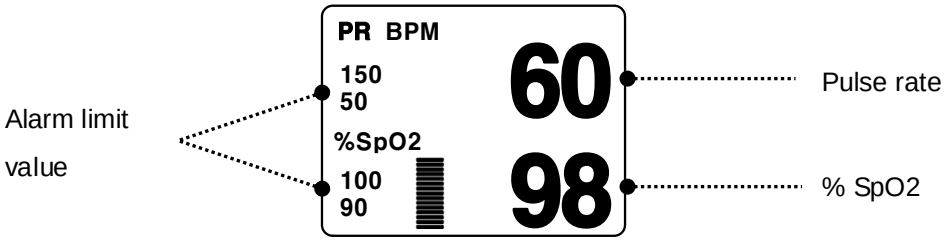
More Menu Window

When the additional menu is selected it will display your available options.

MAIN MENU	DISPLAY	USB FILE COPY	USER SERVICE
PREV MENU	KEY SOUND: ON	DEMO: ON	MAKER SERVICE

Numerical value sign widow

This window displays a measured parameter, function setup, and the boundary of parameter values.



Menu selection by using Touch wheel key

As the key is turned to the right, the menu selection moves clockwise. As the key is turned to the left, the menu selection moves counterclockwise. The menu selection is activated when you Touch Wheel
key.

MAIN MENU	DISPLAY	USB FILE COPY	USER SERVICE
PREV MENU	KEY SOUND: ON	DEMO : ON	MAKER SERVICE

Menu selection with arrows

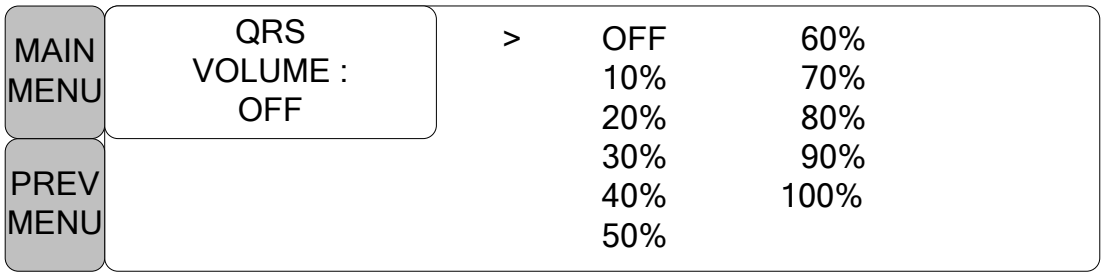
Upward Movement: Turns the touch wheel key to the left.

Downward Movement: Turns the touch wheel key to the right.

Selection is made by touching the touch wheel key. One exits the menu after the selection.

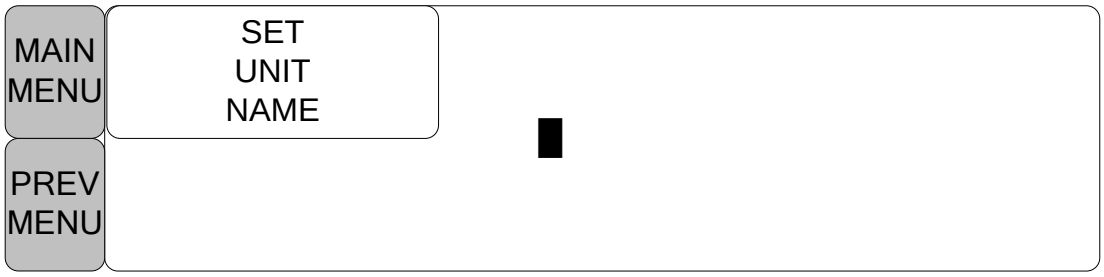
MAIN MENU	ADMIT TYPE: ADT	> ADT PED NEO	DISCHARGE
PREV MENU			

When moving the within the quadrilateral, the text color reverses, and the numeric value applies immediately.

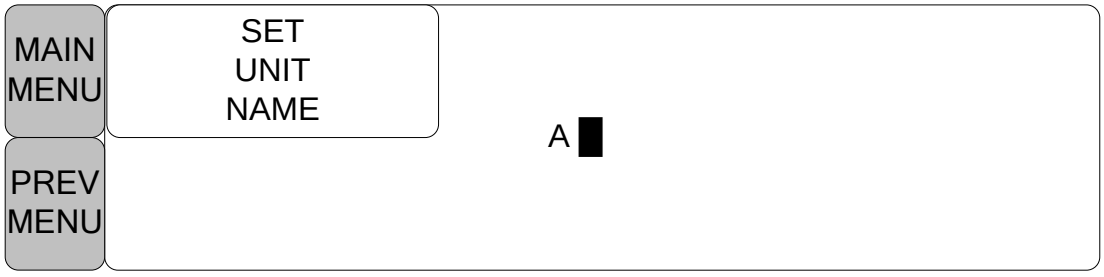


Word feature menu

The following figure shows the screen where the word sequence menu is activated within the word sequence correction menu. Here, the cursor moves over the words when the touch wheel key is turned in the clockwise direction.



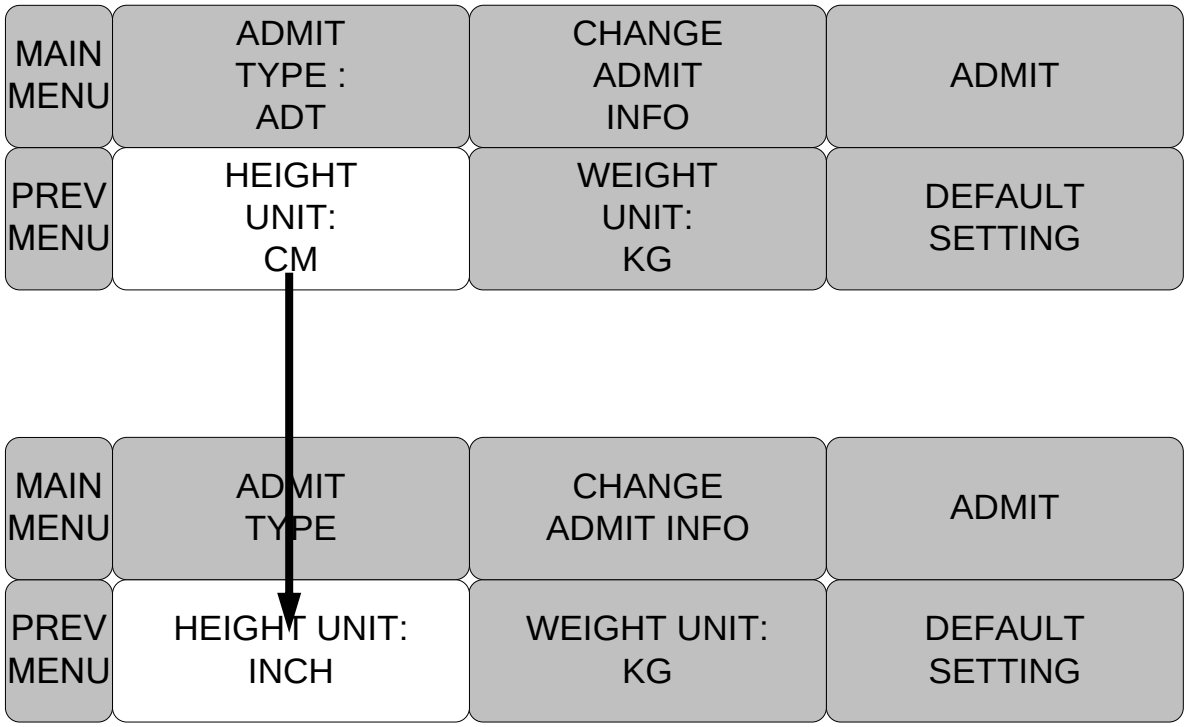
The above figure shows how the cursor moves on the screen. The cursor moves according to the direction the touch wheel Key is turned. Press the touch wheel key if you want to change a letter currently on the screen.



The above figure shows how the cursor is selected to change a letter. Right-hand turning of the touch wheel Key makes it possible to select in the order of 0-9,A-Z, and a blank, while left-hand turning makes the movement in the opposite direction. Once a letter or a number is selected, the screen comes back to the condition where the same process of selection can be made. One may move to the menu item in the left of the screen to end the process, which is completed by touching touch wheel Key. After completion, the screen comes back to the earlier picture.

Operation menu

The setup value changes without a selection when the menu is moved.



2. PATIENT/DATA MANAGEMENT

2.1 ADMIT

CHANGE ADMIT INFO

DISCHARGE

HEIGHT

WEIGHT

2.2 ALARM

ALL LIMITS

ALARM VOLUME

ALARM LEVEL

ALARM REVIEW

ALARM LIST

SAVE ALARM LEVEL

NURSE CALL

2.1 ADMIT

Additional setups are made for each parameter function. One can make an overall setup for the entire monitor system.

CHANGE ADMIT INFO : The CHANGE ADMIT INFO option allows you to change or enter information pertinent to the monitored patient.

ADMIT: Depending on how your monitor is set up, you will see either ADMIT patient or new case

DISCHARGE: This menu option indicates that patient is admitted. You select it to discharge the patient.

HEIGHT UNIT : these options change the units of measure for height

WEIGHT UNIT : these options change the units of measure for height

DEFAULTS SETTING : Configure alarms, set alarm limits, and establish display defaults to be recalled whenever a discharge is performed.

MAIN MENU	ADMIT TYPE: ADT	CHANGE ADMIT INFO	DISCHARGE
PREV MENU	HEIGHT UNIT: CM	WEIGHT UNIT: KG	DEFAULT SETTING

ADMIT TYPE

DISCHARGE menu select YES and unregistered state after switching to the use of equipment to set up the environment.

ADU : ADULT // PED: PEDIATRIC // NEO : NEONATE

MAIN MENU	ADMIT TYPE: ADT	CHANGE ADMIT INFO	ADMIT
PREV MENU	HEIGHT UNIT: CM	WEIGHT UNIT: KG	DEFAULT SETTING

MAIN MENU	ADMIT TYPE: ADT	> ADT PED NEO	ADMIT
PREV MENU			DEFAULT SETTING

CHANGE ADMIT INFO

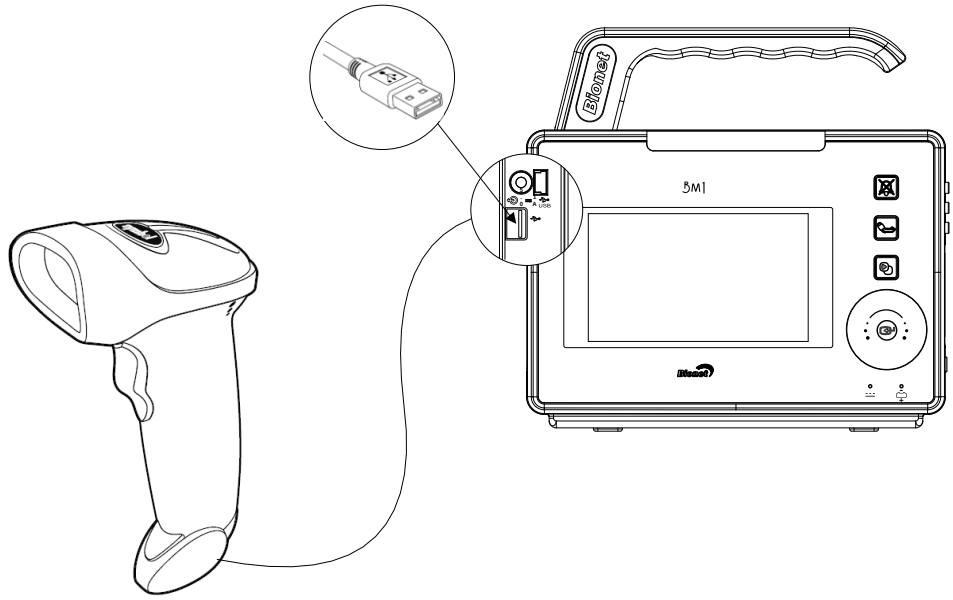
Last and first name (11 letters for each), sex (male or female), date of birth, weight, height, and patient ID (13 characters)

MAIN MENU	ADMIT TYPE: ADT	CHANGE ADMIT INFO	DISCHARGE
PREV MENU	HEIGHT UNIT: CM	WEIGHT UNIT: KG	DEFAULTS SETTING

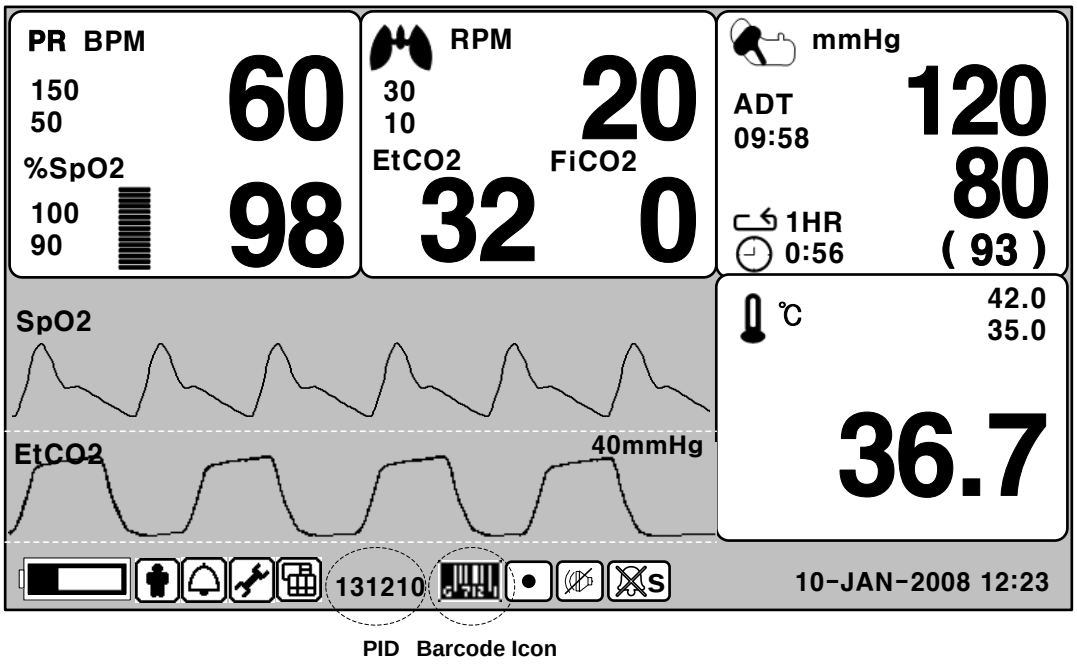
CHANGE ADMIT INFORMATION	
RETURN	CONTENTS
LAST NAME	JOHN
FIRST NAME	WASHINGTON
PATIENT ID	APC001
SEX	MALE
BIRTH DATE	27 – JAN - 1978
AGE	31
HEIGHT	177.0 CM
WEIGHT	62.0KG

Admit Patient ID using the Barcode Scanner

Using the USB barcode scanner, this product can admit the PATIENT ID in barcode form to the device. First connect the barcode scanner to the USB HOST connecter on the left side (from the front) of the device, as shown below. Barcode functionality can be used once after BEEP sound is made and barcode icon is displayed at the lower part of the screen.



ID will be scanned then sent to device after aligning index LED from the scanner to desired barcode and pressing input button. Sent ID will be displayed at the lower part of the display.



DISCHARGE (Discharge Patient)

The CHANGE ADMIT INFO option allows you to change or enter information pertinent to the monitored patient.

Patient information and all numbers change to standard, and the screen displays ⦿

MAIN MENU	ADMIT TYPE: ADT	CHANGE ADMIT INFO	DISCHARGE
PREV MENU	HEIGHT UNIT: CM	WEIGHT UNIT: KG	DEFAULT SETTING

MAIN MENU	ADMIT TYPE: ADT	DISCHARGE	> NO YES
PREV MENU	HEIGHT UNIT: CM		

ADMIT (Admit patient)

Depending on how your monitor is set up, you will see either ADMIT patient or new case.

Patient information and all numbers change to standard, and the screen displays ■

MAIN MENU	ADMIT TYPE: ADT	CHANGE ADMIT INFO	ADMIT
PREV MENU	HEIGHT UNIT: CM	WEIGHT UNIT: KG	DEFAULT SETTING

MAIN MENU	ADMIT TYPE: ADT	ADMIT	> NO YES
PREV MENU	HEIGHT UNIT: CM		

HEIGHT

Unit of height is set as Cm / Inches.

MAIN MENU	ADMIT TYPE : ADT	CHANGE ADMIT INFO	ADMIT
PREV MENU	HEIGHT UNIT: CM	WEIGHT UNIT: KG	DEFAULT SETTING

MAIN MENU	ADMIT TYPE : ADT	CHANGE ADMIT INFO	ADMIT
PREV MENU	HEIGHT UNIT: INCH	WEIGHT UNIT: KG	DEFAULT SETTING

WEIGHT

Unit of weight is set as Kg / LBS.

MAIN MENU	ADMIT TYPE : ADT	CHANGE ADMIT INFO	ADMIT
PREV MENU	HEIGHT UNIT: INCH	WEIGHT UNIT: KG	DEFAULT SETTING

MAIN MENU	ADMIT TYPE : ADT	CHANGE ADMIT INFO	ADMIT
PREV MENU	HEIGHT UNIT: INCH	WEIGHT UNIT: LBS	DEFAULT SETTING

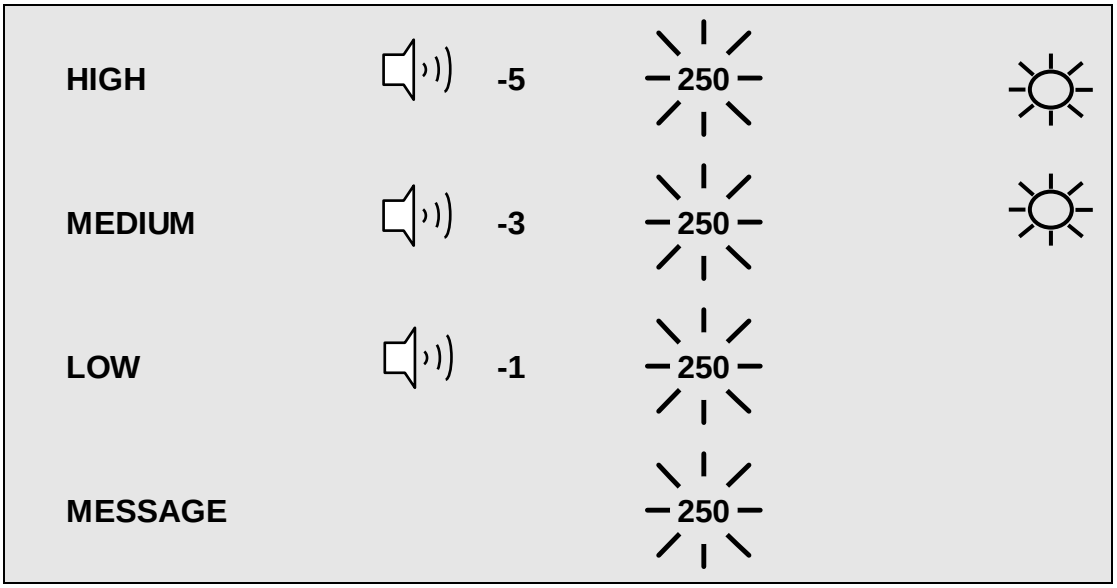
2.2 ALARM

 When you select the icon in the main screen to display the menu on page48.

Alarm is divided into two, alarm for the patient's condition and for the product's condition.

The patient's alarm sound differs in order and volume according to the levels of HIGH, MEDIUM, LOW and MESSAGE.

Alarm for the Product



 : Alarm sounds

: Number flashes

 : Alarm lamp flashes

-5 :Alarm beep number

ALARM LIMITS：The machine enables one to see and change the limits of alarm for all parameter functions.

ALARM VOLUME：volume of each alarm can be adjusted in 10 step.

ALARM LEVEL：Priority of each parameter alarm can be set up.

ALARM REVIEW： Shows the priority order information for all alarms of each measurement.

NURSE CALL： Set the ON/OFF feature of the NURSE CALL.

MAIN MENU	ALL LIMITS		ALARM VOLUME: OFF
PREV MENU	NURSE CALL: ON	ALARM LEVEL	ALARM REVIEW

Alarm ICON

(SILENCED)：To silence an alarm tone when it sounds, Touch the Alarm key on the front of the monitor. The current alarm will be silenced for 60 seconds and the icon is displayed on the screen.

(Alarm pause 5Min.): To start an alarm pause, Touch alarm key on the front of the monitor. Touch the key twice if an alarm is sounding when you want to start an alarm pause.

（All alarm off.): To start an alarm pause, Touch alarm key on the front of the monitor. Touch the key three times if an alarm is sounding when you want to start all alarm pause.

(Alarm VOL. OFF)：You can permanently turn the alarm volume off. The icon is displayed on the screen.

ALL LIMITS

The ALL Limits menu option allows you to view the high and low alarm limits and unit of measurement for each parameter currently monitored.

MAIN MENU	ALL LIMITS		ALARM VOLUME: OFF
PREV MENU	NURSE CALL: ON	ALARM LEVEL	ALARM REVIEW

ALL LIMITS			
RETURN	UNITS	LOW	HIGH
SPO2-%	%	90	100
SPO2-R	BPM	50	150
AWRR	RPM	8	30
EtCO2	mmHg	30	50
FiCO2	mmHg	0	4
APNEA	SEC	0	20
NIBP-S	mmHg	80	200
NIBP-M	mmHg	40	140
NIBP-D	mmHg	20	120
TEMP	‘C	30.0	42.0

ALARM VOLUME

Set the alarm volume to be set at 10 grades.

MAIN MENU	ALL LIMITS		ALARM VOLUME: OFF
PREV MENU	NURSE CALL: ON	ALARM LEVEL	ALARM REVIEW

MAIN MENU	ALARM VOLUME: OFF	> OFF 10% 20% 30% 40% 50%	60% 70% 80% 90% 100%
PREV MENU			

ALARM LEVEL

Set the order of priority in each alarm.

MAIN MENU	ALL LIMITS		ALARM VOLUME: OFF
PREV MENU	NURSE CALL: ON	ALARM LEVEL	ALARM REVIEW

MAIN MENU	PARAMETER LEVEL	PARAMETER LEVEL2	
PREV MENU			

PARAMETER LEVEL

PARAMETER ALARM LEVELS	
RETURN	ALARM LEVEL
SPO2-%	MEDIUM
SPO2-R	LOW
AWRR	MESSAGE
EtCO2	MESSAGE
FiCO2	MESSAGE
APNEA	MESSAGE
NIBP	MEDIUM
TEMP	MESSAGE
CHECK PROBE	MESSAGE
PROBE OFF	MESSAGE
LOW BATTERY	LOW

PARAMETER ALARM LEVEL2

PARAMETER ALARM LEVELS 2	
RETURN	ALARM LEVEL
LOST PULSE	MEDIUM
POOR SIGNAL	MEDIUM
ARTIFACT	MEDIUM

ALARM REVIEW

After an alarm is triggered the alarms and data wave pattern can be reviewed. Set up for priority of each parameter alarm.

MAIN MENU	ALL LIMITS		ALARM VOLUME: OFF
PREV MENU	NURSE CALL: ON	ALARM LEVEL	ALARM REVIEW

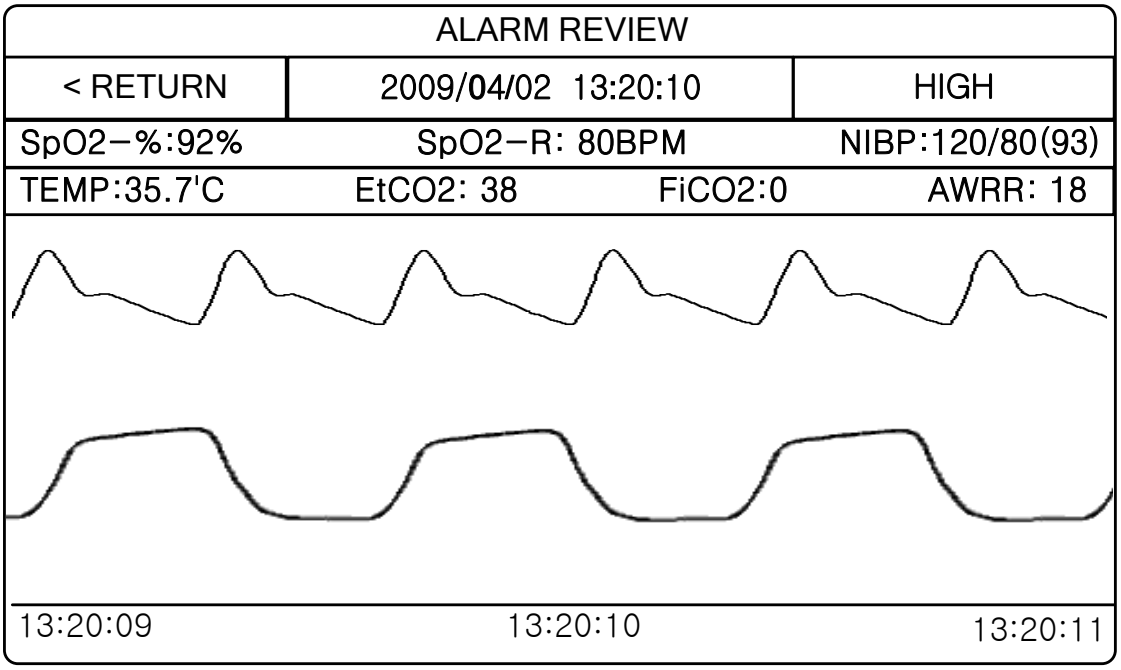
MAIN MENU	ALARM LIST	SAVE CONDITION : HIGH	
PREV MENU			

ALARM LIST

When an alarm activates, this shows the order of the alarms.

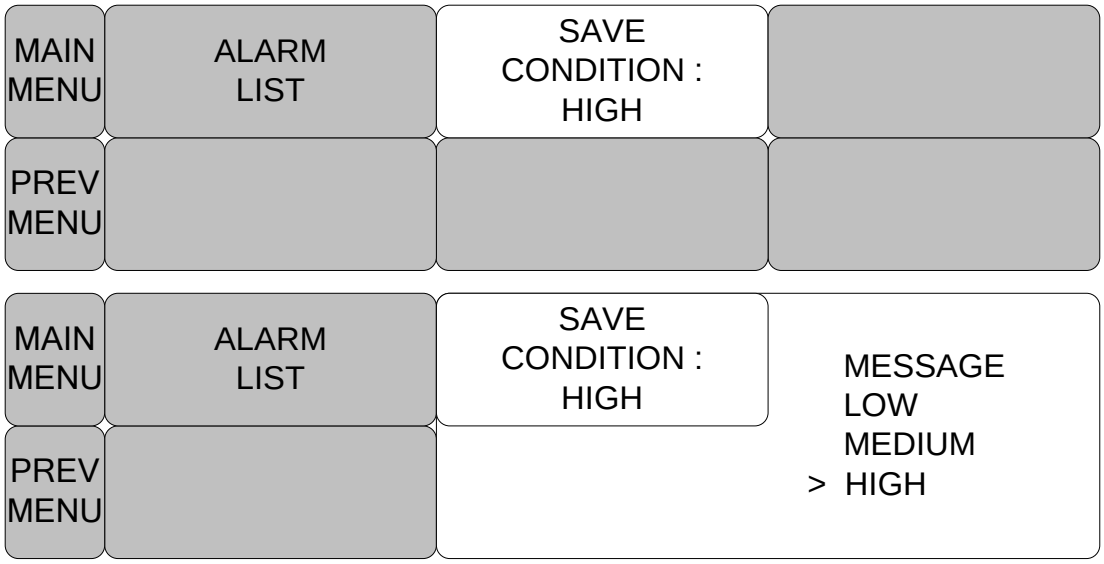
MAIN MENU	ALARM LIST	SAVE CONDITION : HIGH	
PREV MENU			

ALARM REVIEW		
RETURN	TIME	KIND
SPO2	2009/04/02 13:20:10	HIGH
NIBP	2009/04/05 04:45:20	MEDIUM
EtCO2	2009/04/12 15:50:15	HIGH
AWRR	2009/04/15 23:20:30	LOW



SAVE CONDITION

This determines the order in which triggered alarms are saved.



NURSE CALL

When an alarm is triggered, this activated the NURSE CALL function.

MAIN MENU	ALL LIMITS		ALARM VOLUME: OFF
PREV MENU	NURSE CALL: ON	ALARM LEVEL	ALARM REVIEW

MAIN MENU	ALL LIMITS		ALARM VOLUME: OFF
PREV MENU	NURSE CALL: OFF	ALARM LEVEL	ALARM REVIEW

3. SETUP

3.1 SETUP

DISPLAY

DEMO

USB FILE COPY

USER SERVICE

MAKER SERVICE

3.1 SETUP

 When you select the icon in the main screen to display the menu below

DISPLAY : screen set menu

USER SERVICE : This is the menu to set the connection used to interface with an external computer

MAKER SERVICE : This is the basic adjustment menu used to adjust the features of this product.

MAIN MENU	DISPLAY	USB FILE COPY	USER SERVICE
PREV MENU	KEY SOUND: ON	DEMO: ON	MAKER SERVICE

DISPLAY

SET PARA：Measurement function selected.

SET DATE & TIME: Set and change date and time.

SWEEP SPEED : Set speed of SpO2 WAVE DISPLAY

MAIN MENU	SET PARA	SET DATE & TIME	
PREV MENU	SWEEP SPEED: 25mm/s		

SET PARA

Select measurement function to use

AUTO : Automatically parameter windows activate

MAIN MENU	SET PARA	SET DATE & TIME	
PREV MENU	SWEEP SPEED: 25mm/s		

PARAMETER WINDOW SET	
RETURN	WINDOW ON/OFF
AUTO	ON
SPO2	ON
EtCO2	ON
NIBP	ON
TEMP	ON

SET DATE & TIME

It has sub menu to set date and time.

MAIN MENU	SET PARA	SET DATE & TIME	
PREV MENU	SWEEP SPEED: 25mm/s		

SET TIME

Set time of equipment.

MAIN MENU	SET TIME	SET DATE	
PREV MENU			

MAIN MENU	SET TIME:	10 : 58 : 01
PREV MENU		

SET DATE

Set date of equipment

MAIN MENU	SET TIME	SET DATE	
PREV MENU			

MAIN MENU	SET DATE:	14-APR-2009
PREV MENU		

SWEEP SPEED

Set speed of drawing wave signal pattern in this widow.

MAIN MENU	SET PARA	SET DATE & TIME	
PREV MENU	SWEEP SPEED: 25mm/s		

MAIN MENU	SWEEP SPEED: 25mm/s	6.25 mm/s 12.5 mm/s > 25 mm/s 50 mm/s	
PREV MENU			

DEMO

Set ON/OFF DEMONSTRATION of equipment.

MAIN MENU	DISPLAY		USER SERVICE
PREV MENU	KEY SOUND: ON	DEMO: ON	MAKER SERVICE

MAIN MENU	DISPLAY		USER SERVICE
PREV MENU	KEY SOUND: ON	DEMO: OFF	MAKER SERVICE

USB FILE COPY

Use the SAVE button in the USB FILE COPY menu to export records to a USB flash drive.

You can export all saved patient records or all records for a specific patient. The exported file is a filename.csv file with the name DateLog.csv.

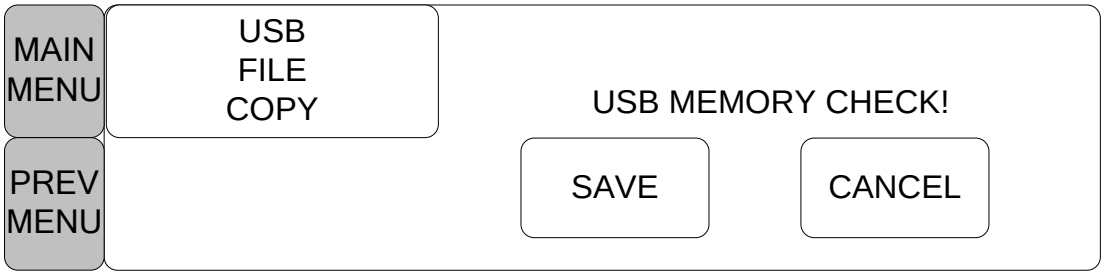
MAIN MENU	DISPLAY	USB FILE COPY	USER SERVICE
PREV MENU	KEY SOUND: ON	DEMO: ON	MAKER SERVICE

SAVE: A command to Export patient records to a USB flash drive

CANCEL: A command to cancel exporting patient records to a USB flash drive.

MAIN MENU	USB FILE COPY		
PREV MENU		SAVE	CANCEL

The following message will appear if there is no USB MEMORY after the user commanded SAVE function



Display the data saving task progress

The number on left indicates files saved so far, while the number on right shows the total number of files to be saved.

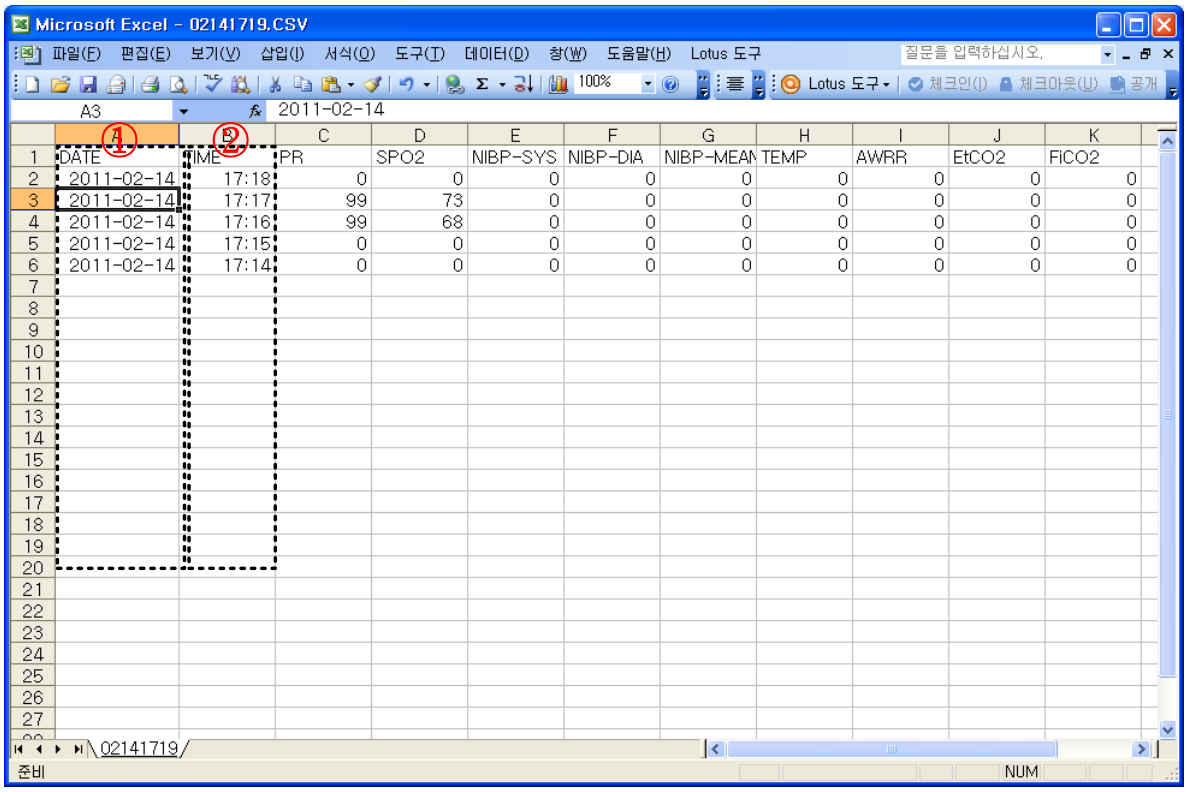
Display following message when Data Saving is cancelled.

Display following message when Data Saving is complete.

The picture below is stored as a Microsoft Excel file is opened the screen

① is the date the data entry, data in this column to see normal cell to form "one - Month - Year" is set.

② is the patient data entry, and data in this column to see a normal cell format "h: mm: ss" is set.



Note
While performing file storage if you remove the USB can not work with USB. When there is no storage space on USB operation can not be properly.

USER SERVICE

The user is able to set the set UNIT NAME, BED NUMBER, external Wireless equipment power , communication parameters, and power supply filter.

MAIN MENU	DISPLAY	USB FILE COPY	USER SERVICE
PREV MENU	KEY SOUND: ON	DEMO : ON	MAKER SERVICE

MAIN MENU	SET UNIT NAME	SET BED NUMBER : 00A	W-LAN: OFF
PREV MENU	SYSTEM	AC FILTER: 50HZ	DISPLAY MODE: MONITOR

SET UNIT NAME

Set up for Equipment name.

MAIN MENU	SET UNIT NAME	SET BED NUMBER : 00A	W-LAN: OFF
PREV MENU	SYSTEM	AC FILTER: 50HZ	DISPLAY MODE: MONITOR

MAIN MENU	SET UNIT NAME	
PREV MENU		

SET BED NUMBER

Set up for patient bed number.

Allowable setters are from 0~ 9, A ~ Z .

MAIN MENU	SET UNIT NAME	SET BED NUMBER : 00A	W-LAN: OFF
PREV MENU	SYSTEM	AC FILTER: 50HZ	DISPLAY MODE: MONITOR

MAIN MENU	SET UNIT NAME	SET BED NUMBER : 00A	0 0 A
PREV MENU	SYSTEM		

AC FILTER

AC FILTER is function where you can set power supply frequency. This feature is required because power supply frequency can be different from one country to another. . (The selectable frequencies are 50Hz and 60Hz.)

MAIN MENU	SET UNIT NAME	SET BED NUMBER : 00A	
PREV MENU	SYSTEM	AC FILTER: 50HZ	

MAIN MENU	SET UNIT NAME	SET BED NUMBER : 00A	
PREV MENU	SYSTEM	AC FILTER: 60HZ	

W-LAN

W-LAN power can be supplied for enabling a External wireless LAN equipment use.

MAIN MENU	SET UNIT NAME	SET BED NUMBER : 00A	W-LAN: OFF
PREV MENU	SYSTEM	AC FILTER: 60HZ	DISPLAY MODE: MONITOR

DISPLAY MODE (MONITOR or SPOT)

You can selected Monitoring display mode or Spot display mode.

MAIN MENU	SET UNIT NAME	SET BED NUMBER : 00A	W-LAN: OFF
PREV MENU	SYSTEM	AC FILTER: 60HZ	DISPLAY MODE: MONITOR

SYSTEM

System able to change and verify Equipment version information and system information

SYSTEM INFO SET	
RETURN	CONTENTS
MAIN VER	1.034.BHCDEC00A
CENTRAL	OFF
HOST IP	192 . 168 . 030 . 077
DEVICE IP	192 . 168 . 030 . 100
SUBNET	255 . 255 . 255 . 000
GATEWAY	192 . 168 . 030 . 001
MAC ADDR	00 : E1 : A8 : 80 : CB : 00

KEY SOUND

Set ON/OFF Key Sound of equipment.

MAIN MENU	DISPLAY	USB FILE COPY	USER SERVICE
PREV MENU	KEY SOUND: ON	DEMO: ON	MAKER SERVICE

MAIN MENU	DISPLAY	USB FILE COPY	USER SERVICE
PREV MENU	KEY SOUND: OFF	DEMO: OFF	MAKER SERVICE

MAKER SERVICE

Maker service is a menu is used by manufacturers.

MAIN MENU	DISPLAY	USB FILE COPY	USER SERVICE
PREV MENU	KEY SOUND: ON	DEMO : ON	MAKER SERVICE

4. TREND

4.1 TREND

GRAPHIC TREND

TABULAR TREND

4.1 TREND

 When you select the icon in the main screen to display the menu below.

TREND shows saved data graphically displayed with numeric values.

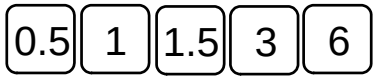
Real-time data recording duration is 1 minute. Amount of saving time is for this data will be saving for 128hours.

MAIN MENU	GRAPHIC TREND	TABULAR TREND	
PREV MENU			

 : Move to main screen

 : Move within the tables

 : Move up and down to other analysis function

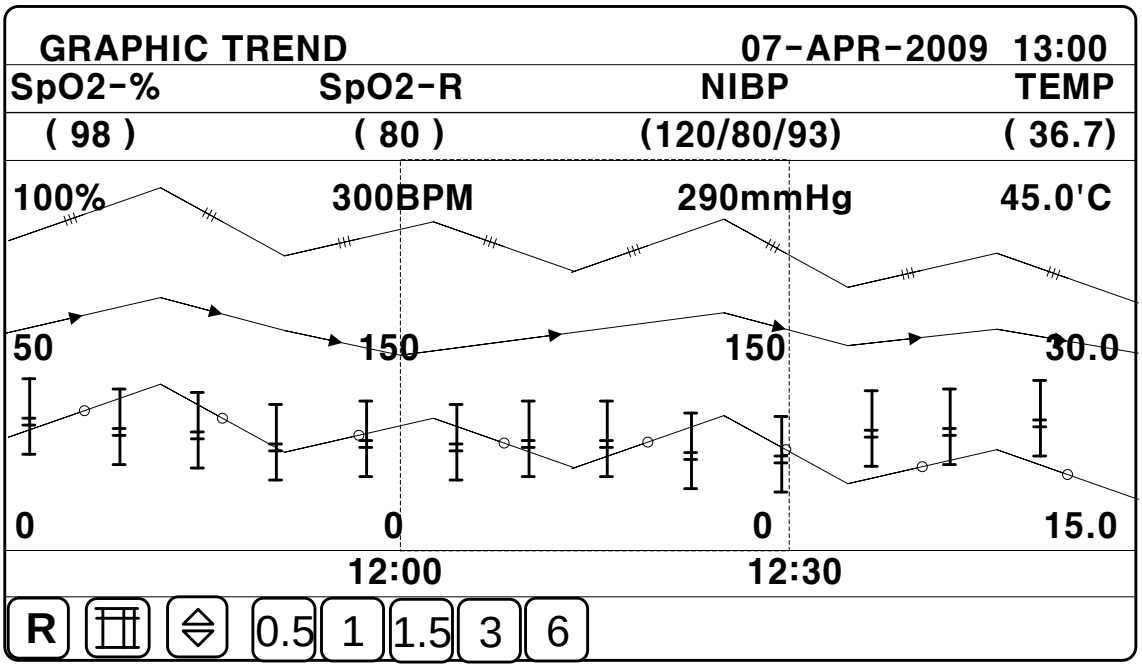
 : Time(HOURS) period set menu at Graphic Trend

 : Time(MIN) period set menu at Tabular Trend

GRAPHIC TREND

Wave Data can be stored and seen according to section.

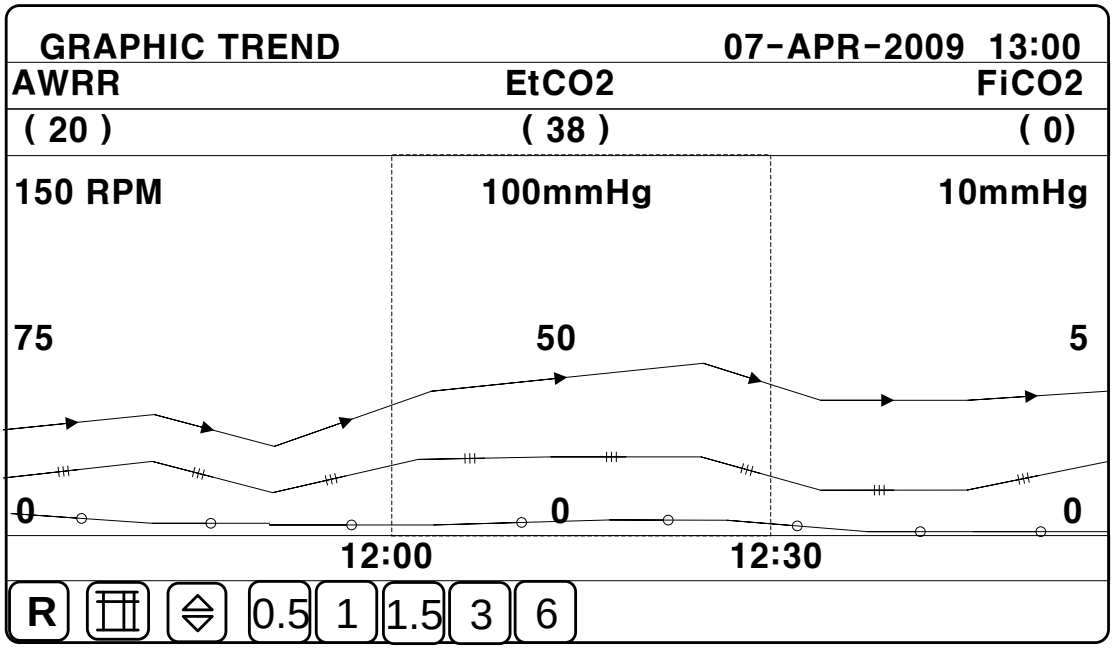
MAIN MENU	GRAPHIC TREND	TABULAR TREND	
PREV MENU			



TIME PERIOD

One can set up and store data and time that one can see in a screen.

0.5 1 1.5 3 6



TABULAR TREND

One can see the stored data at the time previously set up.

MAIN MENU	GRAPHIC TREND	TABULAR TREND	
PREV MENU			

TIME INTERVAL

One can store data and set up time.

1 5 15 30 60

TABULAR TREND 10-APR-2009 13:00

	10-APR 12:10	10-APR 12:09	10-APR 12:08	10-APR 12:07	10-APR 12:06
SPO2-%	99	99	99	99	99
SPO2-R	80	80	80	80	80
AWRR	20	20	20	20	20
EtCO2	38	38	38	38	38
FiCO2	0	0	0	0	0
NIBP-S	120	120	120	120	120
NIBP-M	93	93	93	93	93
NIBP-D	80	80	80	80	80
TEMP	36.7	36.7	36.7	36.7	36.7

R 1 5 15 30 60

5. SpO_2

5.1 Outline

SpO_2 Connector Location and Measuring Cable

5.2 SpO2 Data Window

5.3 SpO2 Data Setup

SWEEP SPEED

RATE VOLUME

ALARM

ALARM LIMIT

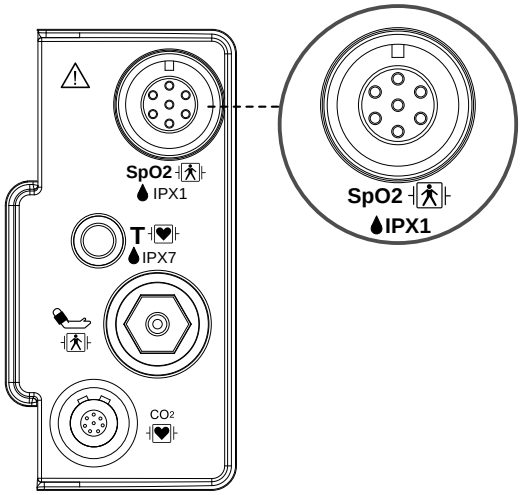
5.4 Trouble Shooting

5.1 Outline

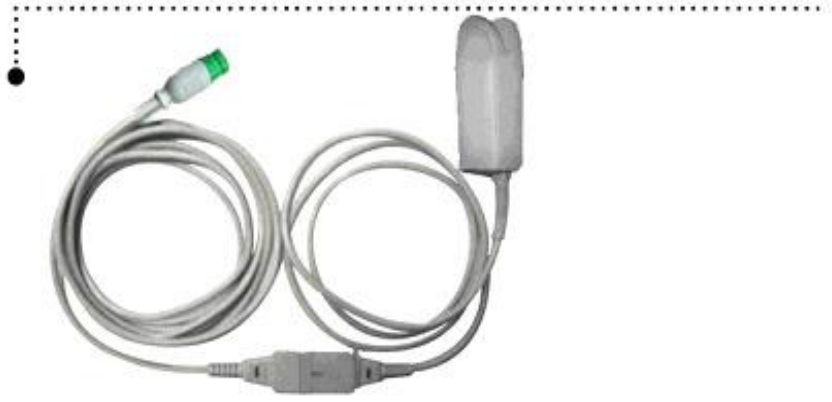
SPO2 monitoring is a noninvasive technique used to measure the amount of oxygenated hemoglobin and pulse rate by measuring the absorption of selected wavelengths of light. The light generated in the probe passes through the tissue and is converted into an electrical signal by the photodetector in the probe. The monitor processes the electrical signal and displays on the screen a waveform and digital values for SpO2 and pulse rate. It detects SpO2 in the way of transmitting the red and infrared rays into the capillary vessel to take the pulsation. Also perform the alarm function according to the setting value.

SpO2 Connector Location and Measuring Cable

SpO_2 connector

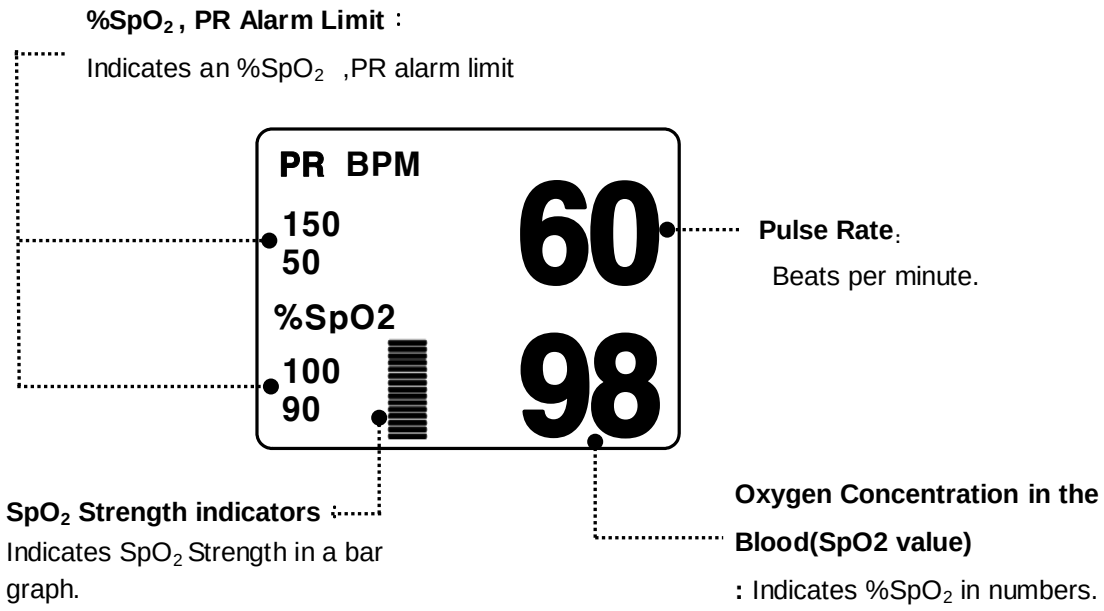


SpO_2 Measuring Cable



Note
The signal input is a high-insulation port and it is defibrillator proof ( ) The insulated input ensures patient safety and protects the device during defibrillation and electrosurgery.

5.2 SpO_2 Data Window



The current SPO2 value and the derived pulse rate (RATE) are displayed. The block sets indicate the strength of the signal (twenty block bars indicate the strongest signal). The SPO2 measurements are averaged over a 6-second period of time.

The monitor display is updated every second.

The SPO2 monitoring features are found in the SPO2 menu. These features include alarm limit adjustment, display of RATE, and RATE volume.

Note
SpO_2 WAVE SIZE is changed automatically.

Signal and Data Validity

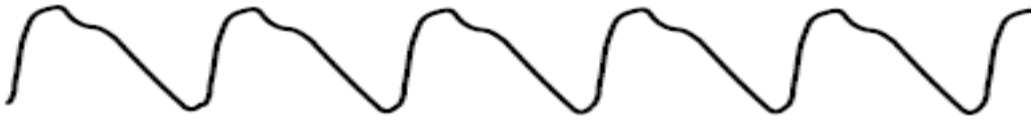
It is extremely important to determine that the probe is attached to the patient correctly and the data is verifiable. To make this determination, three indications from the monitor are of assistance—signal strength bar, quality of the SPO2 waveform, and the stability of the SPO2 values. It is critical to observe all three indications simultaneously when ascertaining signal and data validity.

Signal Strength Bar

The signal strength bar is displayed within the SPO2 values window. This bar consists of 15 blocks set depending on the strength of the signal. Proper environmental conditions and probe attachment will help to ensure a strong signal.

Quality of SPO2 Waveform

Under normal conditions, the SPO2 waveform corresponds to (but is not proportional to) the arterial pressure waveform. The typical SPO2 waveform indicates not only a good waveform, but helps the user find a probe placement with the least noise spikes present. The figure below represents an SPO2 waveform of good quality.



Good Quality SPO2 Waveform

If noise (artifact) is seen on the waveform because of poor probe placement, the photodetector may not be flush with the tissue. Check that the probe is secured and the tissue sample is not too thick. Pulse rate is determined from the SPO2 waveform which can be disrupted by a cough or other hemodynamic pressure disturbances. Motion at the probe site is indicated by noise spikes in the normal waveform. (See the figure below.) It has been noted that letting the patient view the SPO2 waveform enables them to assist in reducing motion artifact.

SPO2 Waveform with Artifact

Stability of SPO2 Values

The stability of the displayed SPO2 values can also be used as an indication of signal validity. Although stability is a relative term, with a small amount of practice one can get a good feeling for changes that are artifactual or physiological and the speed of each. Messages are provided in the SPO2 values window to aid you in successful SPO2 monitoring.

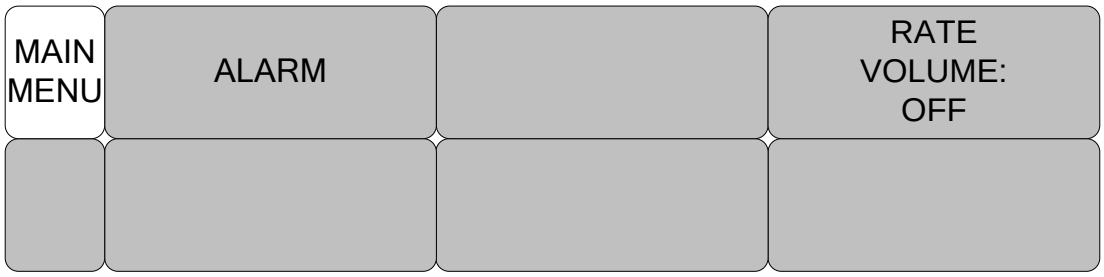
WARNING
In the monitoring of patients the coincidence of adverse conditions may lead to a disturbed signal going unnoticed. In this situation artifacts are capable of simulating a plausible parameter reading, so that the monitor fails to sound an alarm. In order to ensure reliable patient monitoring, the proper application of the probe and the signal quality must be checked at regular intervals.

5.3 SpO_2 Data Setup

Turn the rotary wheel on the blue cursor to position the data window (refer to P.78), Select the menu button, and the following window is displayed.

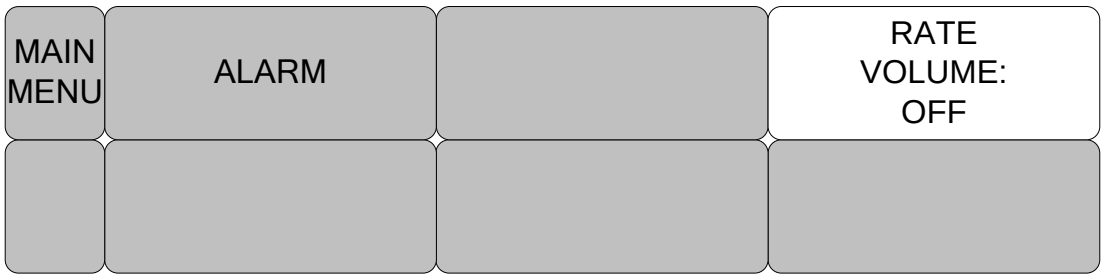
ALARM ： Menu in which SpO_2 alarm are set up.

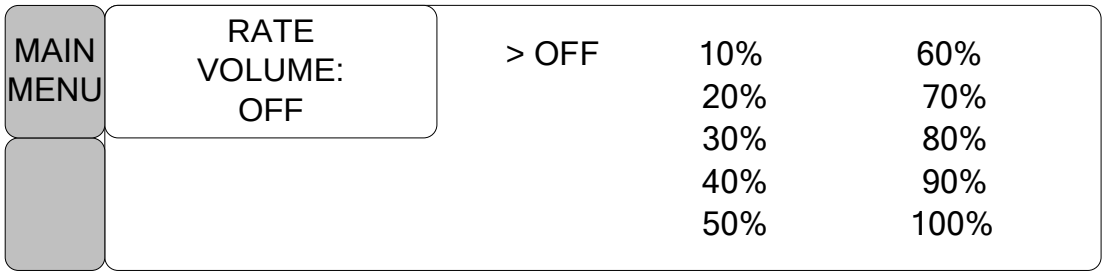
RATE VOLUME：Menu in which RATE VOLUME is set up



RATE VOLUME

Move the KEY to select the volume from OFF to 100%.





ALARM

Two menus: ALARM LIMIT, ALARM SOUND provided in the alarm menu

MAIN MENU	ALARM		RATE VOLUME: OFF

ALARM LIMIT

Number setting of alarm value of %SpO_2 is 0 ~ 100

1. Move the ▶ mark to select from RETURN, SpO_2 or SpO_2-R, and press.
2. After pressing at SpO_2, move the cursor right or left to LOW, and press.
3. Once the color is changed, move the cursor again to the selected value and press.
4. Place the cursor to HIGH and press, when the color changes, move the cursor again to select the targeted value, and press. Finally move to SpO_2 and press.
(You may decide to perform the process in the opposite order, LOW to HIGH, to have the same result.)
5. After pressing at SpO_2-R, move the cursor right or left to LOW, and press.
6. Once the color is changed, move the cursor again to the selected value and press.
7. Place the cursor to HIGH and press, when the color changes, move the cursor again to select the targeted value, and press. Finally move to SpO_2-R and press.
8. With the selection of RETURN the user gets out of the menu.

MAIN MENU	ALARM LIMIT	ALARM SOUND: ON	
PREV MENU			

SPO2 ALARM LIMIT			
RETURN	UNITS	LOW	HIGH
SPO2-%	%	90	100
SPO2-R	BPM	50	150

ALARM SOUND

Warning sound or message displays configuration menu when an alarm is triggered.

MAIN MENU	ALARM LIMIT	ALARM SOUND: ON	
PREV MENU			

MAIN MENU	ALARM LIMIT	ALARM SOUND: OFF	
PREV MENU			

5.4 TROUBLE SHOOTING

LEAD FAULT Condition

When using a reusable finger probe, there is a system alarm to alert you when the probe is off the Monitor. The monitor defaults this " LEAD FAULT" condition as a System Warning alarm. You can, however, set it as a System ALARM LEVEL in Monitor Defaults.

SPO2 Messages

Below is a list of system status alarm messages which may be displayed in the SPO2 parameter window during monitoring.

CHECK PROBE

Reusable finger probe is off the patient. Check the probe. *The factory default for this alarm is MESSAGE ALARM.*

PULSE SEARCH

Detection by the monitor of a repeatable pulse has ceased. Check the patient and the probe site.

POOR SIGNAL

The SPO2 signal is too low. No SPO2 data is displayed. This can be due to a low patient pulse, patient motion, or some other interference. Check the patient and the probe.

LOST SIGNAL

SPO2 data continues to be displayed, but the quality of the signal is questionable. Check the patient and the probe.

ARTIFACT

The SPO2 signal is patient's motion artifact and noise

No SpO2 data is displayed. One of the following conditions is indicated:

- defective or damaged probe,
- defective or damaged cable
- probe is off the patient, or
- Detection of a repeatable pulse has ceased.
- Check the probe and cable: reposition or replace as needed.

6. NIBP

6.1 Outline

NIBP Connector Location and Cuff

6.2 NIBP Data Window

6.3 NIBP Data Setup

ALARM LIMIT

ALARM

CUFF SIZE

UNIT SELECT

INTERVAL

STAT

INFLATION

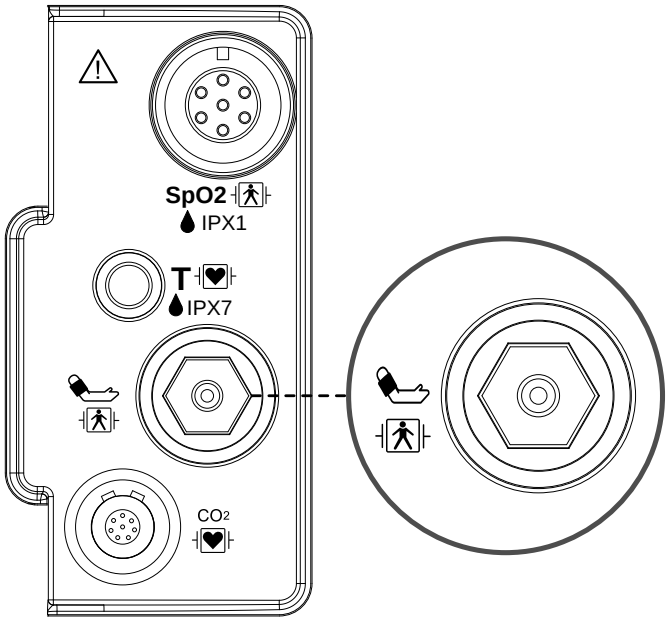
6.4 Trouble Shooting

6.1 Outline

This function is to measure minimum, Maximum and average blood pressure by using Oscillometric method

Position of NIBP Connecter and cuff

NIBP Connector



ADULT CUFF

Note
As the value of NIBP can vary according to the age and sex of a patient, the user needs to set up right data in Parameter Menu before measurement. The NIBP cable connector is insulated and it is defibrillator-proof( ). Use only the NIBP cuffs listed in the enclosed publication.

WARNING
Noninvasive blood pressure monitoring is not recommended for patients with extremely high or low heart rate or hypotension, hypertension, arrhythmias. The software algorithm cannot accurately compute NIBP or patients with these conditions.

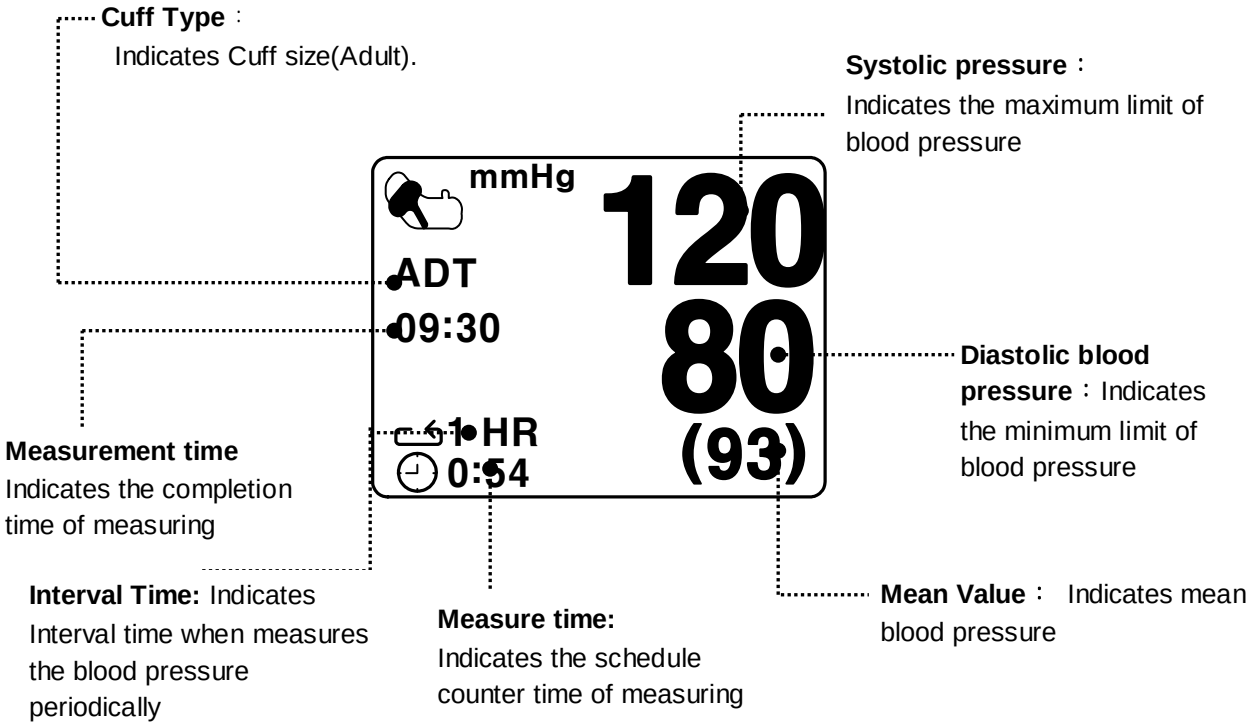
Note
As the value of NIBP can vary according to the age and sex of a patient, the user needs to set up right data in parameter Menu before measurement. Tubes between the cuff and the monitor are not kinked or blocked. The air pad should be exactly over the brachial artery. Tubing is immediately to the right or left of the brachial artery to prevent kinking when elbow is bent.

The maintenance is performed every 2 years.

Check the following list devise to operates properly and safety at all times.

1. Check for proper cuff size.
2. Check for residual air left in the cuff from a previous measurement.
3. Make sure cuff is not too tight or too loose.
4. Make sure cuff and heart are at same level, otherwise hydrostatic pressure will offset the NIBP value.
5. Minimize patient movement during measurement.
6. Watch for pulses paradox us.
7. Check for leak in cuff or tubing.
8. Patient may have a weak pulse.

6.2 NIBP Data Window



NIBP KEY

The manual touch of external key can start or stop the operation of NIBP

6.3 NIBP Data Setup

Turn the rotary wheel on the blue cursor to position the data window (refer to P.81), Select the menu button, and the following window is displayed.

ALARM： A menu to set the Alarm

CUFF SIZE：A menu to select cuff size (ADT (Adult) , PED(Pediatric) , NEO(Neonate))

UNIT SELECT: A menu to select the pressure unit (mmHg , kPa).

INTERVAL ：A menu to set Interval time when measures the blood pressure periodically

INFLATION: Initial Pressurization setting menu

MAIN MENU	ALARM		CUFF SIZE: ADT
	UNIT SELECT: mmHg	INFLATION: 170mmHg	INTERVAL: OFF

ALARM

The alarm provides ALARM LIMIT and ALARM SOUND.

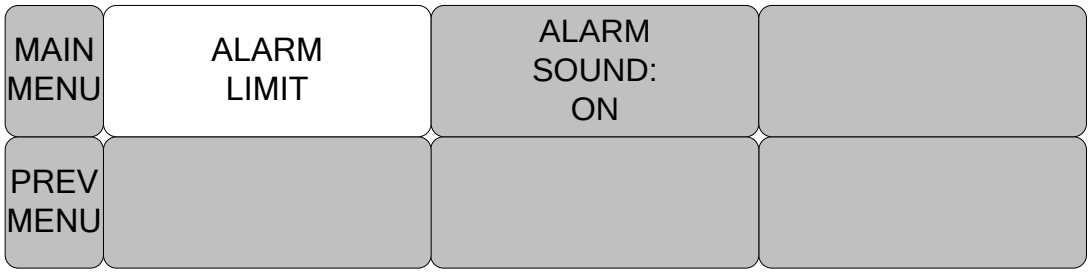
MAIN MENU	ALARM		CUFF SIZE: ADT
	UNIT SELECT: mmHg	INFLATION: 170mmHg	INTERVAL: OFF

MAIN MENU	ALARM LIMIT	ALARM SOUND: ON	
PREV MENU			

ALARM LIMIT

Alarm setting Numeric Value of Systolic, Diastolic, and mean pressure is 10 ~ 300mmHg.

1. Move the ▶ mark to select one from RETURN, NIBP-S, NIBP-M, or NIBP-D, and press.
2. Press the key at NIBP-S, and move to LOW, and press again.(The user gets the same result regardless of the LOW-HIGH, or HIGH-LOW order.)
3. When the color has changed, move it again to select a target value, and press.
4. Press the key at HIGH. When the color has changed, move to the right to select a target value, and press.
5. Set up or revise the values of NIBP-M and NIBP in the same way as above.
6. With the selection of RETURN, the user can get out of the window.



NIBP ALARM LIMIT			
RETURN	UNITS	LOW	HIGH
NIBP-S	mmHg	80	200
NIBP-M	mmHg	40	140
NIBP-D	mmHg	20	120

ALARM SOUND

Warning sound or message displays configuration menu when an alarm is triggered.

MAIN MENU	ALARM LIMIT	ALARM SOUND: ON	
PREV MENU			

CUFF SIZE

The user can select a CUF between ADULT and NEONATAL.

MAIN MENU	ALARM		CUFF SIZE: ADT
	UNIT SELECT: mmHg	INFLATION: 170mmHg	INTERVAL: OFF

MAIN MENU	ALARM	CUFF SIZE:	> ADT PED NEO
	UNIT SELECT: mmHg		

UNIT SELECT

It is a function to set blood pressure measurement unit.

The blood pressure measurement unit provides mmHg and kPa.

MAIN MENU	ALARM		CUFF SIZE: ADT
	UNIT SELECT: mmHg	INFLATION: 170mmHg	INTERVAL: OFF

MAIN MENU	ALARM		CUFF SIZE: ADT
	UNIT SELECT: kPa	INFLATION: 170mmHg	INTERVAL: OFF

INTERVAL

This menu is used for selecting intervals when measures the blood pressure automatically.

Select a target interval from 1min, 2, 3, 4, 5, 10, 15, 20, 30, 1hour, 2, 4, 8.

MAIN MENU	ALARM		CUFF SIZE: ADT
	UNIT SELECT: mmHg	INFLATION: 170mmHg	INTERVAL: OFF

MAIN MENU	INTERVAL: OFF	> OFF	10MIN.	4H
		1MIN.	15MIN.	8H
		2MIN.	20MIN.	
		3MIN.	30MIN.	
		4MIN.	1H	
		5MIN.	2H	

Warning
Periodically check patient limb circulation distal to the cuff. Check frequently when using auto NBP in 1 and 2 minute intervals. Intervals below 10 minutes are not recommended for extended periods of time.

INFLATION

It is a function for pressurization pressure.

ADT/PED : Numeric value is 80, 90, 100, 110, ~ 230, and 240.

NEO : Numeric value is 60, 70, 80, 90, 100, 110, and 120.

MAIN MENU	ALARM		CUFF SIZE: ADT
	UNIT SELECT: mmHg	INFLATION: 170mmHg	INTERVAL: OFF

MAIN MENU	ALARM		CUFF SIZE: ADT
	UNIT SELECT: mmHg	INFLATION: 80mmHg	INTERVAL: OFF

MAIN MENU	ALARM		CUFF SIZE: ADT
	UNIT SELECT: mmHg	INFLATION: 240mmHg	INTERVAL: OFF

Warning
Pay attention to not to block connecting hose when you put cuff on patient.

6.4 TROUBLESHOOTING

NIBP Status Messages

Below is a list of system status alarm messages which may be displayed in the NIBP parameter window during monitoring.

Status Message	Monitor Response	Solution
OVER PRESSURE	System status alarm. Auto mode will shut off after ONE message.	Remove cuff and contact service.
INFLATION FAIL. CHECK CUFF	System status alarm.	Check cuff, connections, and tubing.
DEFLATION FAIL. CHECK CUFF	System status alarm. Auto mode will shut off after ONE message.	Remove cuff and contact service.
OVER TIME PRESSURE	System status alarm. Auto mode will shut off after TWO consecutive message.	Possible excessive patient movement or arrhythmia condition. Check patient.
PULSE TO WEAK	System status alarm. Auto mode will shut off after ONE message.	Check patient and cuff placement.
EXCESSIVE MOTION	System status alarm. Auto mode will shut off after ONE message.	Possible excessive patient movement. Check patient.
MEASUREMENT ERROR	ystem status alarm. Auto mode will shut off after ONE message.	Possible excessive patient movement or arrhythmia condition. Check patient.

Erroneous NIBP measurement

- Check for proper cuff size
  1. Too small a cuff can give an erroneously high value.
  2. Too large a cuff can give an erroneously low value.
- Check for residual air left in the cuff from a previous measurement.
- Make sure cuff is not too tight or too loose.
- Make sure cuff and heart are at same level, otherwise hydrostatic pressure will offset the NIBP value.
- Minimize patient movement during measurement.
- Check for leak in cuff or tubing.
- Patient may have a weak pulse.

7. TEMPERATURE

7.1 Outline

Temperature Connector and Measuring Cable

7.2 Temperature Data Window

7.3 Temperature Data Setup

ALARM LIMIT

UNIT SELECT

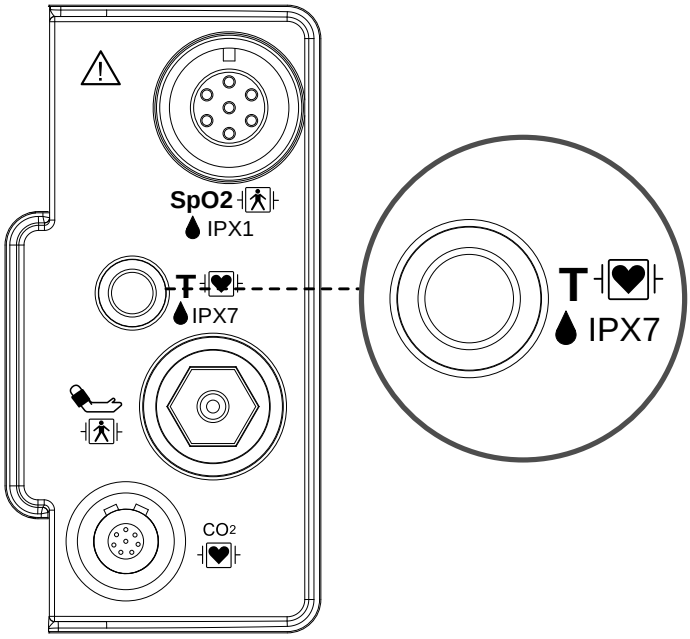
7.4 Trouble Shooting

7.1 Outline

This function is used to indicate the changes of resistance generated by the changes of temperature in numbers. The function involves the process of transferring the changes into electric signals.

Temperature Connector and Measuring Cable

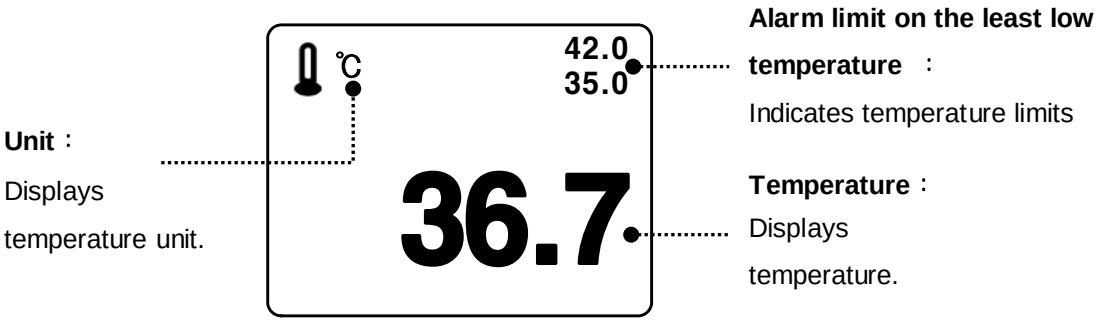
Temperature Connector



Temperature Measuring

Note
Temperature probe is correctly positioned and fixed to do not disconnect on the patient. Temperature cable is attached to the monitor. The TEMP cable connector is a high-insulation port and it is defibrillator-proof( ).

7.2 Temperature Data Window



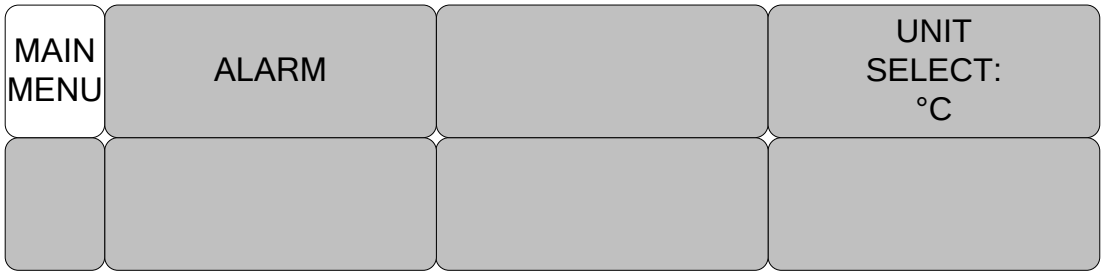
Note
The minimum measuring time required to obtain accurate readings at the specific body site is at least 3 minutes.

7.3 Temperature Data Setup

Turn the rotary wheel on the blue cursor to position the data window (refer to P.98), Select the menu button, and the following window is displayed.

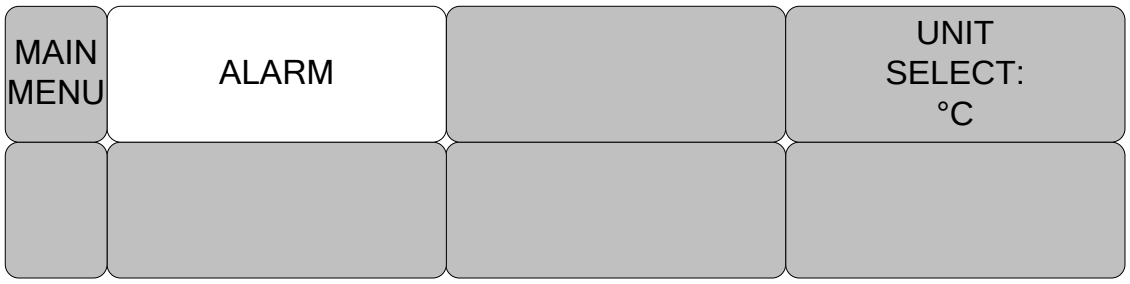
ALARM： Temperature measurement alarm set

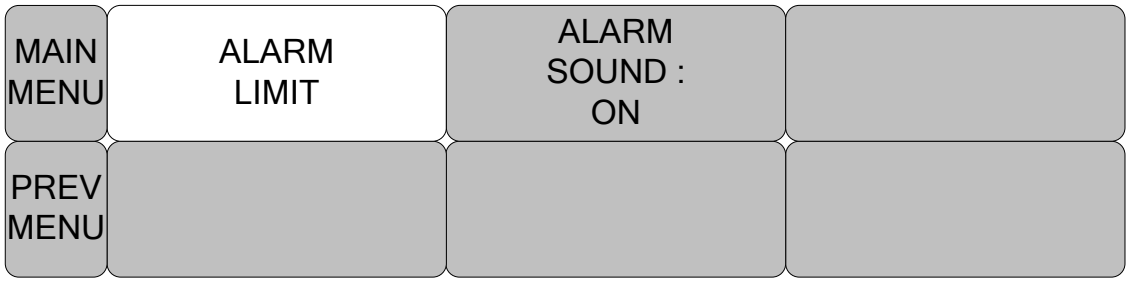
UNIT: Temperature measurement unit set



ALARM

Alarm menu provide ALARM LIMIT and ALARM SOUND.

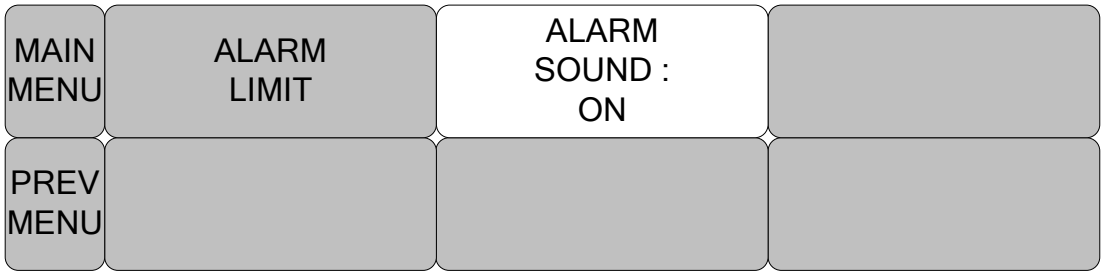




ALARM LIMIT

Setting numeric value is 15.0℃ ~ 45.0℃.

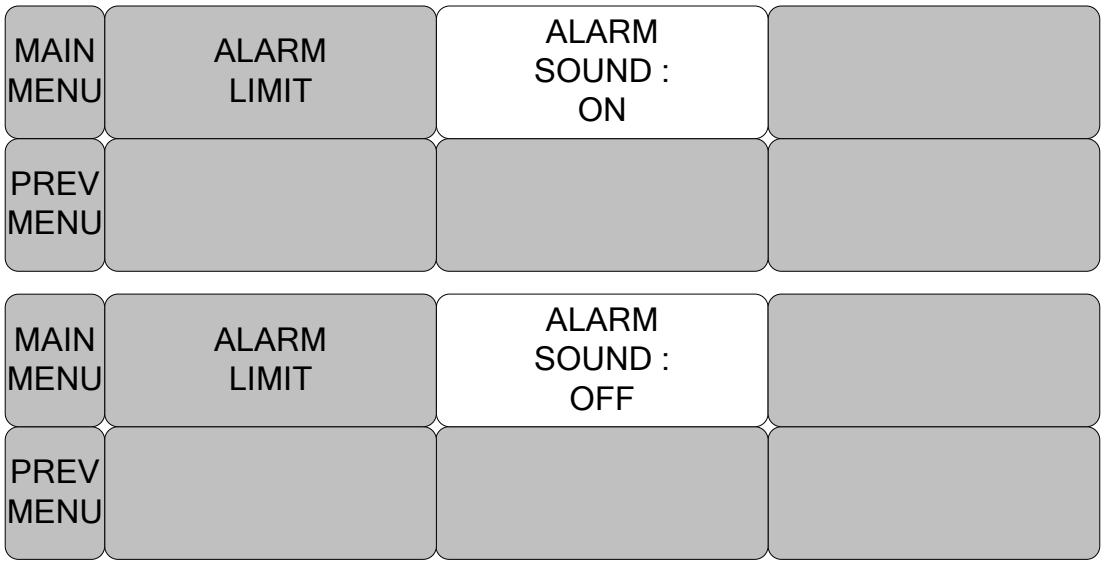
1. Move the ▶ mark to select either RETURN or TEMP, and press.
2. After pressing the cursor at TEMP, move it to LOW, and press.
3. When the color has changed, move the cursor again to select a target value, and press.
4. Move the cursor to HIGH and press. After the color has changed, move the cursor again to select a target value, and press. (One may choose HIGH first to get the same result.)
5. Select RETURN to get out of the menu.



TEMPERATURE ALARM LIMIT			
RETURN	UNITS	LOW	HIGH
TEMP	°C	30.0	42.0

ALARM SOUND

Warning sound or message displays configuration menu when an alarm is triggered.



UNIT SELECT

Able to select unit with °C, °F.

7.4 TROUBLESHOOTING

Check list

1. The temperature probe(YSI 400 series) is correctly positioned on the patient.
2. Temperature cable is attached to the monitor.
3. Temperature setup is adjusted, if necessary. Follow detailed procedures within this chapter.

TEMP Message

If you experience some problems with temperature monitoring, one of the following messages may be displayed in the TEMP parameter window.

- PROBE OFF : Probe is not properly connected. Check the probe.

- No temperature value will be displayed . Service on the monitor is required.

8. EtCO2

8.1 INTRODUCTION

Position of $EtCO_2$ Connector and Accessory

$EtCO_2$ ACCESSORY

8.2 $EtCO_2$ Parameter Window

8.3 $EtCO_2$ Parameter Setting Menu

8.4 $EtCO_2$ Parameter Setting Menu

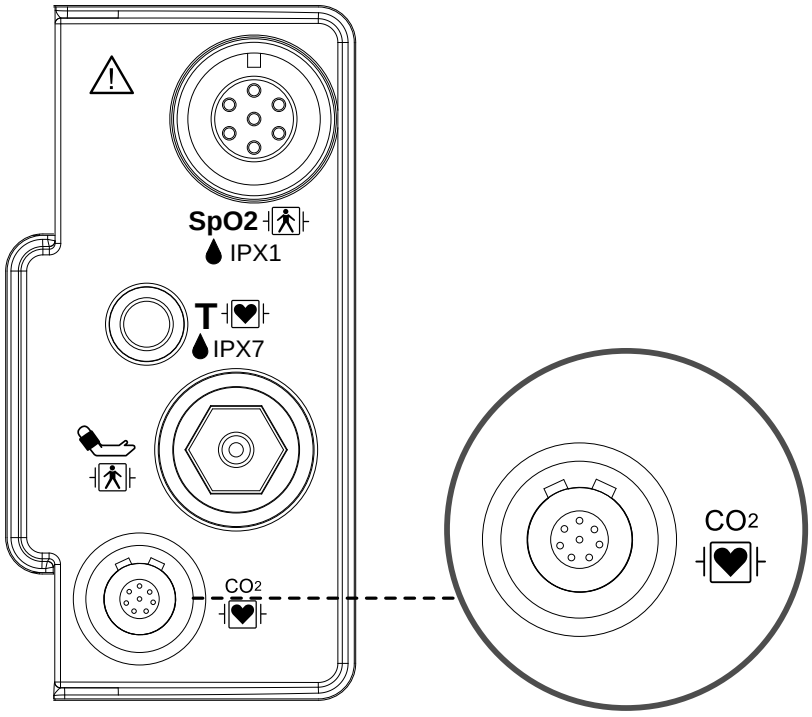
8.4 Trouble Shooting

8.1 Introduction

ETCO2(End-Tidal CO2) is a device to see the concentration of end-tidal carbon dioxide, which uses a method of measurement based on the non-dispersed IR absorption of CO2 using IR ray by sampling a certain part of respiration through pipe during respiration.

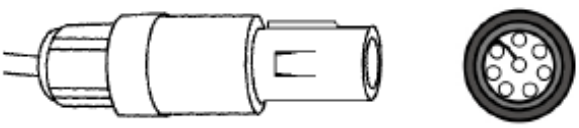
EtCO2 connector position and accessory
(Sidestream, Mainstream ; Respironics)

EtCO2 Connector



LoFlo sidestream CO2 sensor and connector

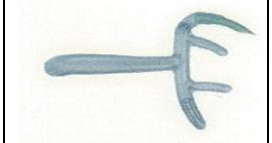
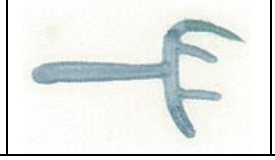
Sidestream sensor



Sidestream sensor connector

- EtCO2 accessories for sidestream applications

EtCO2 monitoring accessory uses the accessories for LoFlo™ sidestream module of Respironics Company.

The CO2 Sampling Cannula for sidestream Non-intubated applications			
3468ADU-00		Nasal CO_2 Sampling Cannula	ADULT
3468PED-00		Nasal CO_2 Sampling Cannula	PEDIATRIC
3468INF-00		Nasal CO_2 Sampling Cannula	INFANT/ NEONATAL
3470ADU-00		Oral/Nasal CO_2 Sampling Cannula	ADULT
3470PED-00		Oral/Nasal CO_2 Sampling Cannula	PEDIATRIC
3469ADU-00		Nasal CO_2 Sampling Cannula w/ O_2 Delivery	ADULT
3469PED-00		Nasal CO_2 Sampling Cannula w/ O_2 Delivery	PEDIATRIC
3469INF-00		Nasal CO_2 Sampling Cannula w/ O_2 Delivery	INFANT/ NEONATAL
3471ADU-00		Oral/Nasal CO_2 Sampling Cannula w/ O_2 Delivery	ADULT
3471PED-00		Oral/Nasal CO_2 Sampling Cannula w/ O_2 Delivery	PEDIATRIC

The airway adapters for sidestream intubated applications			
3473ADU-00		Airway Adapter Kit w/ Dehumidification Tubing	Weight: 4.5 grams Deadspace – adds approximately 7 cc of deadspace **Intended for use when monitoring patients with ET Tube sizes >4.0 mm**
3473INF-00		Airway Adapter Kit w/ Dehumidification Tubing	Weight: 5.8 grams Deadspace – adds approximately 1 cc of deadspace **Intended for use when monitoring patients with ET Tube sizes <=4.0 mm**

- Connecting the LoFlo Sample Kit

1. The sample cell of the sampling kit must be inserted into the sample cell receptacle of the LoFlo CO_2 Module as shown in Figure 1. A "click" will be heard when the sample cell is properly inserted.

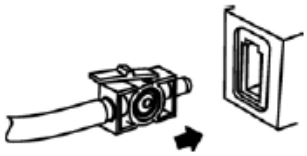


Figure 1

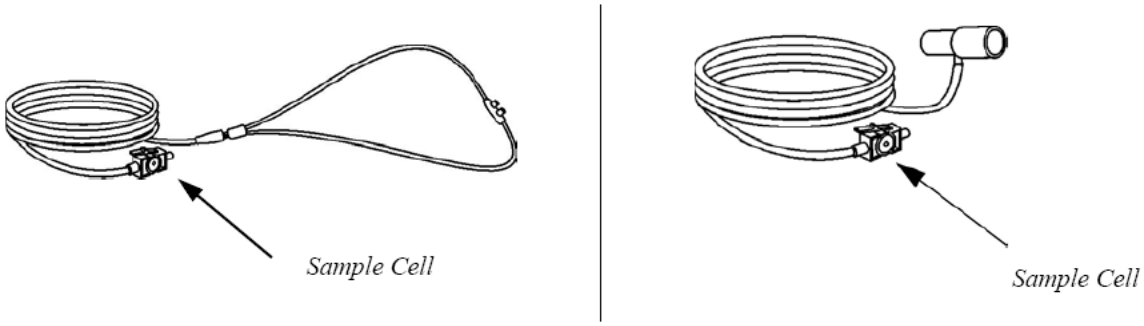


Figure 2

2. Inserting the sample cell into the receptacle automatically starts the sampling pump. Removal of the sample cell turns the sample pump off.

3. To remove the sampling kit sample cell from the sample cell receptacle, press down on the locking tab and pull the sample cell from the sample cell receptacle.

- CAPNOSTAT 5 mainstream CO2 sensor and

Mainstream sensor

Mainstream sensor connector

- EtCO2 accessories for mainstream applications

EtCO2 monitoring accessory uses the accessories for CapnoStat 5 microstream sensor of Respironics Company.

The airway adapters for mainstream intubated applications		
6063-00		Single-Patient Use Airway Adapter
6312-00		Single-Patient Use Airway Adapter
7007-00		Reusable Airway Adapter
7053-00		Reusable Airway Adapter

- Connecting the CAPNOSTAT® 5 CO2 Sensor to the Host System

1. Insert the CAPNOSTAT 5 CO_2 Sensor connector into the receptacle of the host monitor as shown in Figure 1.

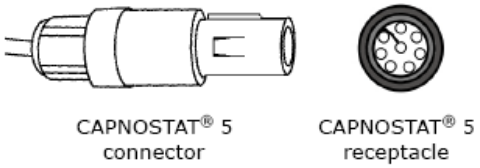


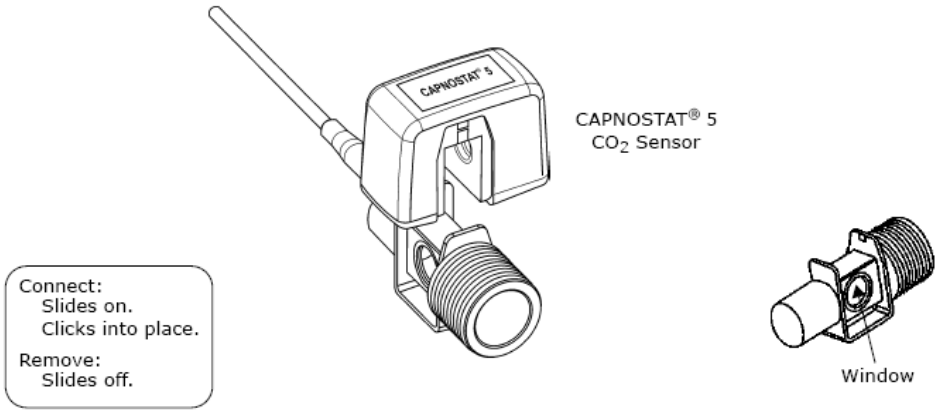
Figure 1

2. Make sure the arrows on the connector are at the top of the connector and line up the two keys of the connector with the receptacle and insert.

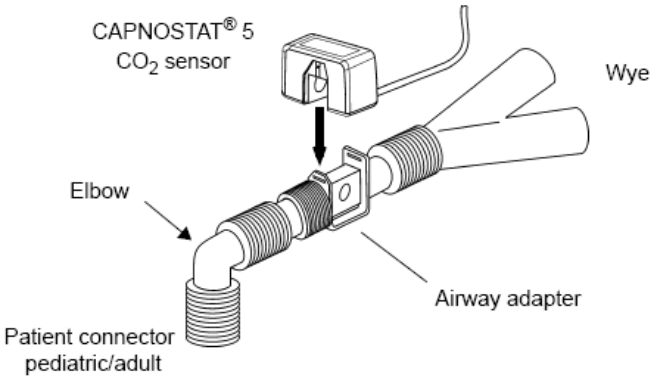
3. To remove the connector, grasp the body portion of the connector back and remove.

Note: Do not remove by pulling cable.

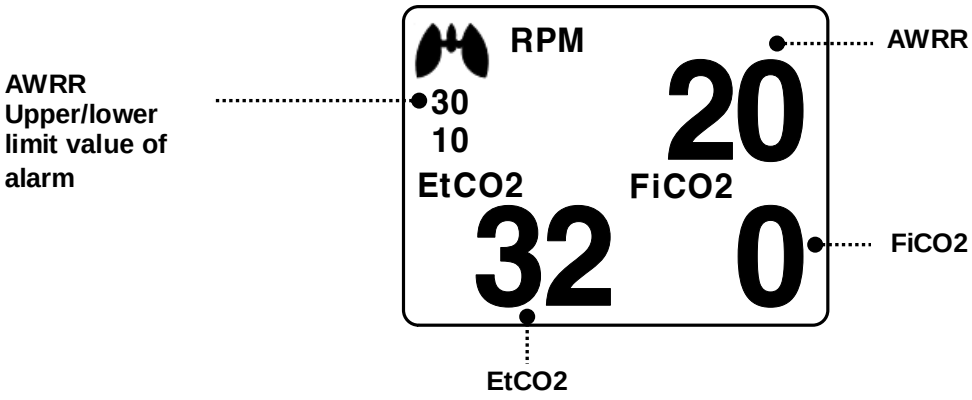
Shown below is the CAPNOSTAT 5 CO_2 Sensor connection to a Respironics Novametrix CO_2 adapter



Shown below is the CAPNOSTAT 5 CO_2 Sensor with a patient circuit:



8.2 EtCO2 Parameter Window



Upper/lower limit value of alarm: Display of alarm setting range value for concentration of CO_2

$EtCO_2$: Display of concentration value of carbon dioxide

AWRR: Display of the number of respirations per miniute

FiCO2: Display of concentration value of carbon dioxide during inspiration

Note
$EtCO_2$ waveform is always displayed if cable is connected.

8.3 EtCO2 Parameter Setting Menu

Turn the rotary wheel on the blue cursor to position the data window, Select the menu button, and the following window is displayed.

ALARM: A menu to set the alarm

SWEEP SPEED: Speed is changeable to 6.25, 12.5, 25mm/s.

SCALE: A menu to set the screen scale of measured waveform

SETUP: A menu to handle the information of EtCO2 Module

ZERO : When the adapter type is changed.

APNEA DETECT : Turn the APNEA detection alarm off and on

MAIN MENU	ALARM	SWEEP SPEED: 6.25mm/s	WAVEFORM SCALE: 40
	APNEA DETECT: OFF	ZERO	SETUP

ALARM LIMIT(Upper/lower limit value of alarm)

Upper/lower limit value of alarm differs depending on the position of measurement.

The basic setting range of alarm setting value for EtCO2, FiCO2, AWRR, APNEA.

MAIN MENU	ALARM	SWEEP SPEED: 6.25mm/s	WAVEFORM SCALE: 40
	APNEA DETECT: OFF	ZERO	SETUP

MAIN MENU	ALARM LIMIT	ALARM SOUND: OFF	
PREV MENU			

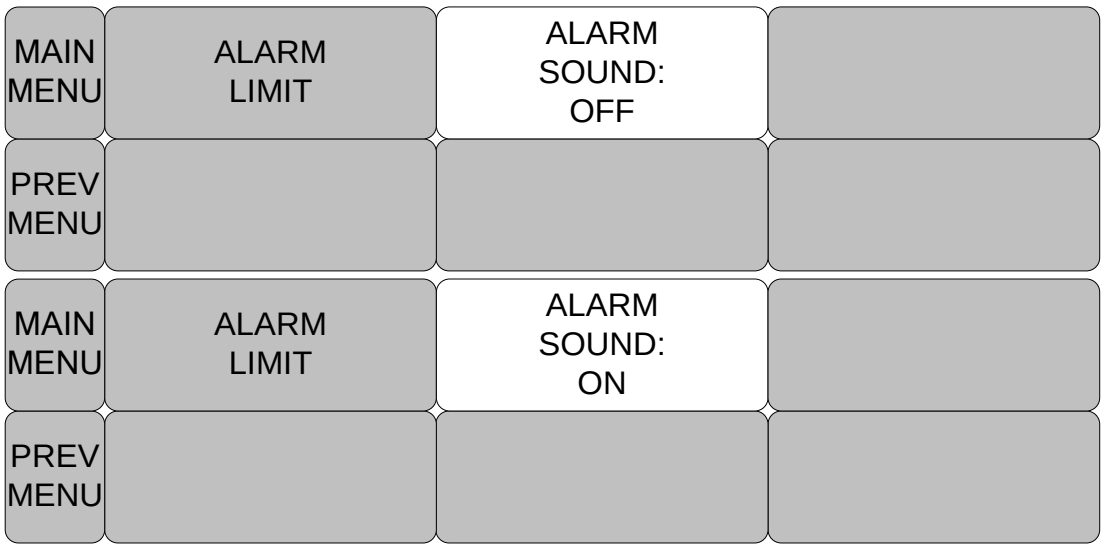
EtCO2 ALARM LIMIT			
RETURN	UNITS	LOW	HIGH
EtCO2	mmHg	25	50
FiCO2	mmHg	0	5
AWRR	RPM	10	30
APNEA	SEC	0	20

The following table shows standard alarm limit of parameter and setting value of scale when setting the label.

Parameter	Adult			Neonatal		
	Low	High	Scale	Low	High	Scale
EtCO2	25	50	40	25	50	40
FiCO2	0	5		0	5	
AWRR	10	30		15	100	
APNEA	0	20		0	20	

ALARM SOUND

Warning sound or message displays configuration menu when an alarm is triggered.



EtCO2 SWEEP SPEED

EtCO2 speed is 6.5mm/s.

Speed is changeable to 6.25, 12.5, 25mm/s.

MAIN MENU	ALARM	SWEEP SPEED: 6.25mm/s	WAVEFORM SCALE: 40
	APNEA DETECT: OFF	ZERO	SETUP

MAIN MENU	ALARM	SWEEP SPEED: 6.25mm/s	> 6.25mm/s 12.5mm/s 25mm/s
	APNEA DETECT: OFF		

WAVEFORM SCALE (Measured waveform scale setting)

This sets the range of measured waveform versus pressure.

Selectable numerical value means the maximum pressure range value that is shown with waveform.

Pressing the knob switch key and then selecting the desired range value displays the selected pressure range value below the upper dotted line among two dotted lines in the left middle of wave window.

MAIN MENU	ALARM	SWEEP SPEED: 6.25mm/s	WAVEFORM SCALE: 40
	APNEA DETECT: OFF	ZERO	SETUP

MAIN MENU	ALARM	WAVEFORM SCALE: 40	> 40mmHg 50mmHg 60mmHg 80mmHg 100mmHg
	APNEA DETECT: OFF		

SETUP (Various setting)

Different menus are applied to provide menu and information for handling the EtCO2 module.

MAIN MENU	ALARM	SWEEP SPEED: 6.25mm/s	WAVEFORM SCALE: 40
	APNEA DETECT: OFF	ZERO	SETUP

- MODULE SETUP

MAIN MENU	MODULE SETUP	MODULE INFO	
PREV MENU	MODULE RESET		

MODULE INFO SET	
RETURN	CONTENTS
BAROMETRIC PRESSURE	760
GAS TEMPERATURE	35.0
NO BREATH DETECT TIMEOUT	10
O2 COMPENSATION	16
ANESTHETIC AGENT	0.0
BALANCE GAS	ROOM AIR
CURRENT ETCO2 TIME PERIOD	10 SECONDS
CURRENT CO2 UNIT	mmHg
SLEEP MODE	NORMAL OP
ZERO GAS TYPE	ZERO on ROOM AIR
DISABLE SAMPLING PUMP	NORMAL OP

- BAROMETRIC PRESSURE: This setting is used to set current Barometric Pressure.

- GAS TEMPERATURE: This setting is used to set temperature of the gas mixture. This setting is useful when bench testing using static gasses where the temperature is often room temperature or below.

-NO BREATH DETECT TIMEOUT: This setting is used to set the no breaths detected time-out. This time-out is the time period in seconds following the last detected breath at which the Capnostat will signal no breaths detected.

-O2 COMPENSATION: O2 Compensation

-ANESTHETIC AGENT: Anesthetic agent

-BALANCE GAS: Use this setting to correct for the compensation of the gas mixture administered to the patient. Anesthetic agent is ignored when the balance gas is set to helium.

-CURRENT ETCO2 TIME PERIOD: This setting is used to set the calculation period of the $ETCO_2$ value. The end-tidal CO_2 value is the highest peak CO_2 value of all end of expirations (end of breaths) over the selected time period. If less than two breaths exist in the selected time period, the value will be the maximum $ETCO_2$ value for the last two breaths.

-CURRENT CO2 UNIT: Continuous waveform mode commands (the CO_2 Waveform Mode command [command 80h] and the CO_2/O_2 Waveform Mode command [command 90h]) MUST NOT be active when this command is used otherwise this command will be ignored and the setting will remain unchanged.

-SLEEP MODE: Sleep mode is used to save power when the host monitor is in standby mode. There are two sleep modes available for the Capnostat. Using Sleep Mode 1 maintains the heaters so the Capnostat is able to run immediately after exiting the sleep mode. Mode 2 will require the Capnostat to go through its warm up sequence when exiting this mode and a delay will be introduced until the system has stabilized.

-ZERO GAS TYPE: When performing a zero on room air, this setting should be set to room air (the default). Only change to nitrogen (N_2) when performing a zero on 100% N_2 gas; this is provided for use in a laboratory environment.

-DISABLE SAMPLING PUMP: This setting allows the pump to be forced off. In Normal Operating Mode, the pump will be turned on when the sampling cell is connected and no pneumatic system errors are detected. In Pump Disabled Mode, the pump will remain off in all circumstances.

- MODULE INFORMATION

MAIN MENU	MODULE SETUP	MODULE INFO	
PREV MENU	MODULE RESET		

MODULE INFORMATION	
RETURN	CONTENTS
SENSOR PN	1022054
OEM ID	0X1
SENSOR SN	SN3257
HW REVISION NUM	A
TOTAL USE TIME	1660 MIN.
LAST ZERO TIME	0 MIN.
PUMP TOTAL USE TIME	1595 MIN.
PUMP MAX USE TIME	1440000 MIN.

- MODULE RESET

This performs a function to reset handling the EtCO2 module.

MAIN MENU	MODULE SETUP	MODULE INFO	
PREV MENU	MODULE RESET		

APNEA DETECT

Turn the APNEA detection alarm off and on

MAIN MENU	ALARM	SWEEP SPEED: 6.25mm/s	WAVEFORM SCALE: 40
	APNEA DETECT: OFF	ZERO	SETUP

MAIN MENU	ALARM	SWEEP SPEED: 6.25mm/s	WAVEFORM SCALE: 40
	APNEA DETECT: ON	ZERO	SETUP

ZERO

This function is used to initiate a Sensor zero.

The adapter zero allows the CAPNOSTAT5 to adjust to the optical characteristics of each of the different adapter types.

The sample cell zero allows the LoFlo C5 CO2 Module to adjust to the optical characteristics of the sample cell.

• System does not allow adapter zero for 20 seconds after the last breath is detected.

• System does not allow adapter zero if temperature is not stable

• An adapter zero cannot be performed if a sample cell is not connected to the module

CAPNOSTAT® 5 CO2 Sensor Adapter Zero

Adapter Zero

1. Set the BM1 to the zeroing function.
2. Connect the CAPNOSTAT 5 CO2 Sensor
3. Place the CAPNOSTAT 5 CO2 Sensor onto a clean and dry CO2 adapter that is exposed to room air and away from all sources of CO2, including the ventilator, the patient's breath and your own.
4. Start the adapter zero. The maximum time for a CAPNOSTAT zero is 40 seconds. The typical time for a zero is 15~20 seconds.

Note
For best result, connect the CAPNOSTAT 5 CO2 Sensor to an adapter and wait 2 minutes before performing the Adapter Zero procedure.

Zeroing the LoFlo Module

Note
A Sample Cell Zero is not required when switching from one sampling accessory to another.

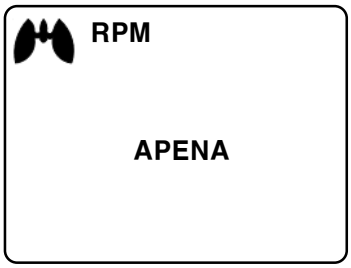
Sample Cell Zero

To perform a Sample Cell Zero:

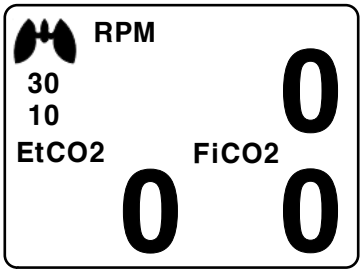
1. Set the BM1 to the zeroing function.
2. Connect the LoFlo C5 CO2 Module and, if necessary, wait for the sensor warm-up message to clear.
3. Connect a LoFlo Sampling accessory to the LoFlo C5 CO2 Module, and make certain that the accessory is exposed to room air and away from all sources of CO2, including the ventilator, the patient's breath and your own.
4. Start the Sample Cell Zero. The maximum time for a LoFlo zero is 40 seconds. The typical time for a zero is 15-20 seconds.

Note
For best results, wait 5 minutes to allow the LoFlo C5 CO2 Module to warm up before performing the Sample Cell Zero procedure.

APNEA ALARM: This performs a function to set the display of apnea message alarm.
This displays a "apnea" message at the center of parameter window as shown in the figure below with apnea alarm on in case of apnea until the set apnea period is passed through.



With apnea alarm off, measured values are displayed instead of message.



Warning
If defibrillation is performed while doing CO2 monitoring, remove the CO2 FilterLine from patient Getting in touch with sensor cable without removing the FilterLine can result in serious electrical burn, shock, or injury due to electric discharge energy.

Note
In the following monitoring conditions, the measured values may be inaccurate. Read the measured values carefully. 1. When using this in an environment of using nitrous oxide gas of high concentration 2. When using this in an environment where abrupt temperature change takes place 3. When using this in an environment with severely high humidity.

Caution
● The measured values may be inaccurate when using this equipment for patients who have very fast or irregular respiration. ● When measuring CO2 from the patient under the anesthesia, check it when gas mixture comes in. Otherwise, the measured result values may be inaccurate. ● When using a anesthesia machine that uses a volatile anesthetic, CO2 values may be inaccurate.

8.4 TROUBLESHOOTING

Following is a list of some of the message that may appear on the monitor when monitoring CO2. The message should clear when normal operating criteria are met or a solution is found.

*** SENSOR OVER TEMP ("TEMP UNSTABLE")**

- Cause : The sensor temperature is greater than 40'C
- Solution : Make sure sensor is not exposed to extreme heat(heat lamp,etc.)

*** SENSOR FAULTY ("SENSOR FAULTY")**

- Cause: One of the following conditions exist : Capnostat Source Current Failure
  EEPROM Checksum Faulty , Hardware Error
- Solution : Check that the sensor is properly plugged in. Reinsert or reset the sensor if necessary.

*** SENSOR WARM UP ("SENSOR WARM UP")**

- Cause : Sensor under temperature , Temperature not stable, Source Current unstable
- Solution : This error condition is normal at startup. This error should clear when the warm up is complete.

*** CHECK SAMPLING LINE ("CHECK LINE")**

- Cause : This error occurs whenever the pneumatic pressure is outside the expected range.
- Solution : Check that the sampling line is not occluded or kinked. Replace the sample line

*** ZERO REQUIRED ("ZERO REQUIRED")**

- Cause : Zero Required , Zero Error
- Solution : To clear, check airway adapter and clean if necessary. If this does not correct the error, perform an adapter zero. If you must adapter zero more than once, a possible hardware error may exist.

*** CO2 OUT OF RANGE ("OUT OF RANGE")**

- Cause : The value being calculated is greater than the upper CO2 limit(150mmHg)
- Solution : If error persists, perform a zero.

*** CHECK AIRWAY ADAPTER ("CHECK ADAPTER")**

- Cause : Usually caused when the airway adapter is removed from the Capnostat or when there is an optical blockage on the windows of the airway adapter. May also be caused by failure to perform Capnostat zero to when adapter type is changed.
- Solution : To clear, clean airway adapter if mucus or moisture is seen. If the adapter is clean, perform a Capnostat zero.

9. DEFAULT SETTING VALUE

1. Adult Mode

Alarm level

	High	Medium	Low	Message
SpO_2 - %		0		
SpO_2- Rate		0		
NIBP		0		
EtCO2				0
FiCO2				0
AWRR				0
APNEA				0
T(℃/℉)				0
Lead Fault				0
Cable Off				0
Low Battery		0		

Parameter Limits

	Low	High
NIBP-S	80	200
NIBP-M	40	140
NIBP-D	20	120
SpO_2 - %	90	100
SpO_2 - Rate	50	150
EtCO2	10	50
FiCO2	--	5
AWRR	8	30
APNEA	--	20
T(℃/℉)	30.0 ℃ / 86.0 ℉	42.0 ℃ / 107.6 ℉

Display Defaults

Patient Age	**Adult**
NIBP Auto	**Off**
NIBP Cuff Size	**Adult**
ADULT Cuff Pressure	**170mmHg**
PED Cuff Pressure	**140mmHg**
NEO Cuff Pressure	**120mmHg**
NIBP Limit Type	**Systolic**
NIBP Units	**mmHg**
SpO_2 Check Probe	**Low Alarm**
Pulse Volume	**Off**
EtCO2- APNEA Detect	**Off**
EtCO2- APNEA	**Message Alarm**
Alarm Volume	**50%**
Units for Height	**cm**
Units for Weight	**kg**
Temperature Units	**°C**

2. Neonate Mode

Alarm level

	High	Medium	Low	Message
SpO_2 - %		0		
SpO_2- Rate		0		
NIBP		0		
EtCO2				0
FiCO2				0
AWRR				0
APNEA				0
T(℃/℉)				0
Lead Fault				0
Cable Off				0
Low Battery		0		

Parameter Limits

	Low	High
NIBP-S	40	100
NIBP-M	30	70
NIBP-D	20	60
SpO_2 - %	88	100
SpO_2 - Rate	90	200
EtCO2	10	50
FiCO2	--	5
AWRR	15	100
APNEA	--	20
T(℃/℉)	30.0 ℃ / 86.0 ℉	42.0 ℃ / 107.6 ℉

Display Defaults

Patient Age	**0~2 years**
NIBP Auto	**Off**
NIBP Cuff Size	**Adult**
ADULT Cuff Pressure	**170mmHg**
PED Cuff Pressure	**140mmHg**
NEO Cuff Pressure	**120mmHg**
NIBP Limit Type	**Systolic**
NIBP Units	**mmHg**
SpO_2 Check Probe	**Low Alarm**
Pulse Volume	**Off**
EtCO2- APNEA Detect	**Off**
EtCO2- APNEA	**Message Alarm**
Alarm Volume	**50%**
Units for Height	**cm**
Units for Weight	**kg**
Temperature Units	**°C**
Units for Weight	**kg**
Temperature Units	**°C**

3. Pediatric Mode

Alarm level

	High	Medium	Low	Message
SpO_2 - %		0		
SpO_2- Rate		0		
NIBP		0		
EtCO2				0
FiCO2				0
AWRR				0
APNEA				0
T(°C/°F)				0
Lead Fault				0
Cable Off				0
Low Battery		0		

Parameter Limits

	Low	High
NIBP-S	60	160
NIBP-M	40	120
NIBP-D	30	100
SpO_2 - %	90	100
SpO_2 - Rate	70	180
EtCO2	10	50
FiCO2	--	5
AWRR	10	50
APNEA	--	20
T(°C/°F)	30.0 ℃ / 86.0 °F	42.0 ℃ / 107.6 °F

Display Defaults

Patient Age	**3~16 years**
NIBP Auto	**Off**
NIBP Cuff Size	**PED**
ADULT Cuff Pressure	**170mmHg**
PED Cuff Pressure	**140mmHg**
NEO Cuff Pressure	**120mmHg**
NIBP Limit Type	**Systolic**
NIBP Units	**mmHg**
SpO_2 Check Probe	**Low Alarm**
Pulse Volume	**Off**
EtCO2- APNEA Detect	**Off**
EtCO2- APNEA	**Message Alarm**
Alarm Volume	**50%**
Units for Height	**cm**
Units for Weight	**kg**
Temperature Units	**°C**
Units for Weight	**kg**
Temperature Units	**°C**

SPOT MODE

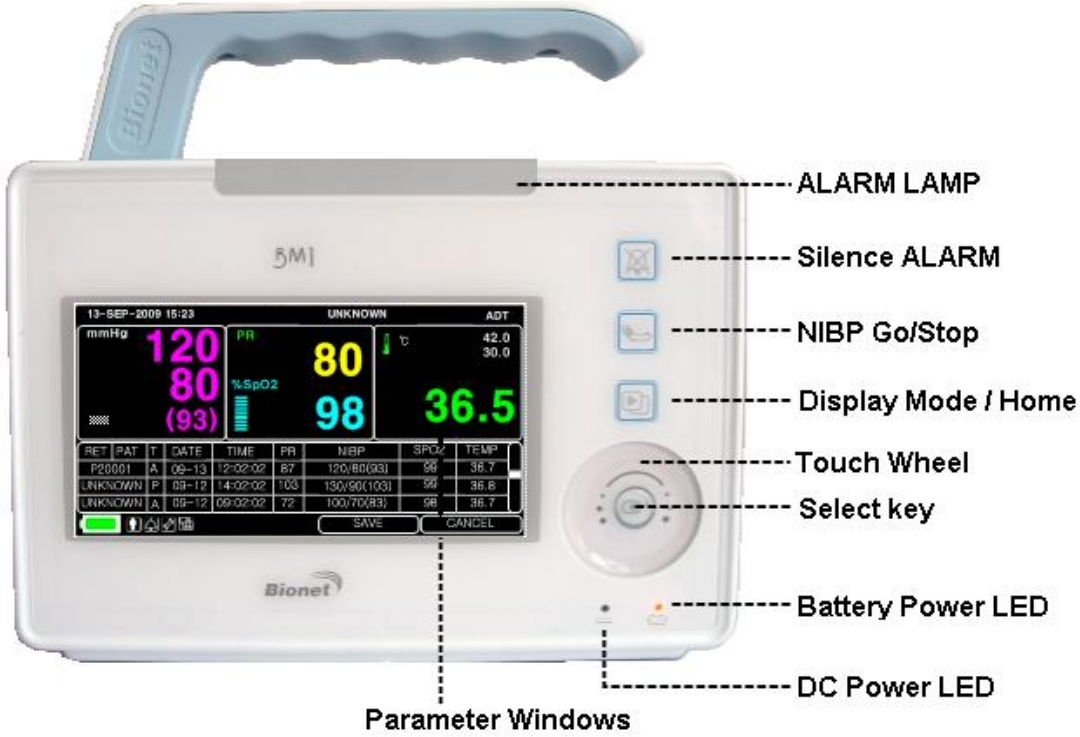
1. General Operation
2. Patient/Data Management
3. Setup
4. Trend
5. SpO2
6. NIBP
7. Temperature

1. General Operation

1.1 Function and key

The front panel of this product consists of an LCD screen and four Touch function keys and one Touch Wheel.

Operating the BM1 Spot Monitor



Operation Key

1. Alarm： Stop alarm sound.
   First press stops the current alarm for one minute
   Second press stops the all alarm for five minutes.
   Third press stops the all alarm off.
   Fourth press makes the alarm back to the original setting.
2. Blood Pressure：Manually completes measuring blood pressure.
3. Display Mode / Home : Change general display and big parameter display , and achieve Home Key function in main display in sub menu.
4. Touch Wheel Key：This key is used to select menu by turning it clock or anticlockwise to move cursors.

1.2 Screen Generating Display Mode

There are 3 types of screen generating display mode.

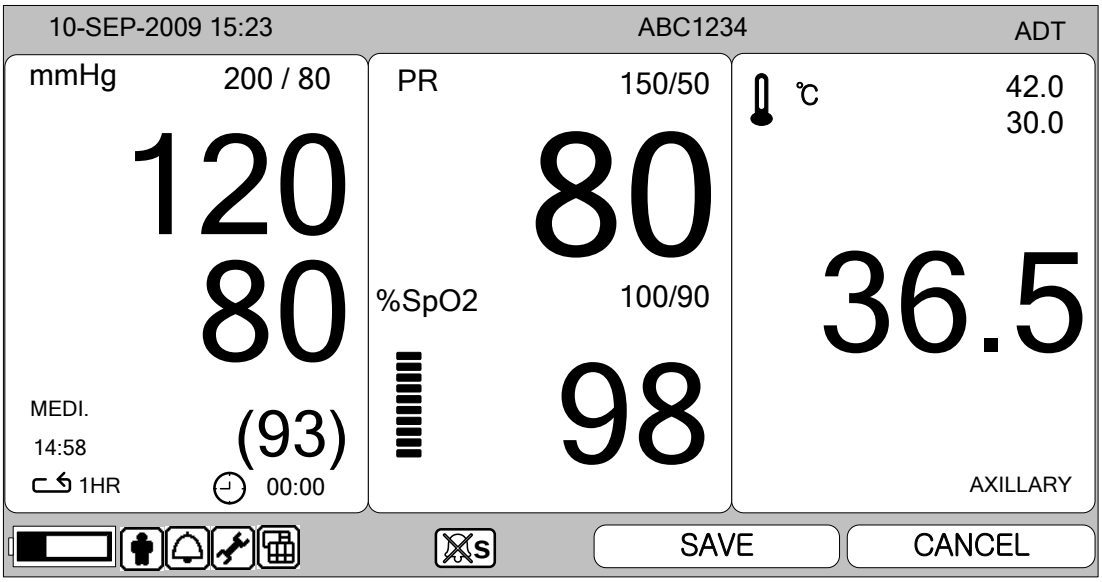
Select the screen display mode icon or press supplement key to change the screen display

TEXT VIEW (test generating mode): Display the bigger number on the screen.

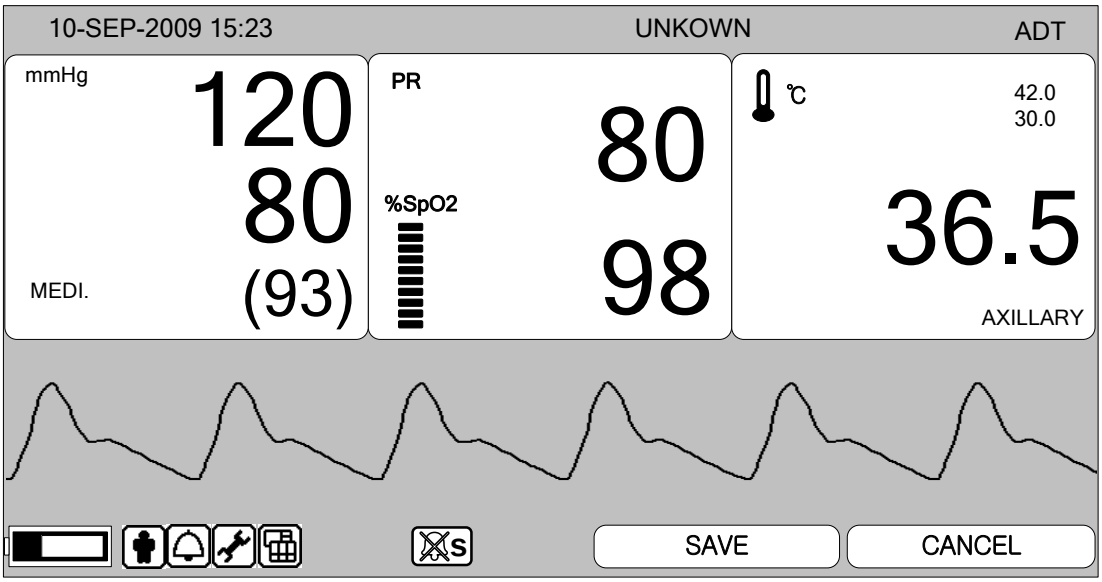
GRAPHIC VIEW (wave pattern generation mode): Generate parameter numeric value and SPO2 wave pattern together.

RECORD LIST VIEW (record list generating mode): Print Record list and parameter numeric value together.

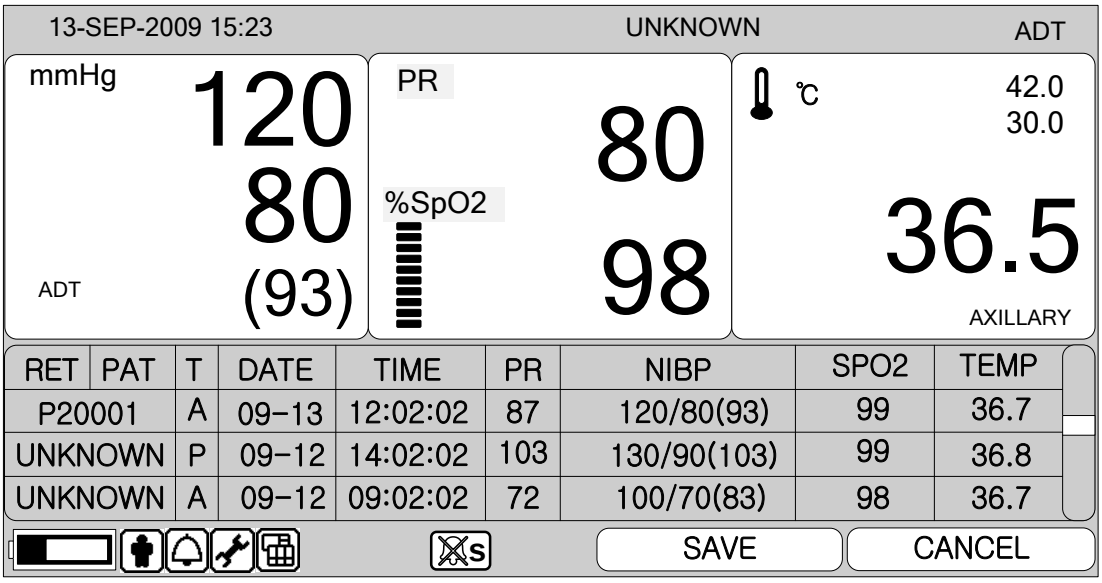
- TEXT VIEW



- **GRAPHIC VIEW**

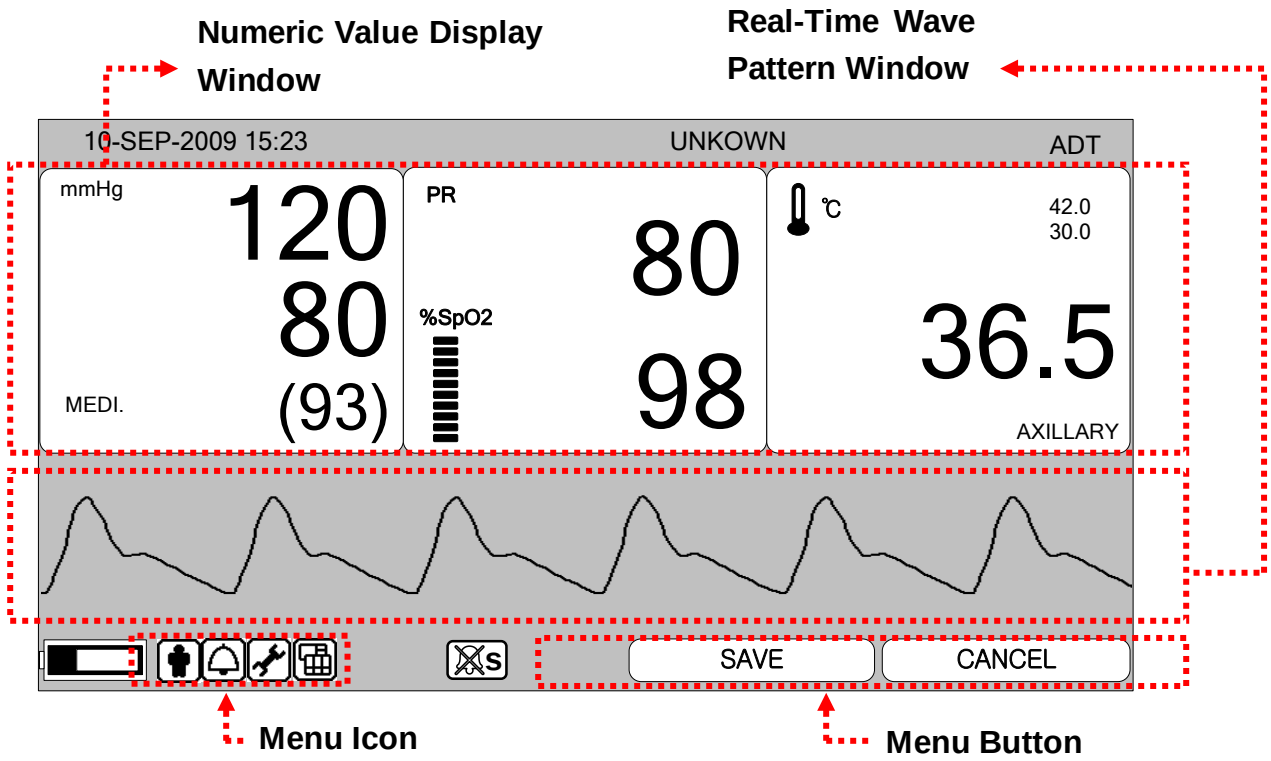


- **RECORD LIST VIEW**



1.3 Standard Menu Operation

Screen Organization

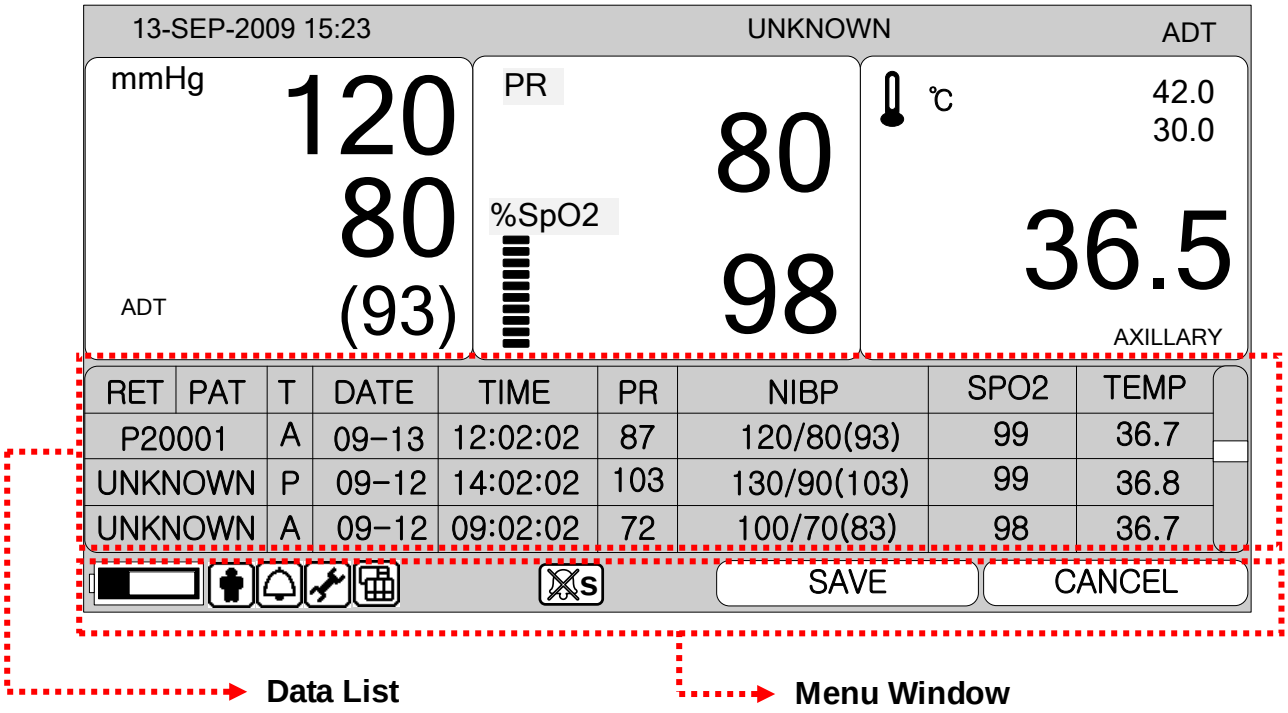


Real Time Wave Pattern Window： Display measured Wave Pattern Window

Numeric Value Window：There are 3 windows in it and each window displays analyzed data and setting status.

Menu Icon：The menu to select the icon.

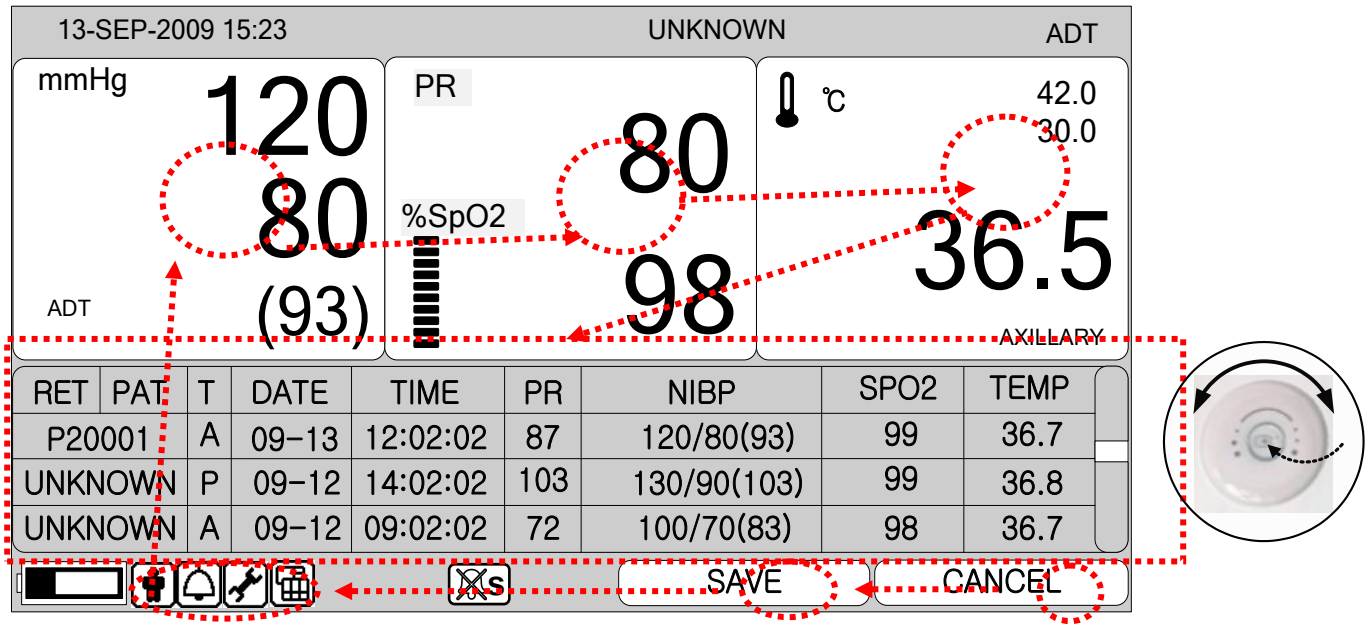
Menu Button: A button to save the data or delete.



Menu Window：Menus appears on window. It appears when the menu activated.

Data List: Display saved Data list.

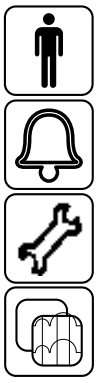
Menu Select



When the Trim Knob Key is turned, Menus are selected in the order indicated above. The menus move to the right in the order of (NIBP) → (SPO2) → (TEMP) → [(RECORD LIST)] → (CANCEL) → (SAVE) → (VIEWER MODE) → (SETUP) → (ALARM) → (PATIENT)

Data list mode does not appear in the Large Parameter mode and Graphic View Mode

Menu Icon Composition



Patient Icon: Patient register and delete.

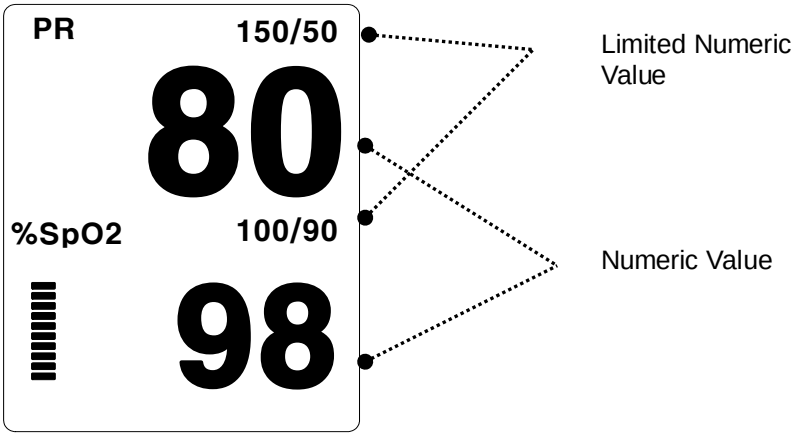
Alarm Icon: Setup alarm.

Setup Icon: Setup Standard Numeric Value.

Viewer Mode: Change the screen display

Numeric Value Window

It displays measured numeric value, functional setting, and limited numeric value.



Select Menu Using by Touch wheel Key

A right-hand turn makes a movement in a clockwise direction.

A left-hand turn makes a movement in an anti-clockwise direction.

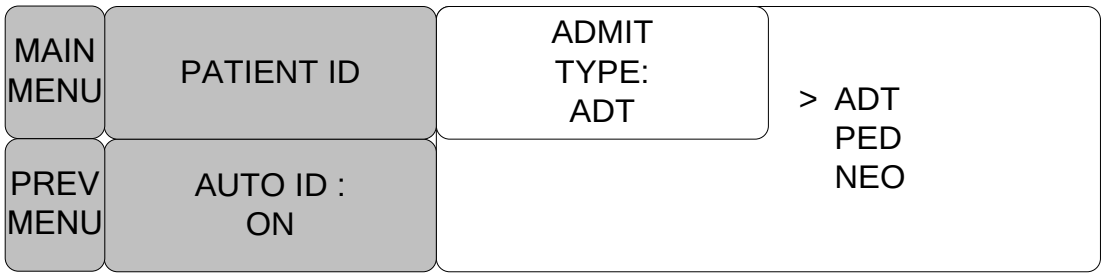
A selection is made by touching the center of touch Wheel Key.

Select Arrow Item Menu

Move to the left：Turn touch wheel Key to the left.

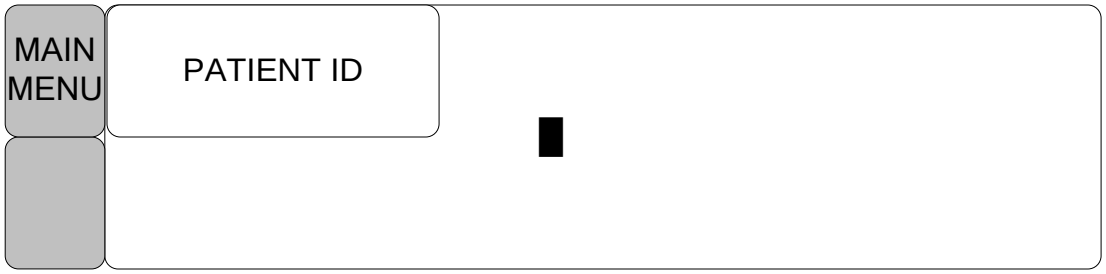
Move to the right： Turn touch wheel Key to the right.

Selection is made by pressing the touch wheel Key. Exit out of the menu after the selection.

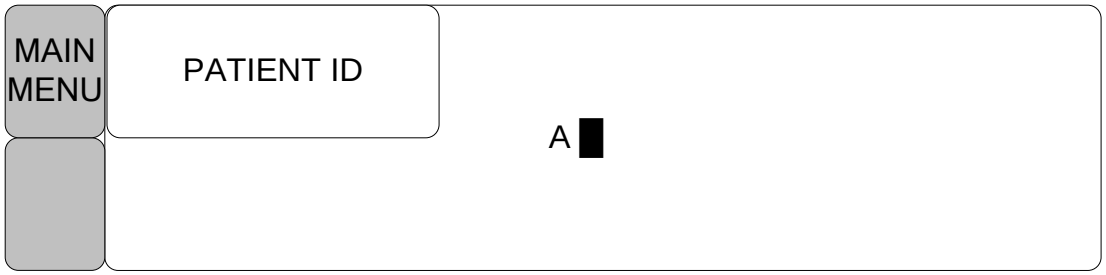


Letter Arrangement Menu

The following figure shows the screen where the word sequence menu is activated within the word sequence correction menu. Here, the cursor moves over the words when the touch wheel Key is turned in the clockwise direction.



The above figure shows how the cursor moves on the screen. The cursor moves according to the direction the touch wheel Key is turned. Press the touch wheel Key if you want to change a letter currently on the screen.



The above figure shows how the cursor is selected to change a letter. Right-hand turning of the touch wheel Key makes it possible to select in the order of A-Z, 0-9, and blank, while left turning makes the movement in the opposite direction.

Once a letter or a number is selected, the screen comes back to the condition where the same process of selection can be made. One may move to the menu item in the left of the screen to end the process, which is completed by touching touch wheel Key. After completion, the screen comes back to the earlier picture.

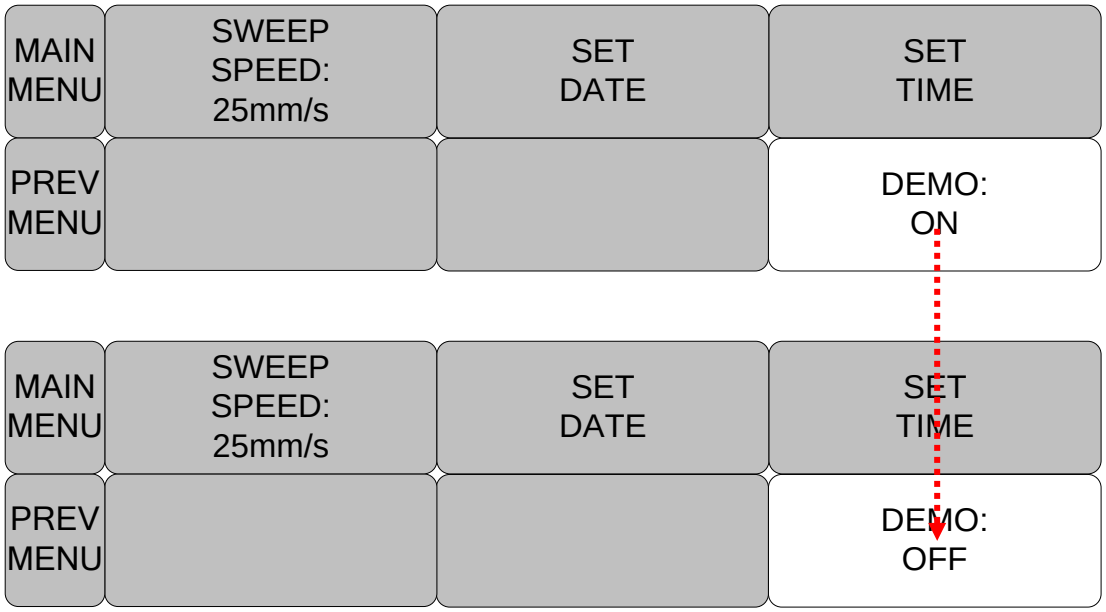
List selective menu

Whenever the square moves, a selected letter or a number is highlighted displaying its value.

RET	PAT	T	DATE	TIME	PR	NIBP	SPO2	TEMP
	P20001	A	09-13	12:02:02	87	120/80(93)	99	36.7
UNKNOWN		P	09-12	14:02:02	103	130/90(103)	99	36.8
UNKNOWN		A	09-12	09:02:02	72	100/70(83)	98	36.7

Operation Menu

The set up value changes without a selection when the menu is moved.



2. PATIENT/DATA MANAGEMENT

2.1 Outline

Resister patient's ID and name to save data of each patient.

Divide to patient's ID and type.

Patient's type divided as adult, baby, and Infant.

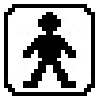
The screen initializes after once saved patient's record in Spot mode.

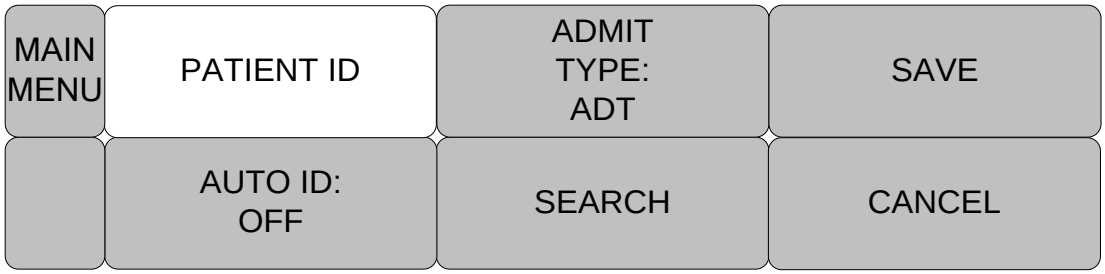
Register the patient whenever you measure them or select from the patient's list to save the patient in Spot Mode.

Without registration of patient, the patient's ID is "UNKNOWN" (When selected off in AUTO ID) or " 01 01 10 0000 " (DD/MM/YY 0000 ~ 4000 , When selected on in AUTO ID) and maintains previous numeric value in Type.

2.2 Admit

Select patient icon in Menu icon





When selected "OFF" in AUTO ID menu

Select ID menu in menu window and register patient ID. After the registration, select ID menu in previous menu window.

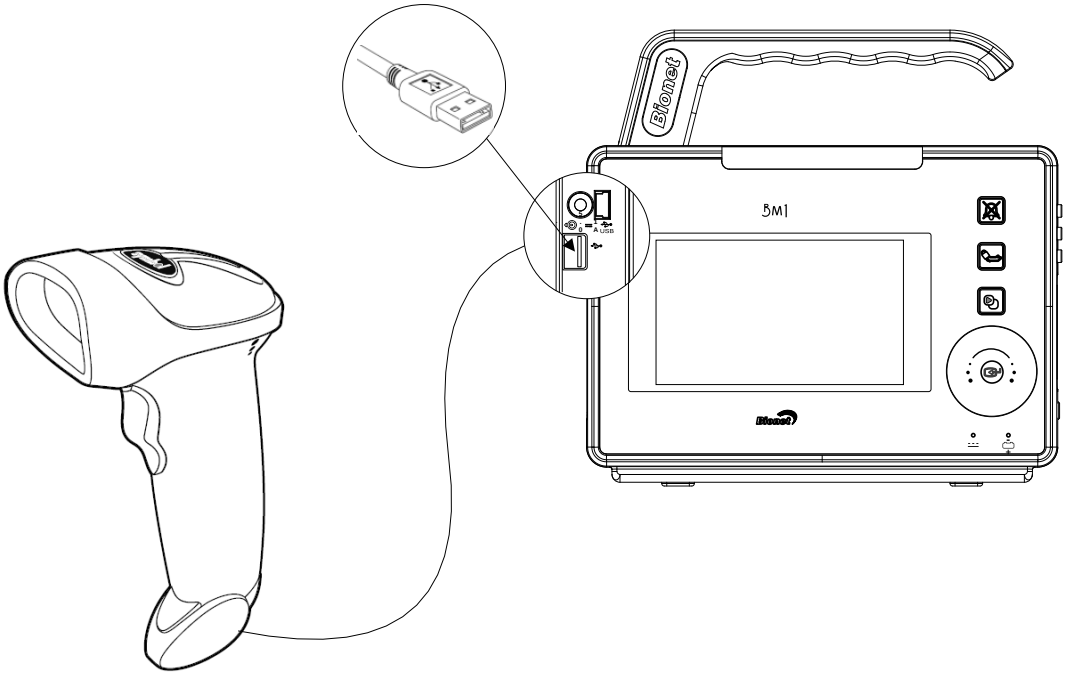
If selected "ON" in AUTO ID menu. Patient ID is registered automatically, do not need patient ID registration.

Patient ID's registration form marks by "DD/MM/YY 0000" ~ "DD/MM/YY 4000 "

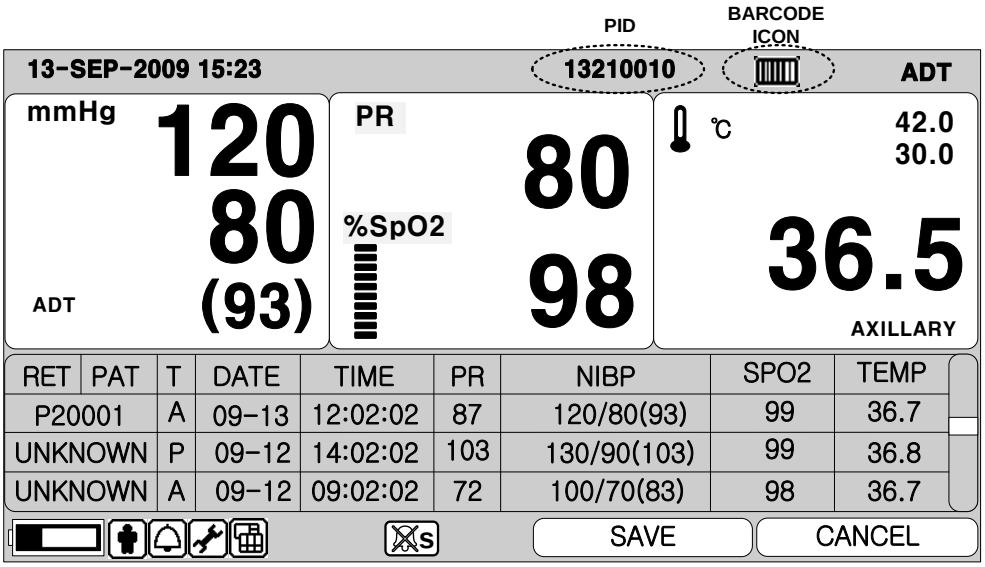
Ex) 01-JAN-2010 144 : " 01 01 10 0144 "

Admit Patient ID using the Barcode Scanner

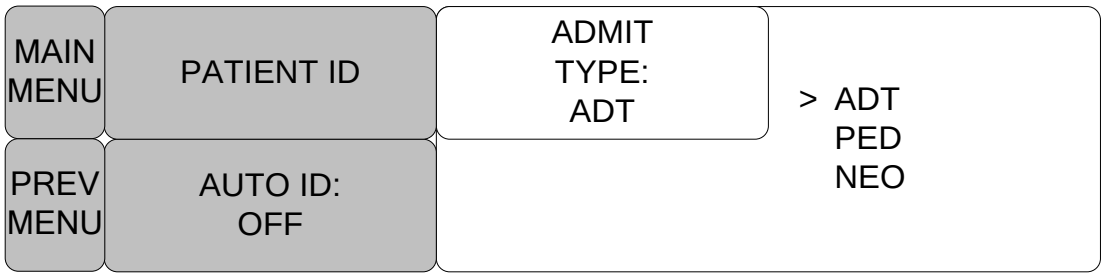
Using the USB barcode scanner, this product can admit the PATIENT ID in barcode form to the device. First connect the barcode scanner to the USB HOST connecter on the left side (from the front) of the device, as shown below. Barcode functionality can be used once after BEEP sound is made and barcode icon is displayed at the upper part of the screen.



ID will be scanned then sent to device after aligning index LED from the scanner to desired barcode and pressing input button. Sent ID will be displayed at the upper-right part of the display.

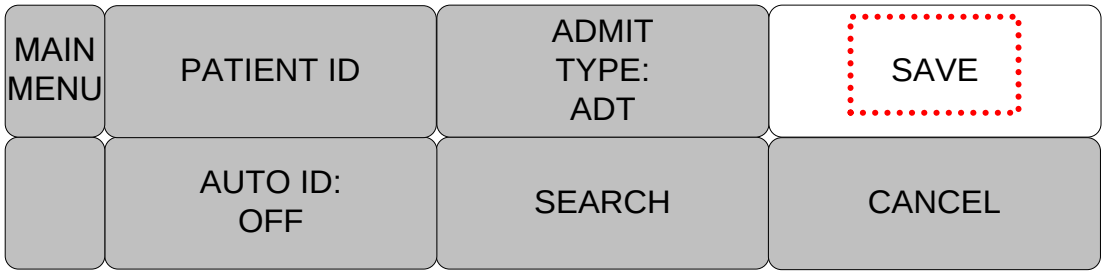


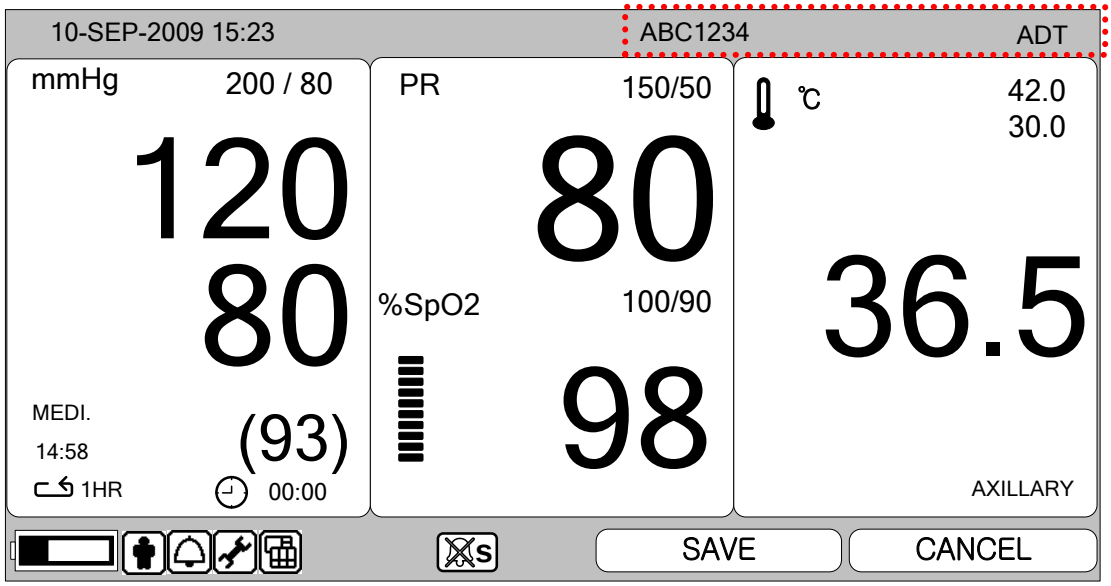
Select TYPE of menu in the menu window and register type of patient.



Select save menu and complete patient registration.

Display registered patient's ID and Type on the top of the screen.

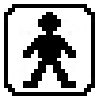




2.3 Select Patient in Admit Information

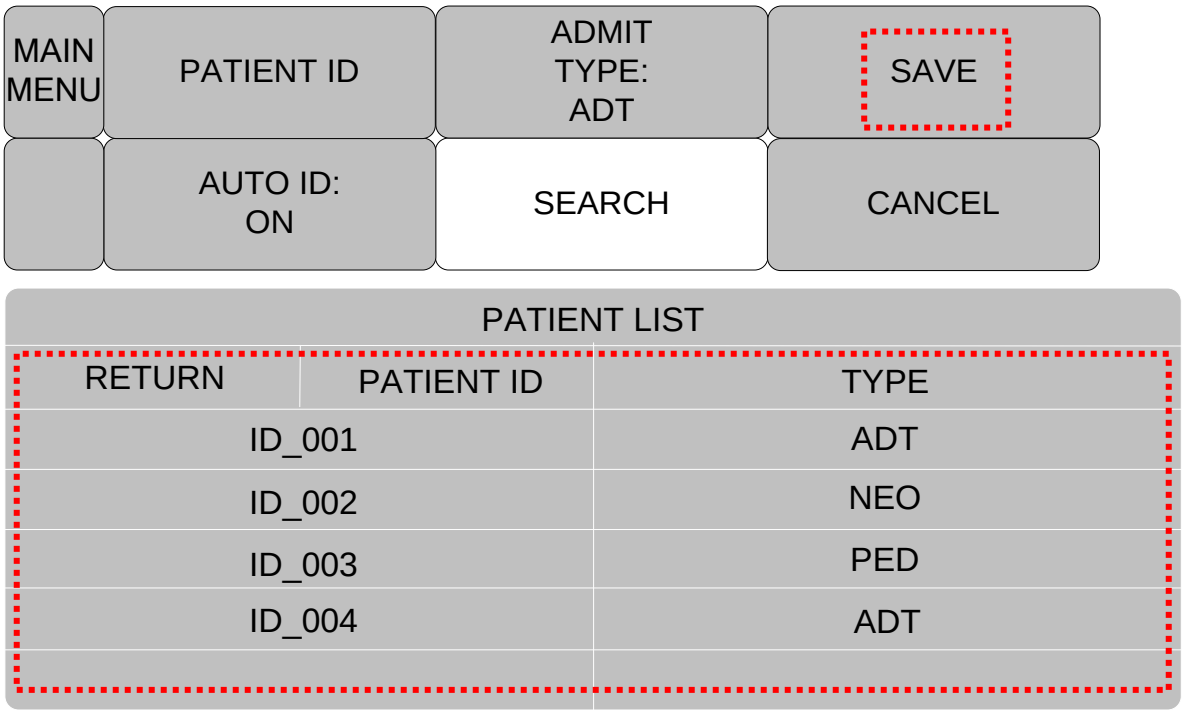
Able to select recoded patient in the patient list

Select patient icon in menu icon.



Select search menu and Confirm patient list in menu window.

The patient list is the patient who already has measured data.



Select the patient's ID by using touch wheel button then register.

Select RETURN menu at the left top of the list to move to the top menu.

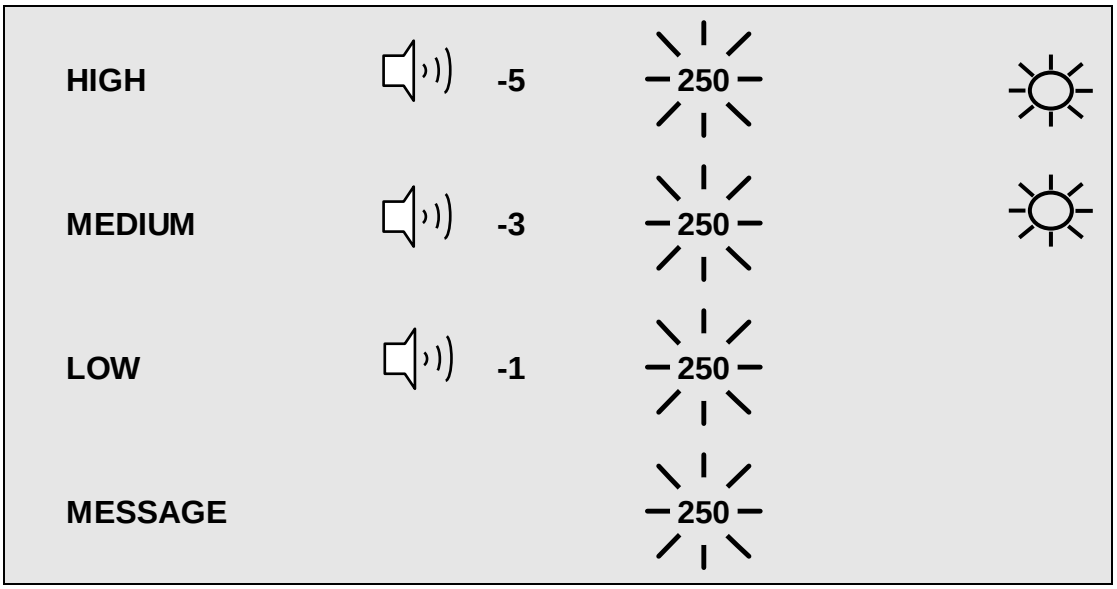
Registered patient's ID and type displays on top of the screen.

2.4 Alarm Outline

Alarm is divided into two, alarm for the patient's condition and for the product's condition.

The patient's alarm sound differs in order in order and volume according to the levels of HIGH, MEDIUM, LOW and MESSAGE.

Alarm for the Product



: Alarm sounds

: Number flashes

: Alarm lamp flashes

Alarm ICON

(SILENCED) : To silence an alarm tone when it sounds, Touch the Silence Alarm key on the front of the monitor. The current alarm will be silenced for 60 seconds and the icon is displayed on the screen.

(Alarm pause 5Min.): To start an alarm pause, touch Silence alarm key on the front of the monitor. Touch the key twice if an alarm is sounding when you want to start an alarm pause.

(All alarm off.): To start an alarm pause, Touch alarm key on the front of the monitor. Touch the key three times if an alarm is sounding when you want to start all alarm pause.

(Alarm VOL. OFF) : You can permanently turn the alarm volume off. The icon is displayed on the screen.

2.5 Alarm Setup

Select alarm icon in menu icon.

MAIN MENU	ALARM LIMIT		ALARM VOLUME: OFF
	ALARM SOUND	NURSE CALL: OFF	ALARM LEVEL

ALARM LIMITS：The machine enables one to see and change the limits of alarm for all parameter functions.

ALARM VOLUME：volume of each alarm can be adjusted in 10 step.

ALARM LEVEL：Priority of each parameter alarm can be set up.

ALARM REVIEW： Shows the priority order information for all alarms of each measurement.

NURSE CALL： Set the ON/OFF feature of the NURSE CALL.

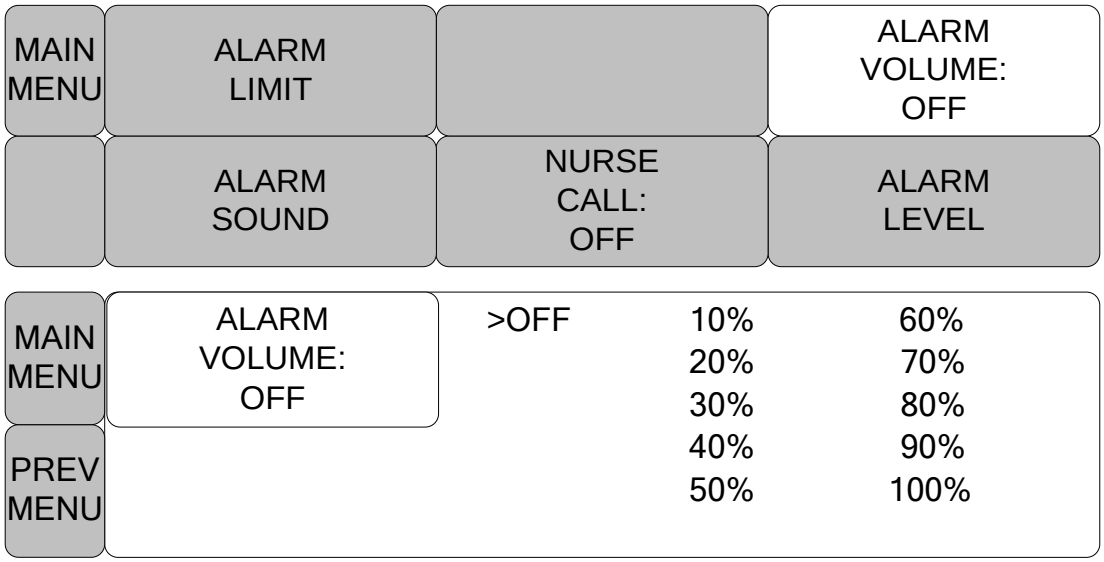
2.6 Alarm Limit

The machine enables one to see and change the limits of alarm for all parameter functions.

ALARM LIMITS			
RETURN	UNITS	LOW	HIGH
PR	BPM	50	150
SPO2-%	%	90	100
NIBP-S	mmHg	80	200
NIBP-M	mmHg	40	140
NIBP-D	mmHg	20	120
TEMP	℃	30.0	42.0

2.7 Alarm Volume

The volume of each alarm can be adjusted in 10 step.



2.8 Alarm Level

Priority of each parameter alarm can be set up.

PARAMETER ALARM LEVELS	
RETURN	ALARM LEVEL
PR	MEDIUM
SPO2-%	LOW
NIBP	MEDIUM
TEMP	MESSAGE
PROBE OFF	MESSAGE

2.9 Nurse Call

Set the ON/OFF feature of the NURSE CALL.

MAIN MENU	ALARM LIMIT		ALARM VOLUME: OFF
	ALARM SOUND	NURSE CALL: OFF	ALARM LEVEL

2.10 Alarm Sound

Set the ON/OFF feature of the Alarm Sound

MAIN MENU	ALARM LIMIT		ALARM VOLUME: OFF
	ALARM SOUND	NURSE CALL: OFF	ALARM LEVEL

PARAMETER ALARM SOUND	
RETURN	PARAMETER ALARM SOUND
SPO2-%	ON
NIBP	ON
TEMP	ON

3. SAVE RECORD

3.1 Outline
3.2 Adjust to Record Mode
3.3 Measure with Monitor Mode
3.3 Measure with Spot Mode
3.4 Save
3.5 Exit from Saving Mode

3.1 Outline

There are two modes to save data. One is called MONITOR mode. It saves the patient's ID/TYPE without re-register once patient registered. The other called SPOT mode. It initializes the machine once Patient's record saved.

SPOT mode is good for measuring many patients. MONITOR mode is used to apply for monitoring only one patient's constantly.

3.2 Adjust to Record Mode

Select setup icon in icon menu.

When SAVE MODE menu selected in menu widow, whenever touching touch wheel Key mode switches to MANUAL and AUTO in turn.

MAIN MENU	DISPLAY	SAVE MODE: MANUAL	USER SERVICE
	MAKER SERVICE	KEY SOUND: ON	SYSTEM

3.3 Measure with Monitor Mode

Measure after setup mode to AUTO

MAIN MENU	DISPLAY	SAVE MODE: AUTO	USER SERVICE
	MAKER SERVICE	KEY SOUND: ON	SYSTEM

It saves a measured data in 60 seconds.

Once NIBP measured, maintains measured data till the next measurement.

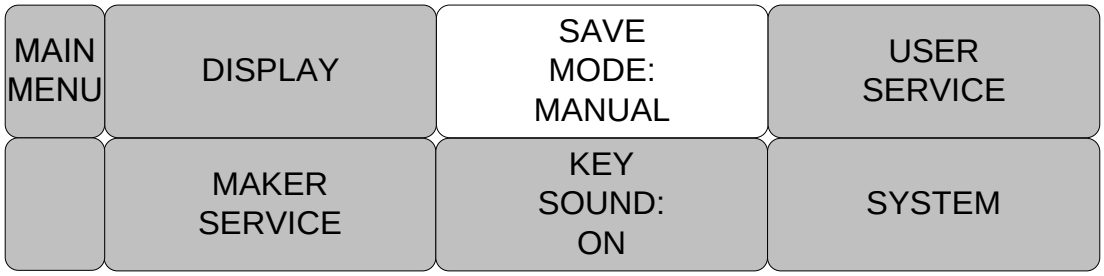
Not be able to delete measured Parameter data once save it in the machine completely Maintain ID and TYPE after complete saving.

Alarm limit numeric value does not change after saving.

If additional NIBP measure did not occur in the next 60 seconds then it is regard as NIBP measurement did not be performed.

3.4 Measure with Spot Mode

Measure after setup a mode to MANUAL.



It saves as press the button after measurement.

NIBP ending spot numeric value stores when NIBP is INTERVAL mode.

NIBP ending spot numeric value stores when NIBP is STAT mode

When NIBP is MANUAL mode, it saves measured numeric value after 60seconds of event below.

Event:

Input patient information

Measure NIBP

Measure SpO2

When new event occur in 60 seconds after pervious event then it saves after 60 seconds of new event occur.

All measured parameter removes from the screen after finish with saving.

Search from record list to confirm measured result.

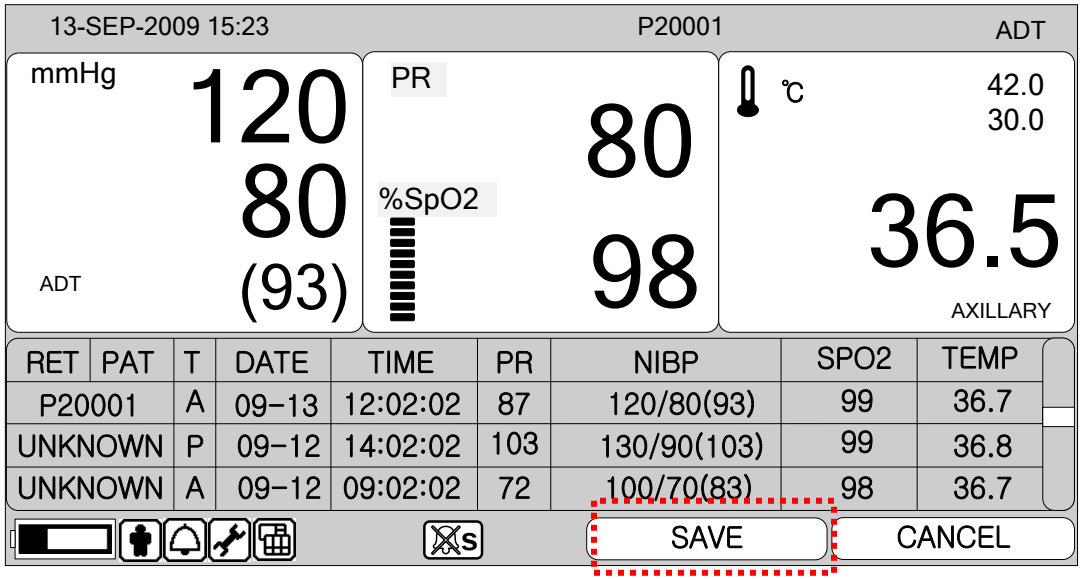
After saving, the patient ID initializes as UNKNOWN.

After saving, adjusted alarm limit numeric value becomes Default numeric value.

3.5 Save

It can be saved automatically by the user not only by MANUAL or AUTO mode.

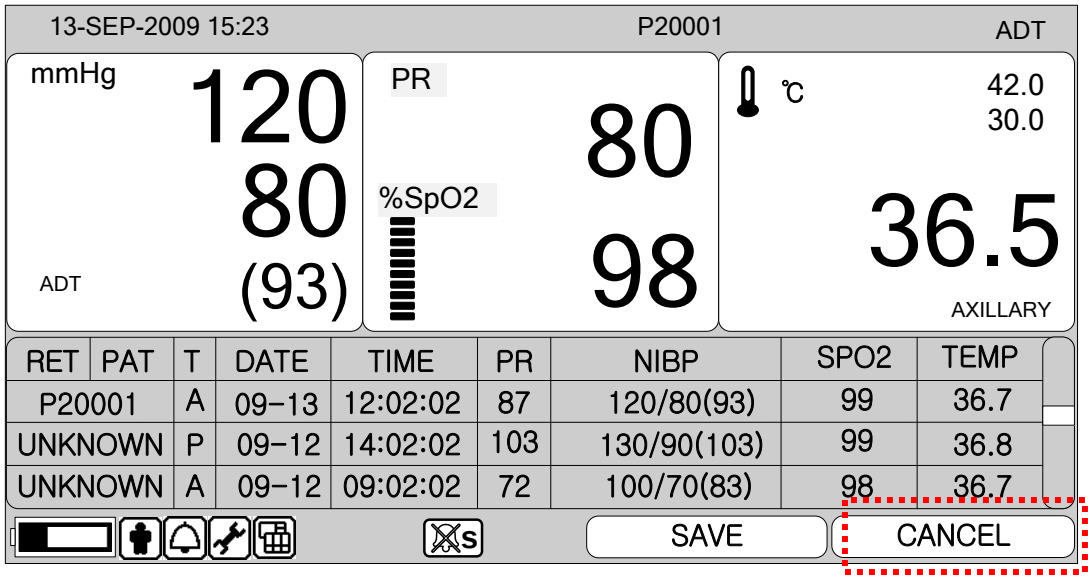
Select save button in the menu button.



3.6 Exit from Saving Mode

It is used for initializing the patient who registered in MANUAL mode.

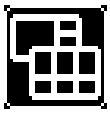
To exit savings mode, select cancel button in menu button.



4. SAVED DATA MANAGEMENT

4.1 Record List View

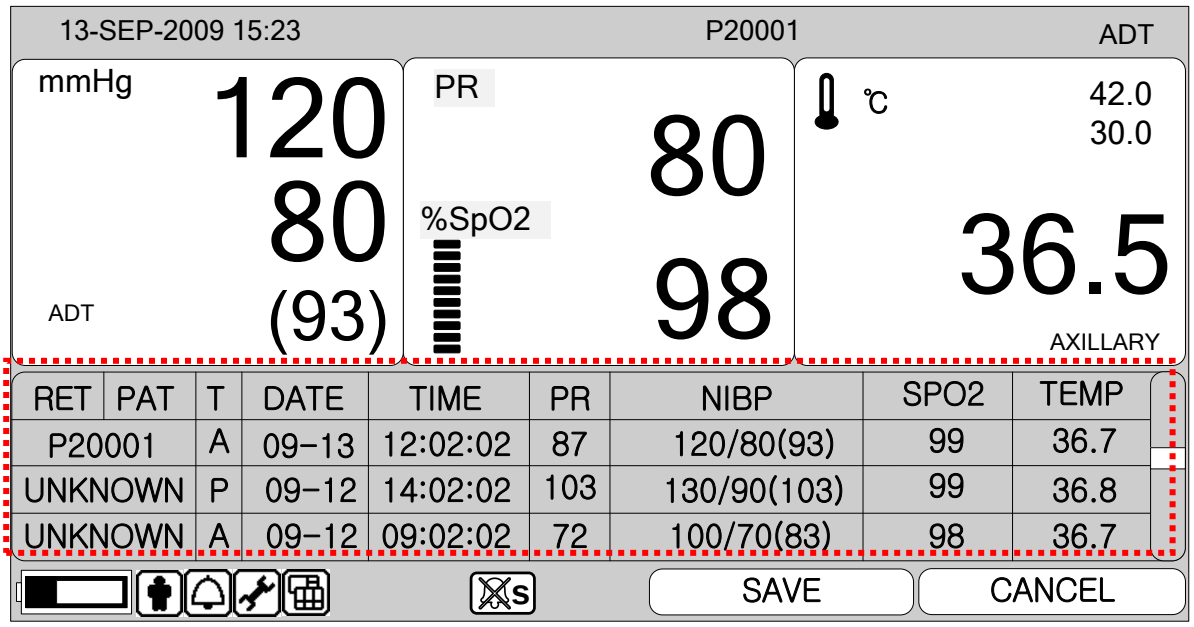
Set up Record List View after selecting print mode icon of menu icon.



Select in the List window and move inside of the list for Management.

Turn touch wheel button in inside of the list then move to records.

Move to patient's record then Touch wheel button to adjust or delete.

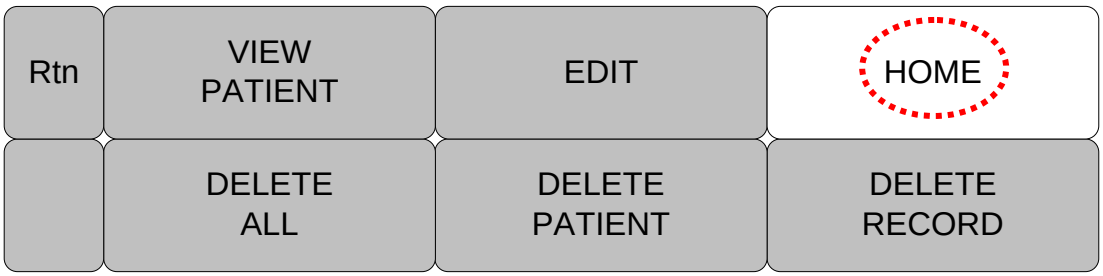


< Record List View >

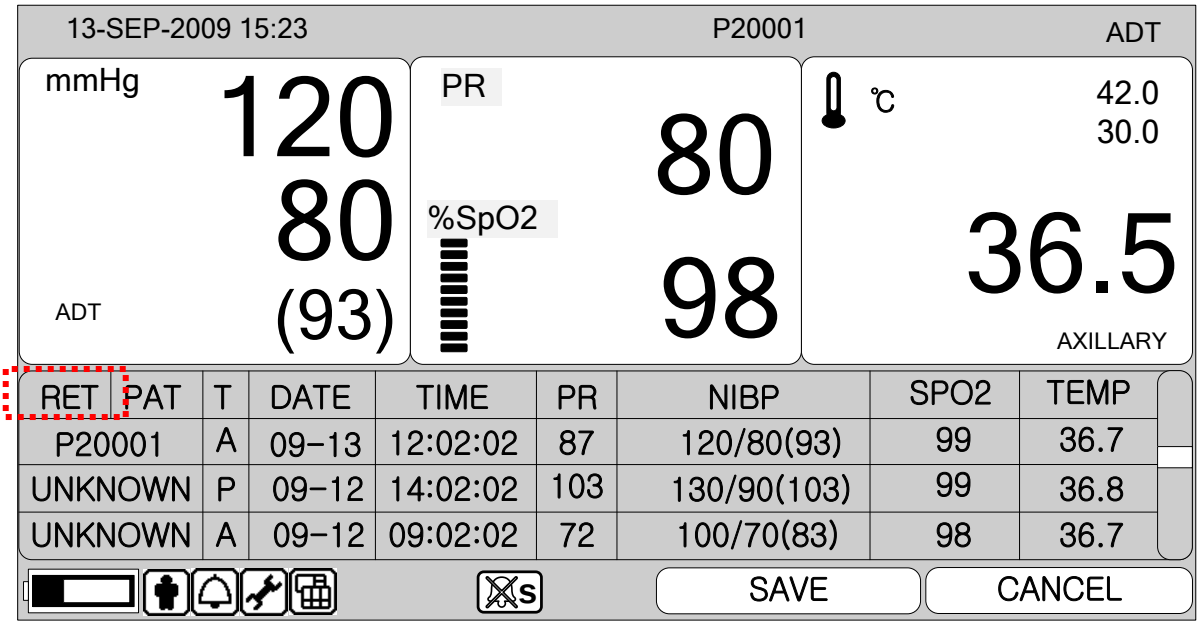
4.2 Exit from Record List

There are 3 ways to exit from Record List.

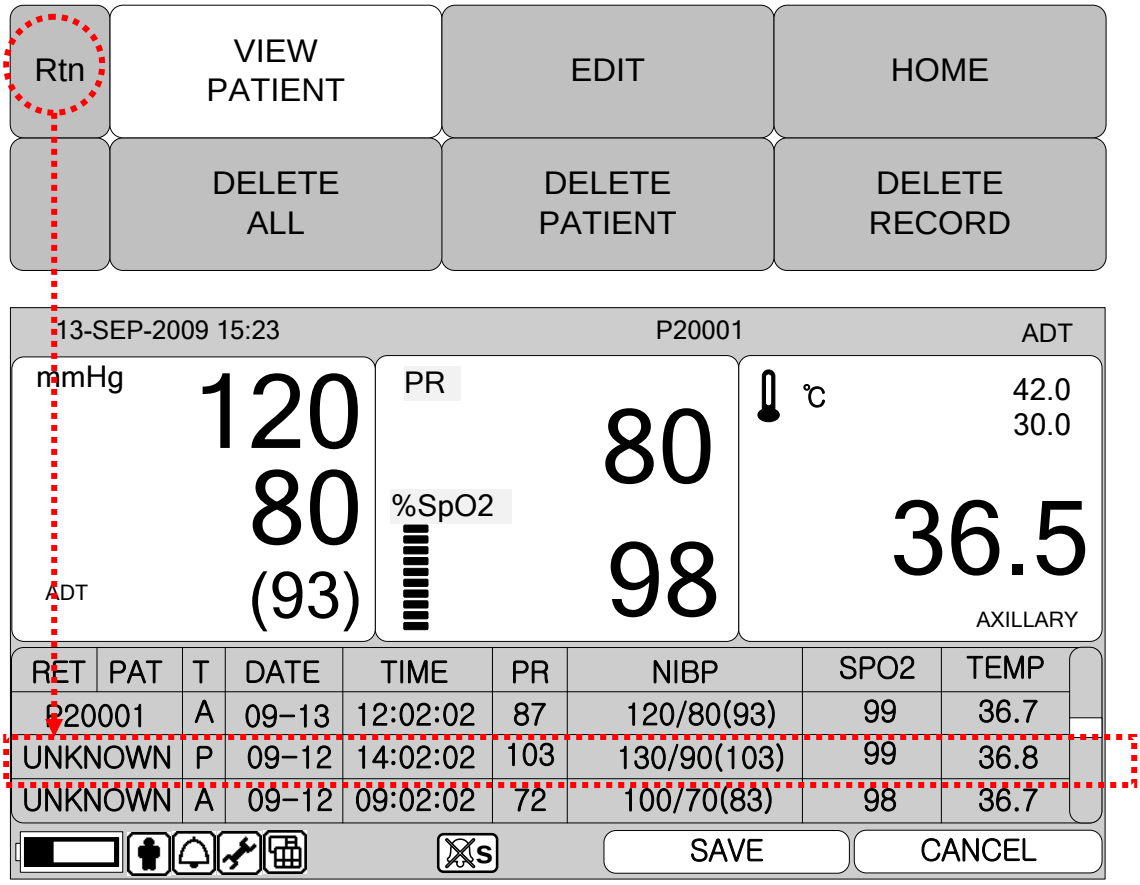
1. Touch Home menu in the Menu



2. Press return menu at the top of the record list window.



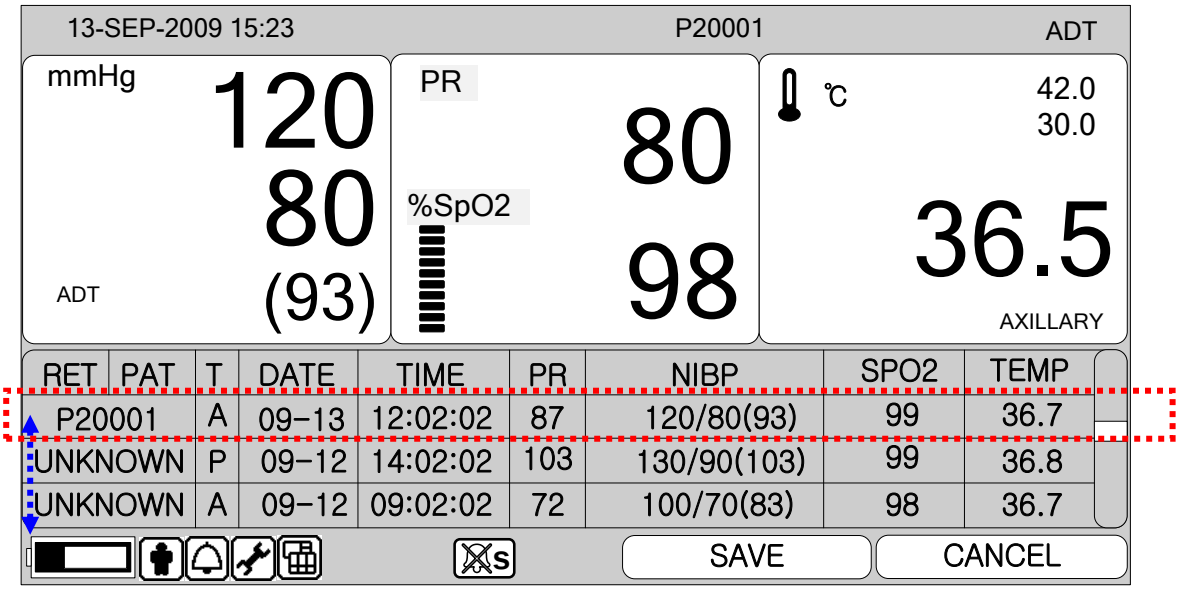
3. Press Rtn in the Menu. Then it will return to Record List.



4.3 View Specified Patient's Record List

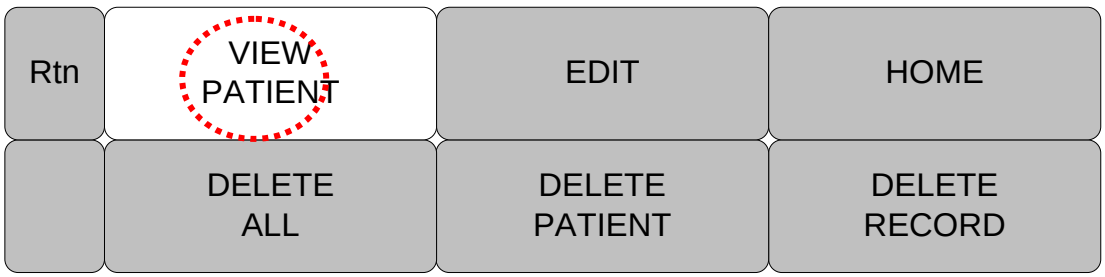
Move to Record List window to view a patient Record List.

Move to a patient's record by turning touch wheel button.



Touch key button on Patient's record then Menu window will pop up.

Select View Patient Menu in Menu window.

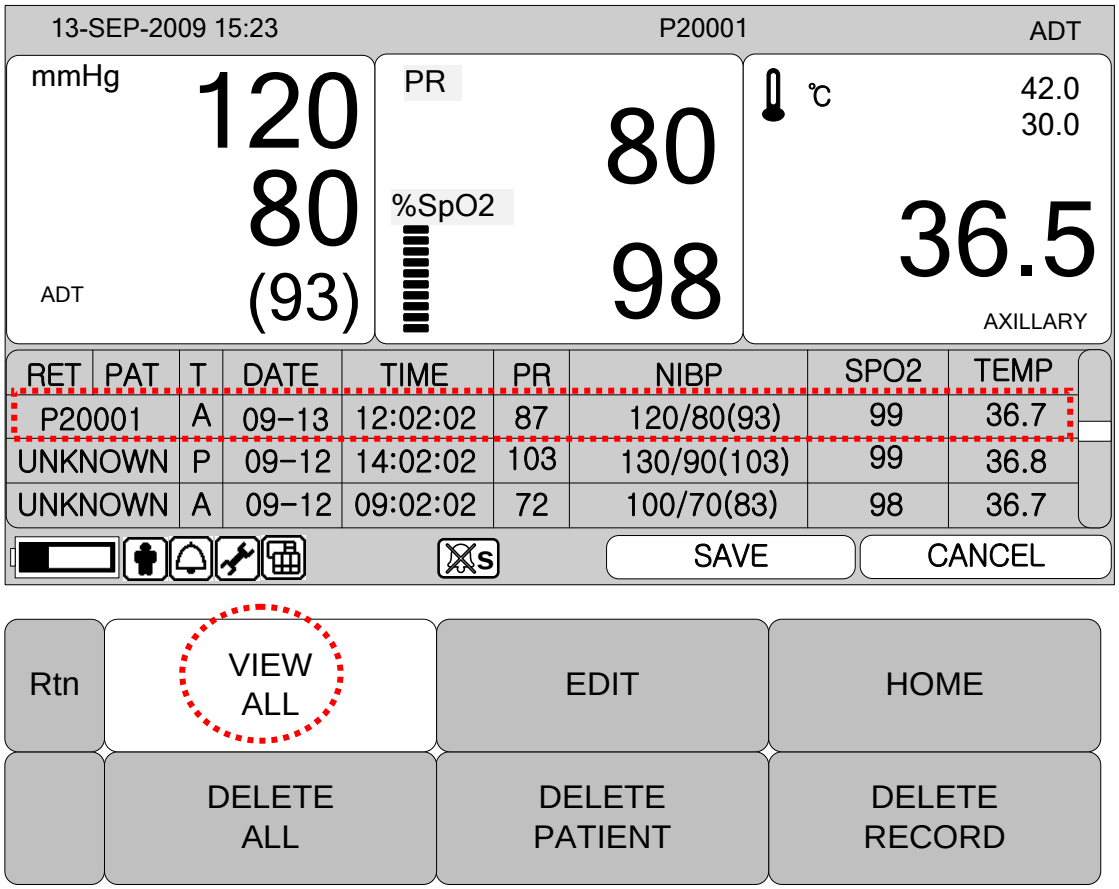


4.4 View All Patients' Record List

Move to Record List.

Touch Key on Patient's record in the list then Menu window will pop up.

Select View All menu in Menu window.

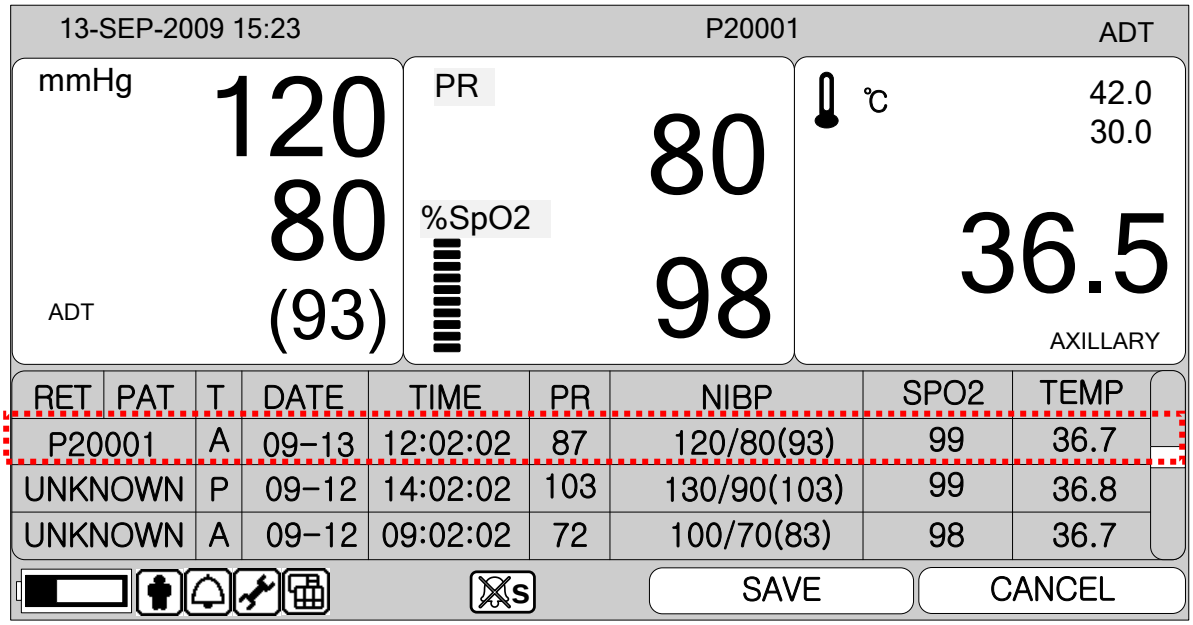


4.5 Adjust Record

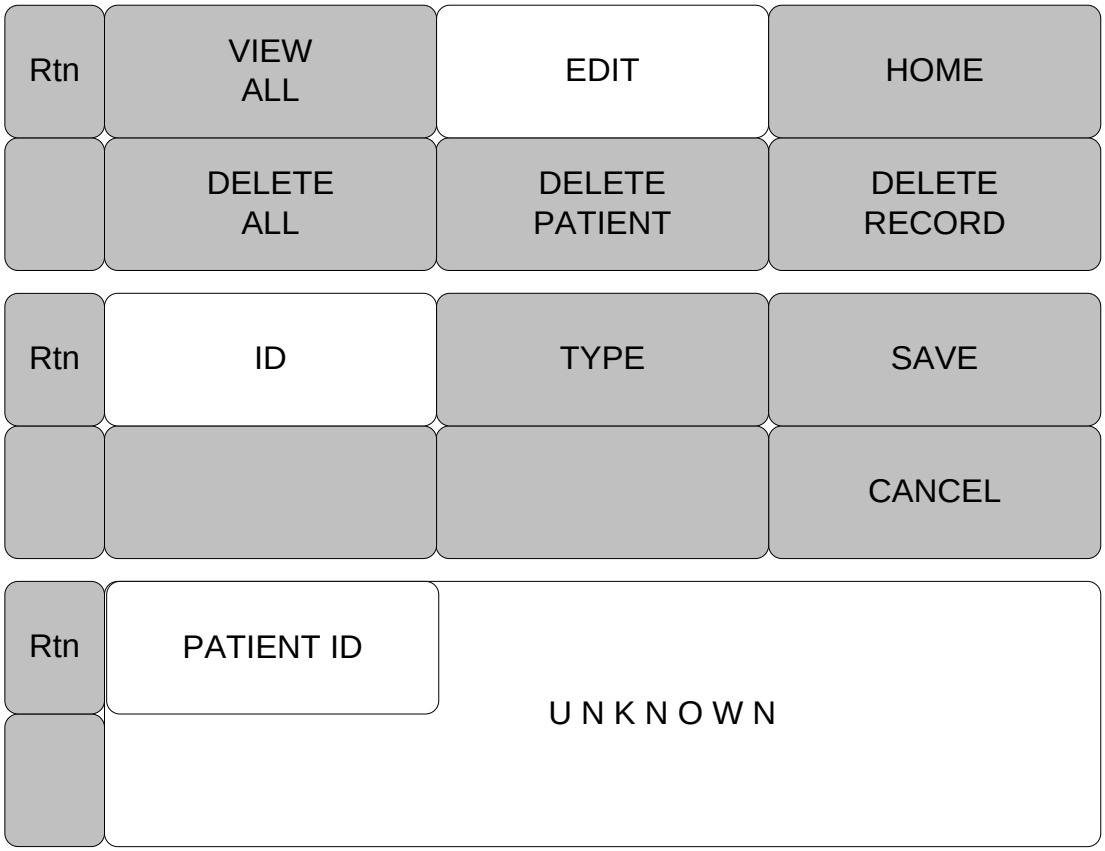
Move to Record List to adjust the record.

Move to the Record where you want to adjust by turning touch wheel Key.

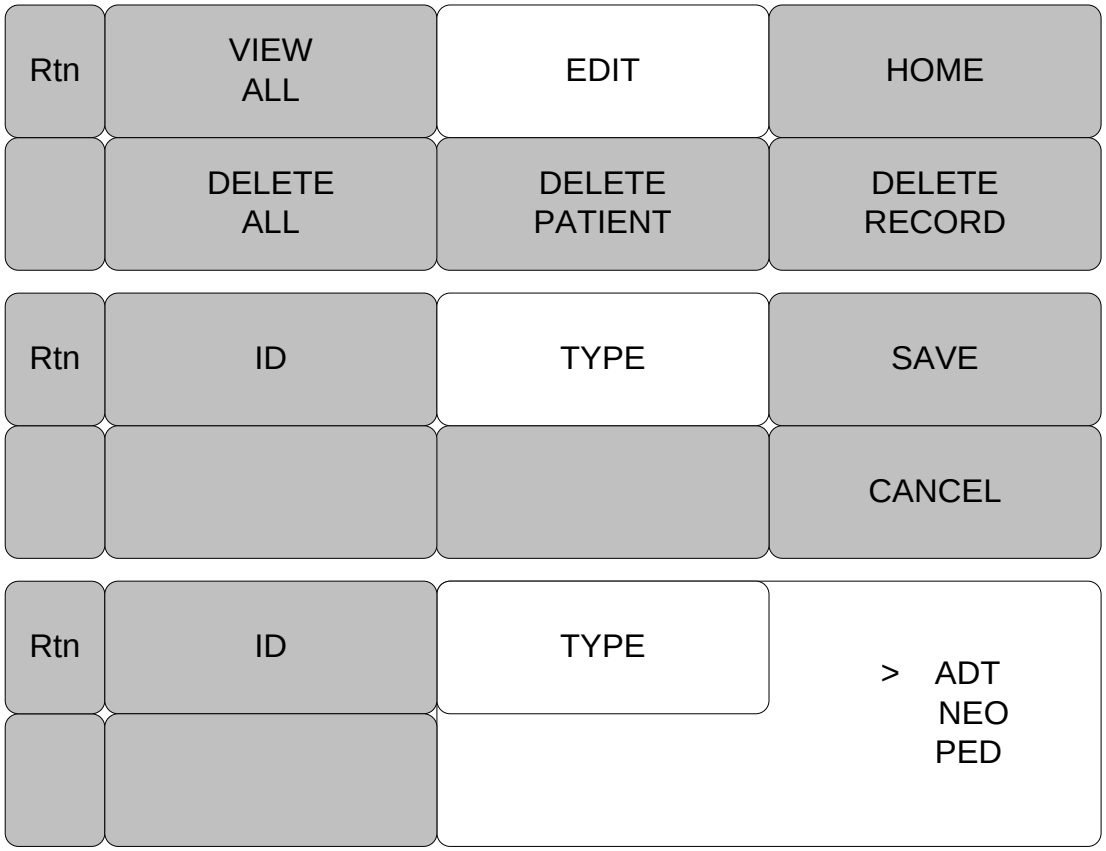
Select Edit menu in the list.



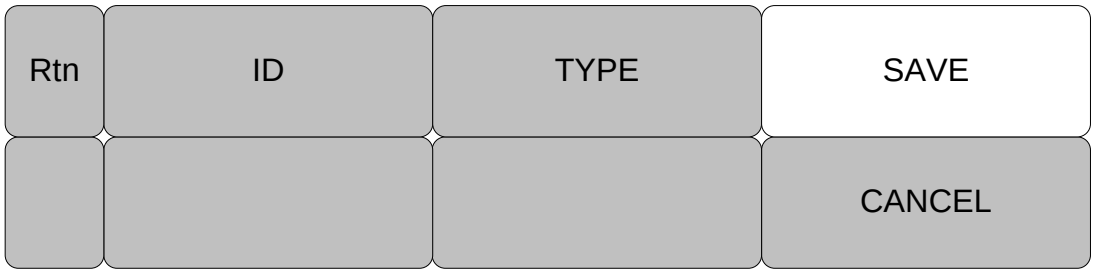
1) Adjust patient's ID. Select ID menu window and Adjust



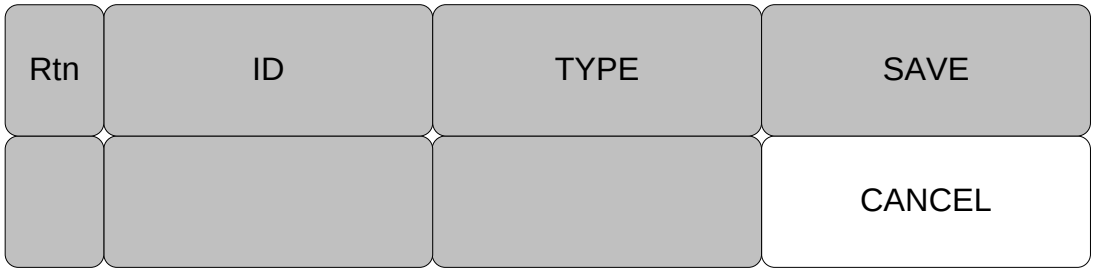
2) Adjust patient's type. Select Type menu and Adjust



Alarm status will not be change as a result of excess alarm limit at the moment of measurement even though patient type changed result of alarm limit numeric value change. Select SAVE menu to save changed status.



Select CANCEL button to cancel patient information adjust

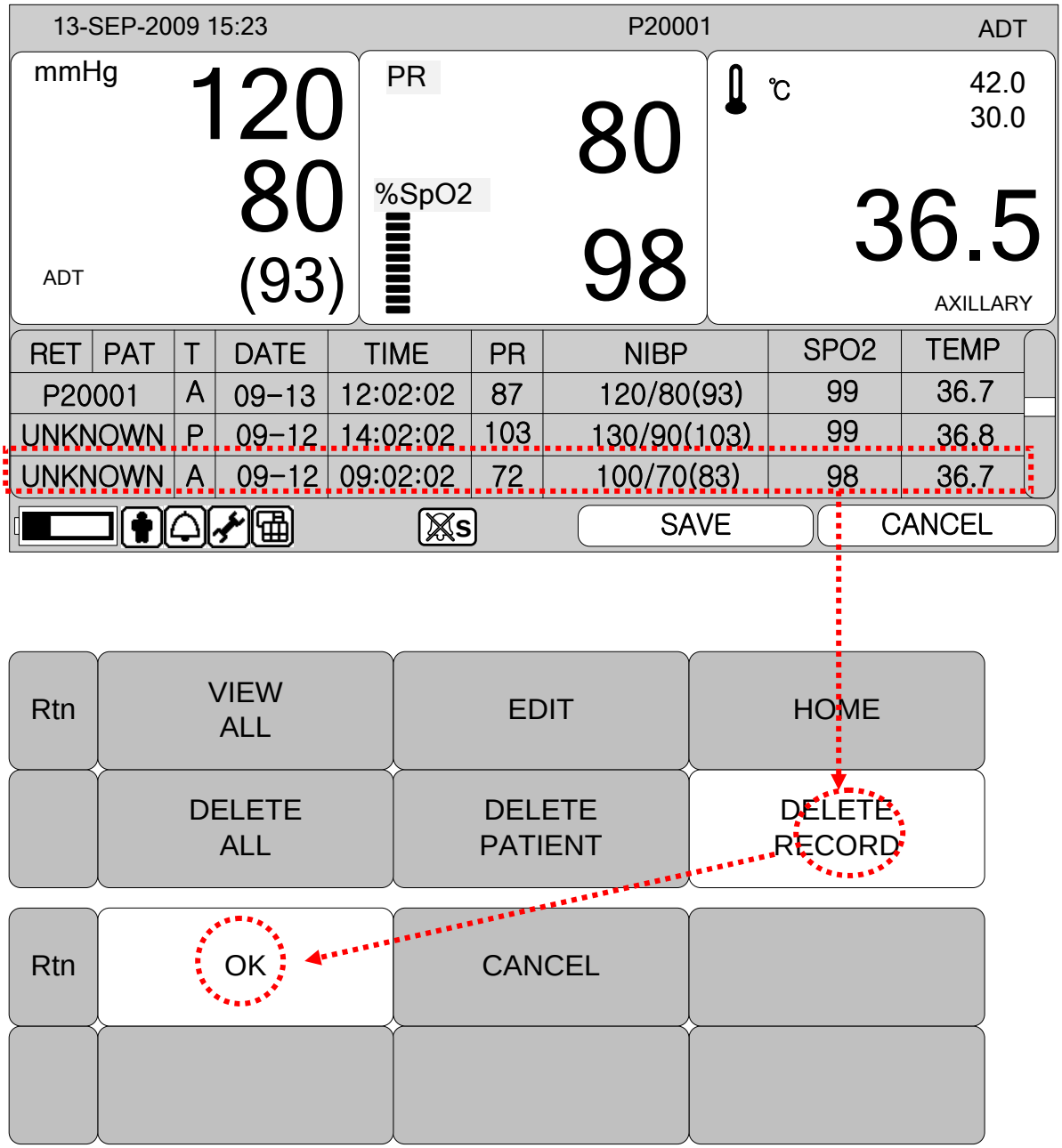


4.6 Delete a Record

Move to the Record List.

Move to the Record where you want to adjust by turning touch wheel Key.

Be cautious to delete because deleted record can not be replace.



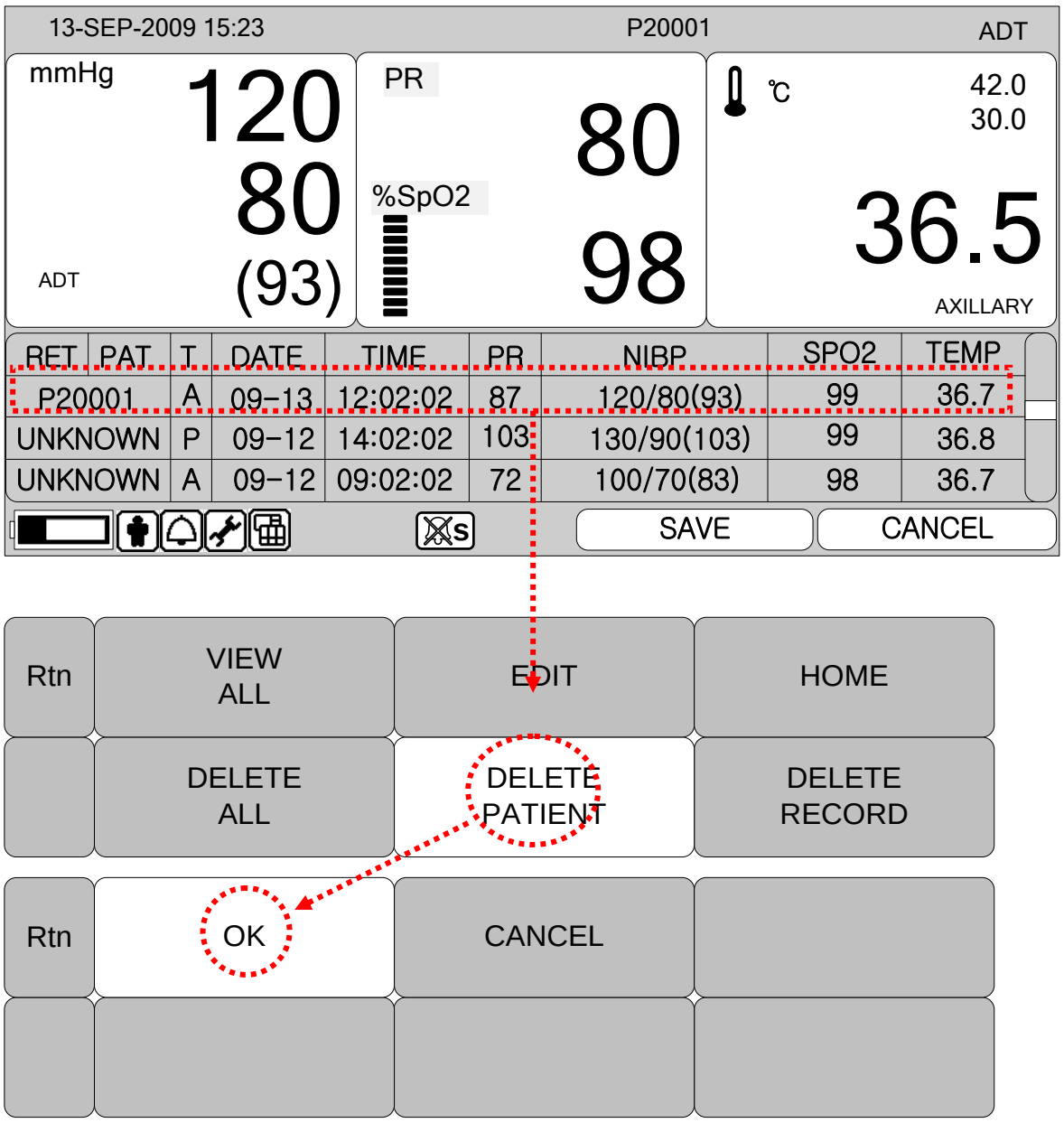
4.7 Delete a Patient's Record

Move to record list in order to delete the record.

Move to the Record where you want to adjust by turning touch wheel Key.

Touch Key in the list and menu will pop up then select Delete Patient button.

Be cautious to delete because deleted record can not be replace.

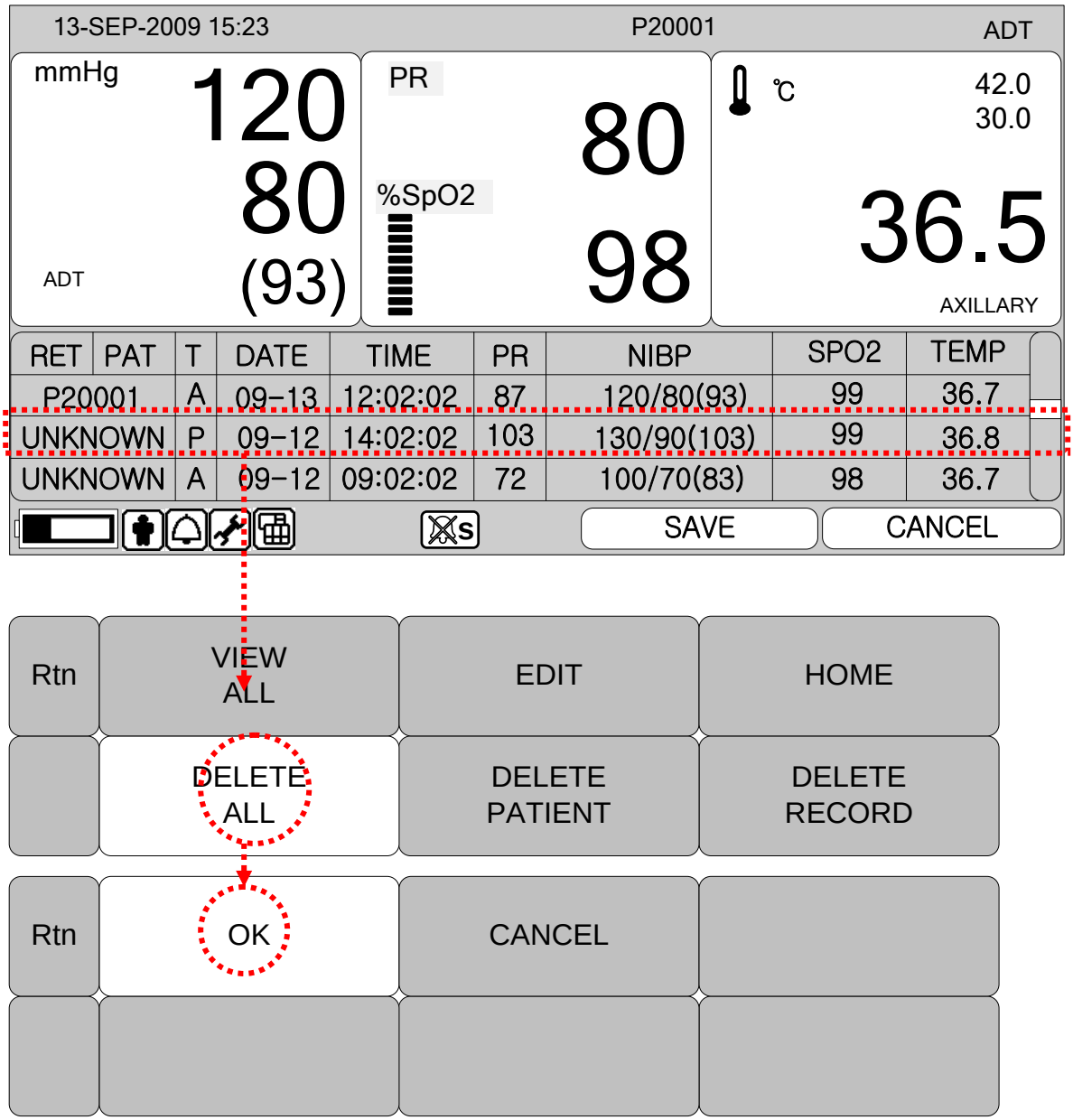


4.8 Delete All Patients' Record

Enter the record list to delete all the record.

Select touch wheel Button in the patient's record then select Delete All.

Be cautious to delete because deleted record can not be replace.



5. SETUP

5.1 SETUP

Select setup Icon in the menu icon.

DISPLAY: A menu to set up screen

SAVE MODE: A menu to setup the record saving mode

USER SERVICE: To setup information of equipment

SYSTEM: To set up connection to external computer

KEY SOUND: Set up ON/OFF of Key sound.

MAKER SERVICE: Using by manufacturer to set up and reform of the product.

MAIN MENU	DISPLAY	SAVE MODE: MANUAL	USER SERVICE
	MAKER SERVICE	KEY SOUND: ON	SYSTEM

5.2. DISPLAY

MAIN MENU	SWEEP SPEED: 25mm/s	SET DATE	SET TIME
PREV MENU			DEMO: OFF

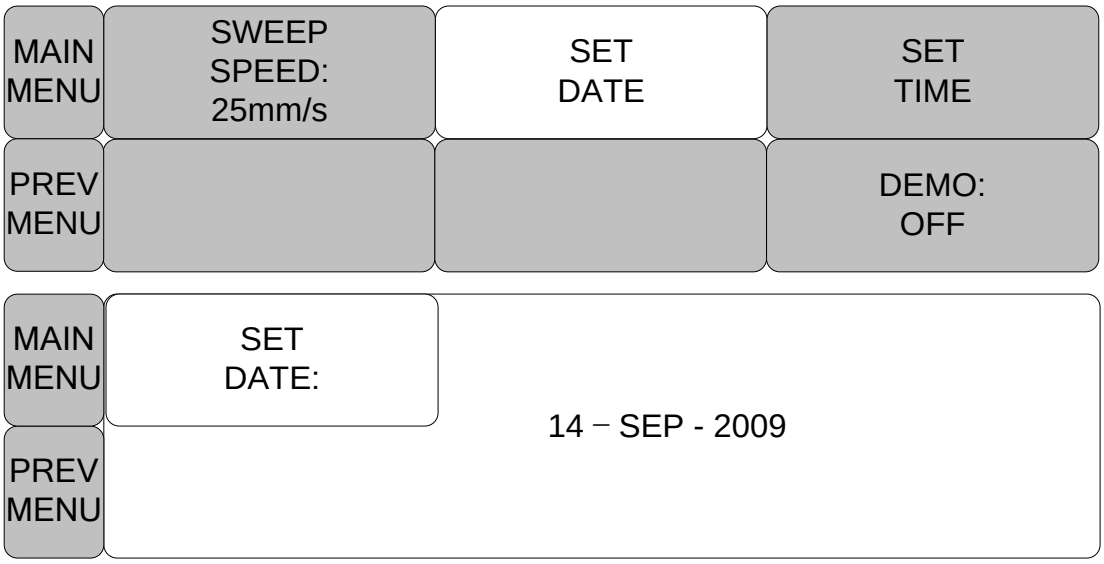
1. SWEEP SPEED

   Set up print speed of amount of oxygen in the blood (SPO2) wave pattern.

MAIN MENU	SWEEP SPEED: 25mm/s	6.25 mm/s 12.5 mm/s > 25 mm/s 50 mm/s	SET TIME
PREV MENU			DEMO: OFF

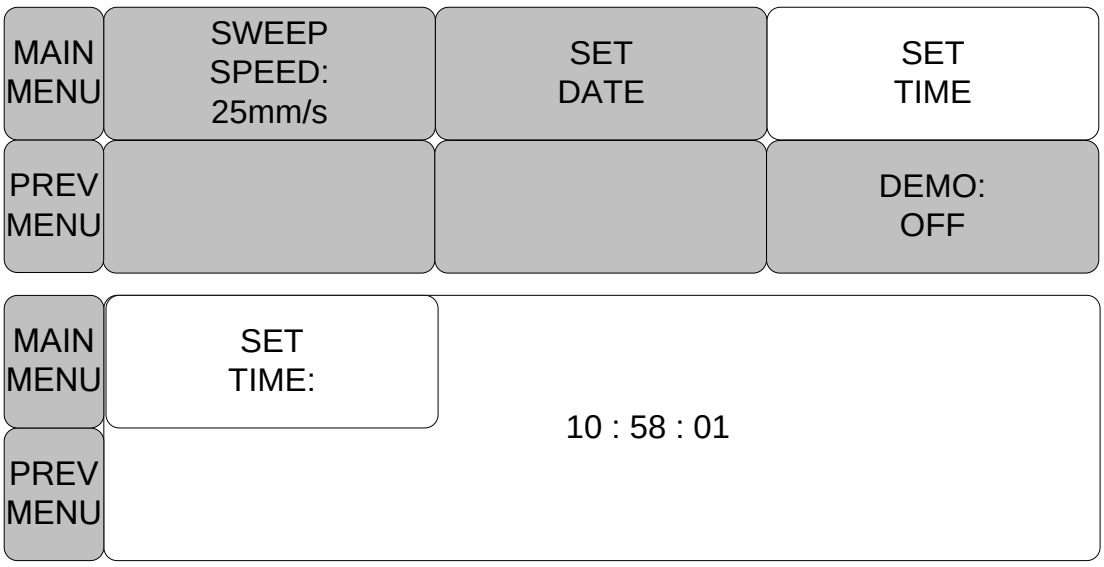
2. SET DATE

Setup and adjust the date.



3. SET TIME

Setup and adjust the time.



4. DEMO

Setup the movement to demo/action mode.

MAIN MENU	SWEEP SPEED: 25mm/s	SET DATE	SET TIME
PREV MENU			DEMO: OFF

MAIN MENU	SWEEP SPEED: 25mm/s	SET DATE	SET TIME
PREV MENU			DEMO: OFF

5.3 SAVE MODE

Set up menu for record saving mode.

MAIN MENU	DISPLAY	SAVE MODE: AUTO	USER SERVICE
	MAKER SERVICE	KEY SOUND: ON	SYSTEM

MAIN MENU	DISPLAY	SAVE MODE: MANUAL	USER SERVICE
	MAKER SERVICE	KEY SOUND: ON	SYSTEM

Monitor mode is to save all of measured data with a same person's ID and TYPE.

SPOT mode is initializing ID whenever saving is activated.

5.4 USER SERVICE

Setup for information of the equipment

MAIN MENU	DISPLAY	SAVE MODE: AUTO	USER SERVICE
	MAKER SERVICE	KEY SOUND: ON	SYSTEM

MAIN MENU	SET UNIT NAME	SET BED NUMBER : 00A	DISPLAY MODE: SPOT
PREV MENU			USB FILE COPY

1. UNIT NAME

Set up UNIT name for connected hospital with equipment.

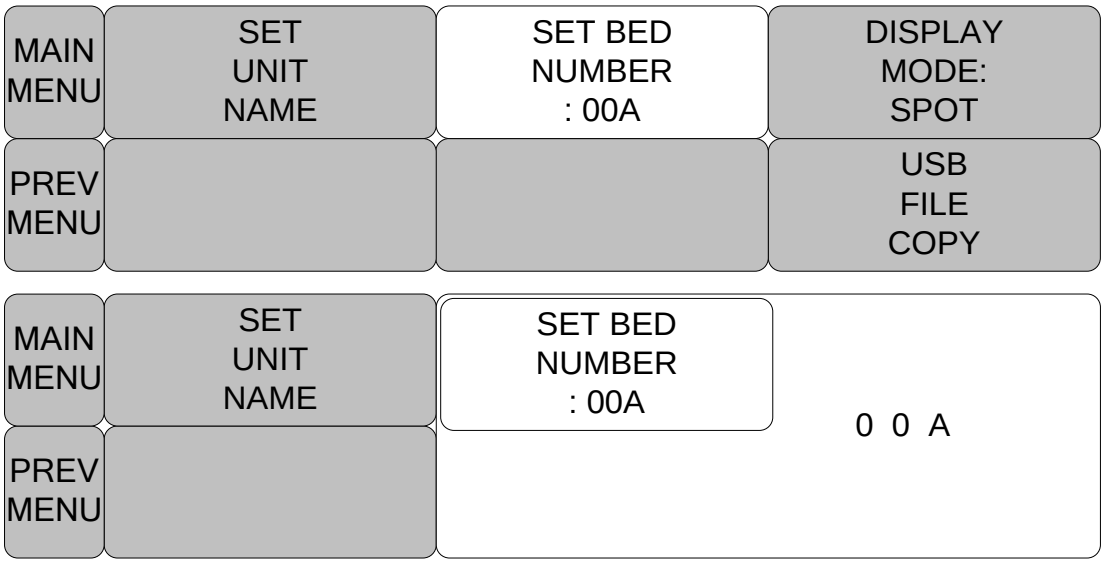
MAIN MENU	SET UNIT NAME	SET BED NUMBER : 00A	DISPLAY MODE: SPOT
PREV MENU			USB FILE COPY

MAIN MENU	SET UNIT NAME	
PREV MENU		

2. SET BED NUMBER

Setup the number for the bed which connected to the equipment.

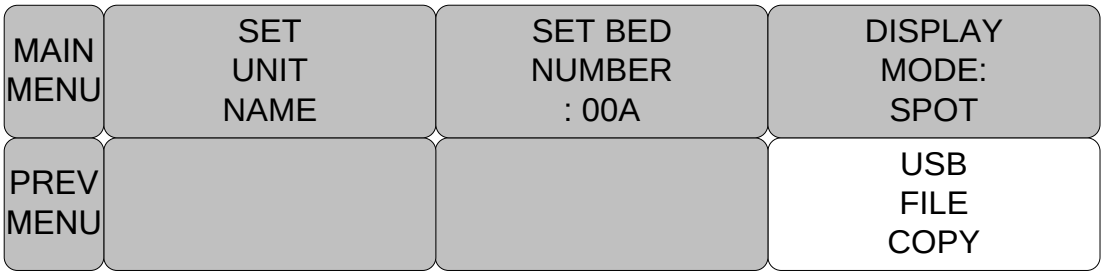
It is able to set up 0~9 and A ~ Z.



3. USB FILE COPY

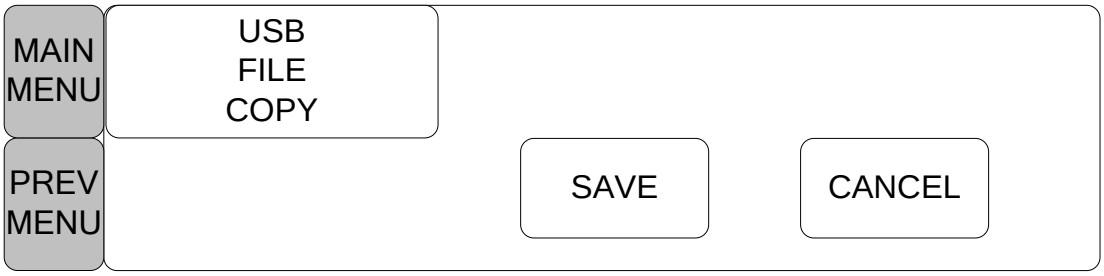
Use the SAVE button in the USB FILE COPY menu to export records to a USB flash drive.

You can export all saved patient records or all records for a specific patient. The exported file is a filename.csv file with the name DateLog.csv.

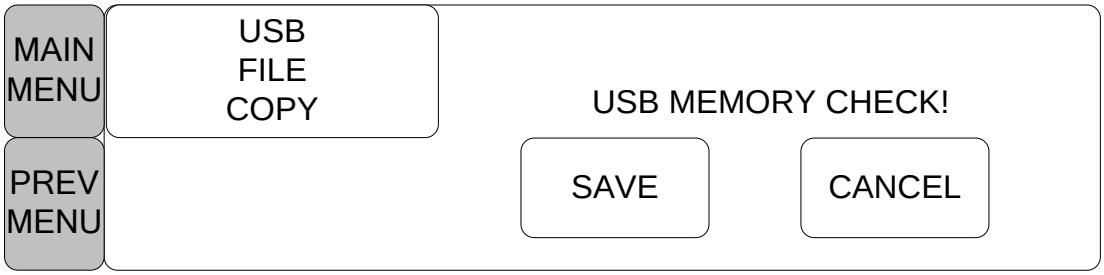


SAVE: A command to Export patient records to a USB flash drive

CANCEL: A command to cancel exporting patient records to a USB flash drive.



The following message will appear if there is no USB MEMORY after the user commanded SAVE function



Display the data saving task progress

The number on left indicates files saved so far, while the number on right shows the total number of files to be saved.

Display following message when Data Saving is cancelled.

Display following message when Data Saving is complete.

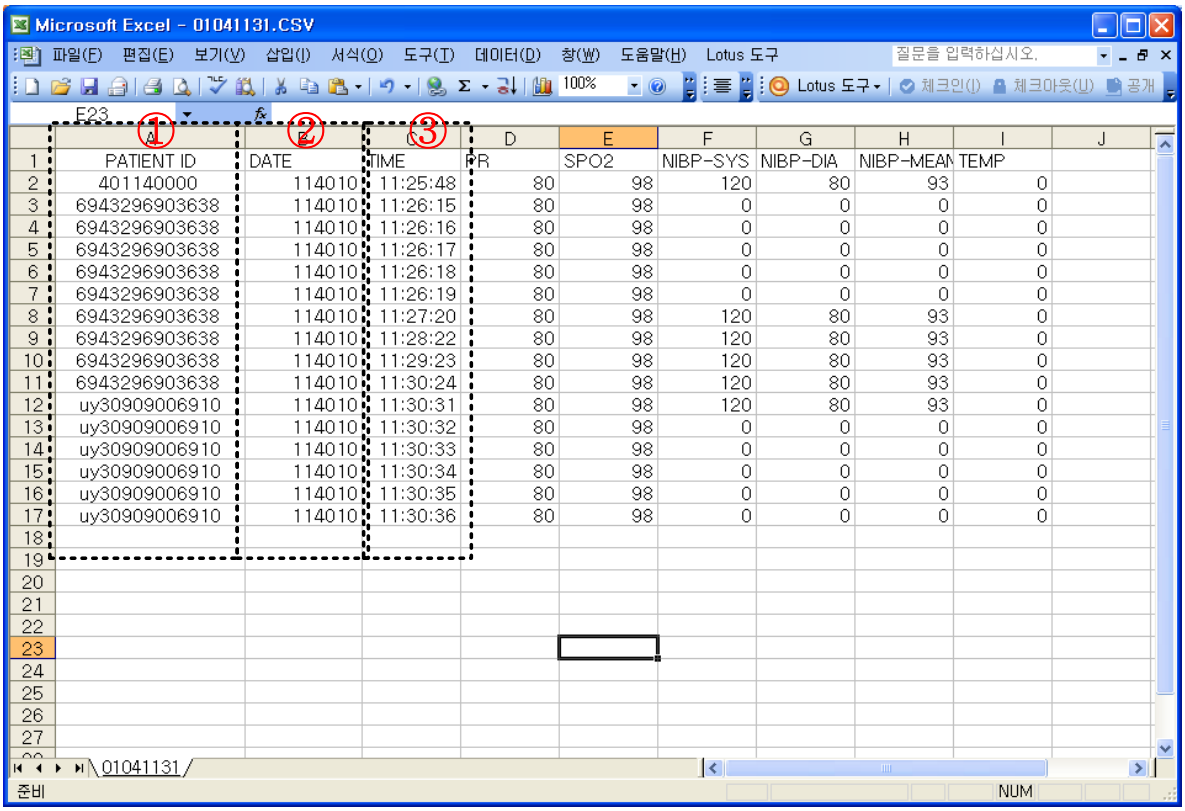
Save method "date-time-minutes.csv " file is stored.

The picture below is stored as a Microsoft Excel file is opened the screen

① is Patient data entry, and to view data in this column on a regular basis to set cell format to numbers.

② is the date the data entry, data in this column to see normal cell to form "one - Month - Year" is set.

③ is the patient data entry, and data in this column to see a normal cell format "h: mm: ss" is set.



5.5 SYSTEM

Setup for connect to outside computer.

MAIN MENU	DISPLAY	SAVE MODE: AUTO	USER SERVICE
	MAKER SERVICE	KEY SOUND: ON	SYSTEM

SYSTEM INFO SET	
RETURN	CONTENTS
MAIN VER	1.034.BHCDEC00A
CENTRAL	OFF
HOST IP	192 . 168 . 030 . 077
DEVICE IP	192 . 168 . 030 . 100
SUBNET	255 . 255 . 255 . 000
GATEWAY	192 . 168 . 030 . 001
MAC ADDR	00 : E1 : A8 : 80 : CB : 00

5.6 KEY SOUND

Setup ON/OFF of key sound.

MAIN MENU	DISPLAY	SAVE MODE: AUTO	USER SERVICE
	MAKER SERVICE	KEY SOUND: ON	SYSTEM

MAIN MENU	DISPLAY	SAVE MODE: AUTO	USER SERVICE
	MAKER SERVICE	KEY SOUND: OFF	SYSTEM

5.7 MAKER SERVICE

A menu used by the manufacturer of the product.

6. NIBP

6.1 Outline

NIBP Connector Location and Cuff

6.2 NIBP Data Window

6.3 NIBP Data Setup

ALARM LIMIT

CUFF SIZE

UNIT SELECT

INTERVAL

INFLATION

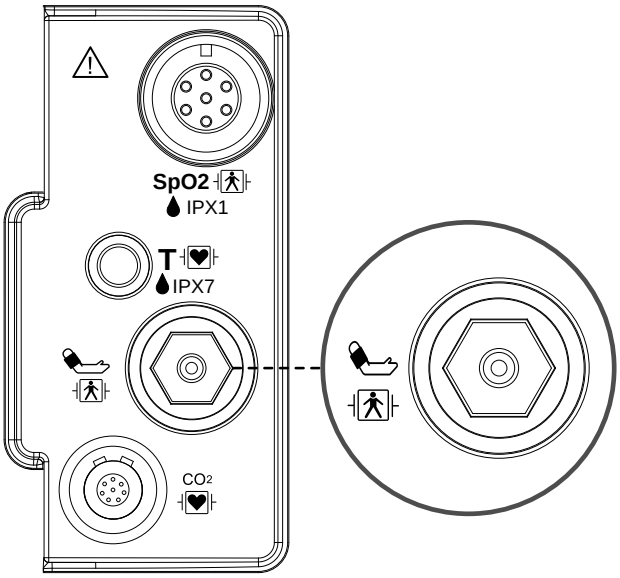
6.4 Trouble Shooting

6.1 Outline

The function is to measure minimum, maximum, and average blood pressure by using oscillometric method.

NIBP Connector Location and Cuff

NIBP Connector



ADULT NIBP CUFF

Note
As the value of NIBP can vary according to the age and sex of a patient, the user needs to set up right data in Parameter Menu before measurement. The NIBP cable connector is insulated and it is defibrillator-proof( ). Use only the NIBP cuffs listed in the enclosed publication.

WARNING
Noninvasive blood pressure monitoring is not recommended for patients with extremely high or low heart rate or hypotension, hypertension, arrhythmias. The software algorithm cannot accurately compute NIBP or patients with these conditions.

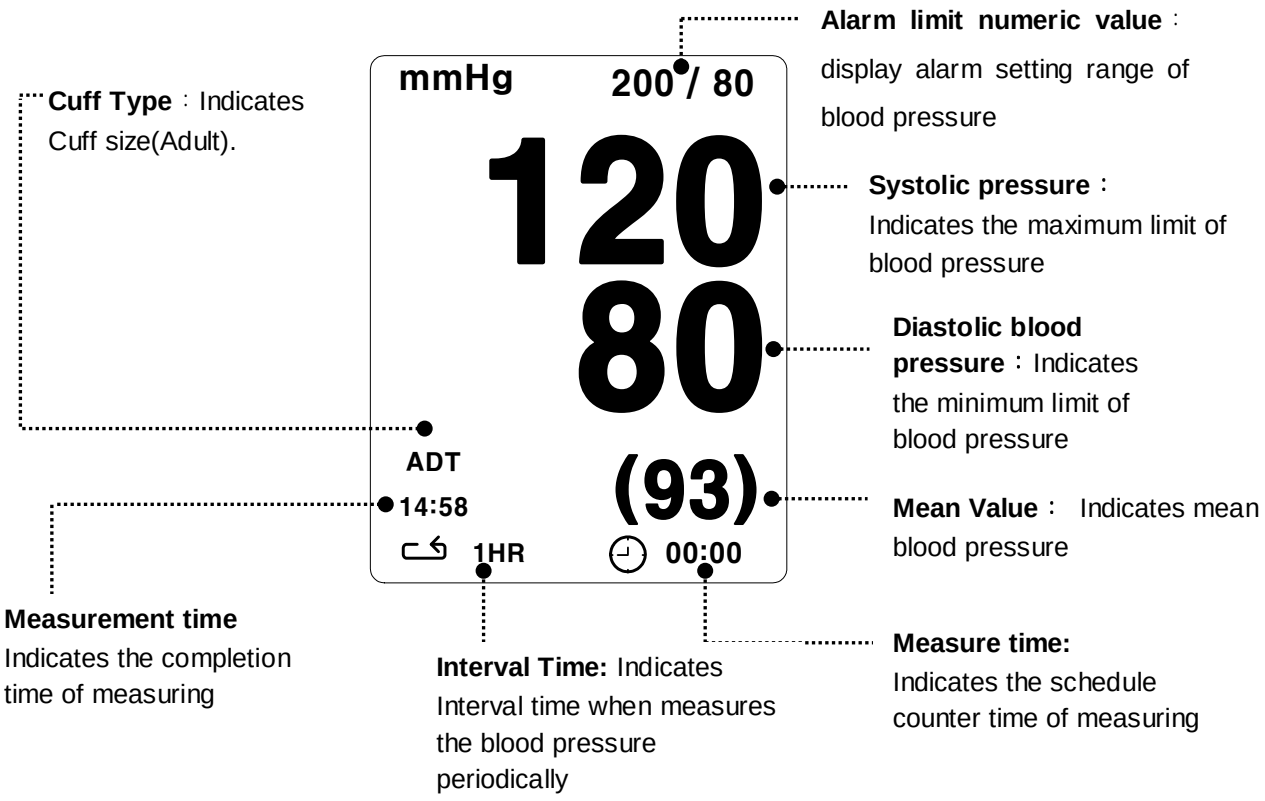
Note
As the value of NIBP can vary according to the age and sex of a patient, the user needs to set up right data in parameter Menu before measurement. Tubes between the cuff and the monitor are not kinked or blocked. The air pad should be exactly over the brachial artery. Tubing is immediately to the right or left of the brachial artery to prevent kinking when elbow is bent.

The maintenance is performed every 2 years.

Check the following list devise to operates properly and safety at all times.

1. Check for proper cuff size.
2. Check for residual air left in the cuff from a previous measurement.
3. Make sure cuff is not too tight or too loose.
4. Make sure cuff and heart are at same level, otherwise hydrostatic pressure will offset the NIBP value.
5. Minimize patient movement during measurement.
6. Watch for pulses paradox us.
7. Check for leak in cuff or tubing.
8. Patient may have a weak pulse.

6.2 NIBP Data Window



6.3 NIBP Data Setup

Turn the rotary wheel on the blue cursor to position the data window(refer to P.174), Select the menu button, and the following window is displayed

ALARM： A menu to set the Alarm

CUFF SIZE：A menu to select cuff size (ADT (Adult) , PED(Pediatric) , NEO(Neonate))

UNIT SELECT: A menu to select the pressure unit (mmHg , kPa).

INTERVAL ：A menu to set Interval time when measures the blood pressure periodically

INFLATION: Initial Pressurization setting menu

MAIN MENU	ALARM LIMIT	CUFF SIZE: ADT	
	INTERVAL: OFF	UNIT SELECT: mmHg	INFLATION: 170mmHg

ALARM LIMIT

Alarm setting Numeric Value of Systolic, Diastolic, and mean pressure is 10 ~ 300mmHg.

MAIN MENU	ALARM LIMIT	CUFF SIZE: ADT	
	INTERVAL: OFF	UNIT SELECT: mmHg	INFLATION: 170mmHg

NIBP ALARM LIMIT			
RETURN	UNITS	LOW	HIGH
NIBP-S	mmHg	80	200
NIBP-M	mmHg	40	140
NIBP-D	mmHg	20	120

CUFF SIZE

The user can select a CUFF between ADULT and NEONATAL.

MAIN MENU	ALARM LIMIT	CUFF SIZE: ADT	
	INTERVAL: OFF	UNIT SELECT: mmHg	INFLATION: 170mmHg

MAIN MENU	ALARM LIMIT	CUFF SIZE:	> ADT PED NEO
	INTERVAL: OFF		

UNIT SELECT

It is a function to set blood pressure measurement unit.

The blood pressure measurement unit provides mmHg and kPa.

MAIN MENU	ALARM LIMIT	CUFF SIZE: ADT	
	INTERVAL: OFF	UNIT SELECT: mmHg	INFLATION: 170mmHg

MAIN MENU	ALARM LIMIT	CUFF SIZE: ADT	
	INTERVAL: OFF	UNIT SELECT: kPa	INFLATION: 170mmHg

INFLATION

It is a function for pressurization pressure.

ADT/PED : Numeric value is 80, 90, 100, 110, ~ 230, and 240.

NEO : Numeric value is 60, 70, 80, 90, 100, 110, and 120.

MAIN MENU	ALARM LIMIT	CUFF SIZE: ADT	
	INTERVAL: OFF	UNIT SELECT: mmHg	INFLATION: 170mmHg

MAIN MENU	ALARM LIMIT	CUFF SIZE: ADT	
	INTERVAL: OFF	UNIT SELECT: mmHg	INFLATION: **170mmHg**

INTERVAL

This menu is used for selecting intervals when measures the blood pressure automatically.

Select a target interval from 1min, 2, 3, 4, 5, 10, 15, 20, 30, 1hour, 2, 4, 8.

MAIN MENU	ALARM LIMIT	CUFF SIZE: ADT	
	INTERVAL: OFF	UNIT SELECT: mmHg	INFLATION: 170mmHg

MAIN MENU	INTERVAL: OFF	> OFF	10MIN.	4H
		1MIN	15MIN.	8H
		2MIN.	20MIN.	
		3MIN.	30MIN.	
		4MIN.	1H	
		5MIN.	2H	

Warning
Periodically check patient limb circulation distal to the cuff. Check frequently when using auto NBP in 1 and 2 minute intervals. Intervals below 10 minutes are not recommended for extended periods of time.

Warning
Pay attention to not to block connecting hose when you put cuff on patient.

6.4 TROUBLESHOOTING

NIBP Status Messages

Below is a list of system status alarm messages which may be displayed in the NIBP parameter window during monitoring.

Status Message	Monitor Pesponse	Solution
OVER PRESSURE	System status alarm. Auto mode will shut off after ONE message.	Remove cuff and contact service.
INFLATION FAIL. CHECK CUFF	System status alarm.	Check cuff, connections, and tubing.
DEFLATION FAIL. CHECK CUFF	System status alarm. Auto mode will shut off after ONE message.	Remove cuff and contact service.
OVER TIME PRESSURE	System status alarm. Auto mode will shut off after TWO consecutive message.	Possible excessive patient move-ment or arrhythmia condition. Check patient.
PULSE TOO WEAK	System status alarm. Auto mode will shut off after ONE message.	Check patient and cuff place-ment.

EXCESSIVE MOTION	System status alarm. Auto mode will shut off after ONE message.	Possible excessive patient movement. Check patient.
MEASUREMENT ERROR	system status alarm. Auto mode will shut off after ONE message.	Possible excessive patient movement or arrhythmia condition. Check patient.

Erroneous NIBP measurement

- Check for proper cuff size
  3. Too small a cuff can give an erroneously high value.
  4. Too large a cuff can give an erroneously low value.
- Check for residual air left in the cuff from a previous measurement.
- Make sure cuff is not too tight or too loose.
- Make sure cuff and heart are at same level, otherwise hydrostatic pressure will offset the NIBP value.
- Minimize patient movement during measurement.
- Check for leak in cuff or tubing.
- Patient may have a weak pulse.

7. SpO_2

7.1 Outline

SpO_2 Connector Location and Measuring Cable

7.2 SpO2 Data Window

7.3 SpO2 Data Setup

ALARM LIMIT

SWEEP SPEED

RATE VOLUME

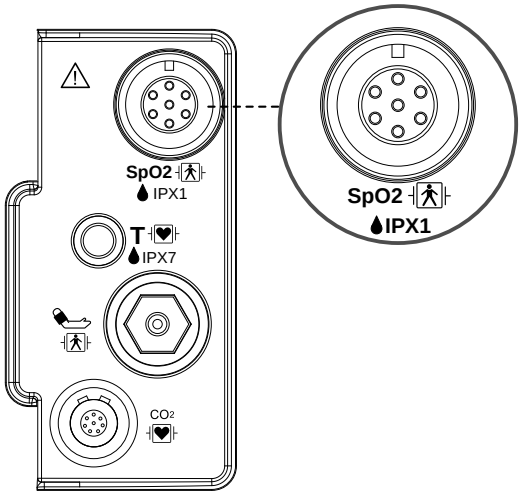
7.4 Trouble Shooting

7.1 Outline

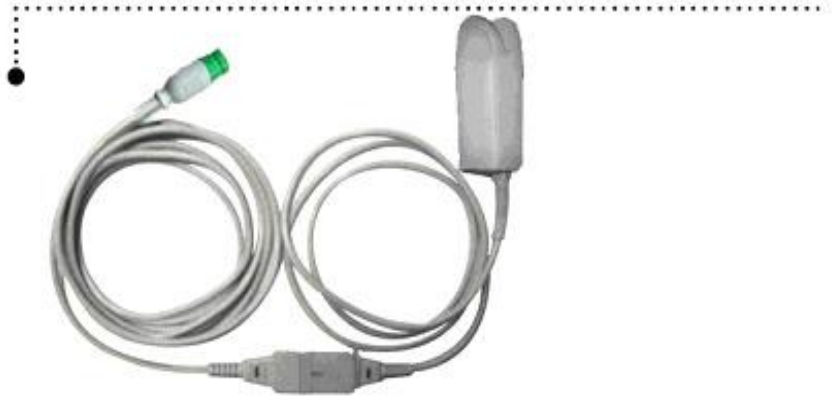
SPO2 monitoring is a noninvasive technique used to measure the amount of oxygenated hemoglobin and pulse rate by measuring the absorption of selected wavelengths of light. The light generated in the probe passes through the tissue and is converted into an electrical signal by the photodetector in the probe. The monitor processes the electrical signal and displays on the screen a waveform and digital values for SpO2 and pulse rate. It detects SpO2 in the way of transmitting the red and infrared rays into the capillary vessel to take the pulsation. Also perform the alarm function according to the setting value.

SpO2 Connector Location and Measuring Cable

SpO_2 connector

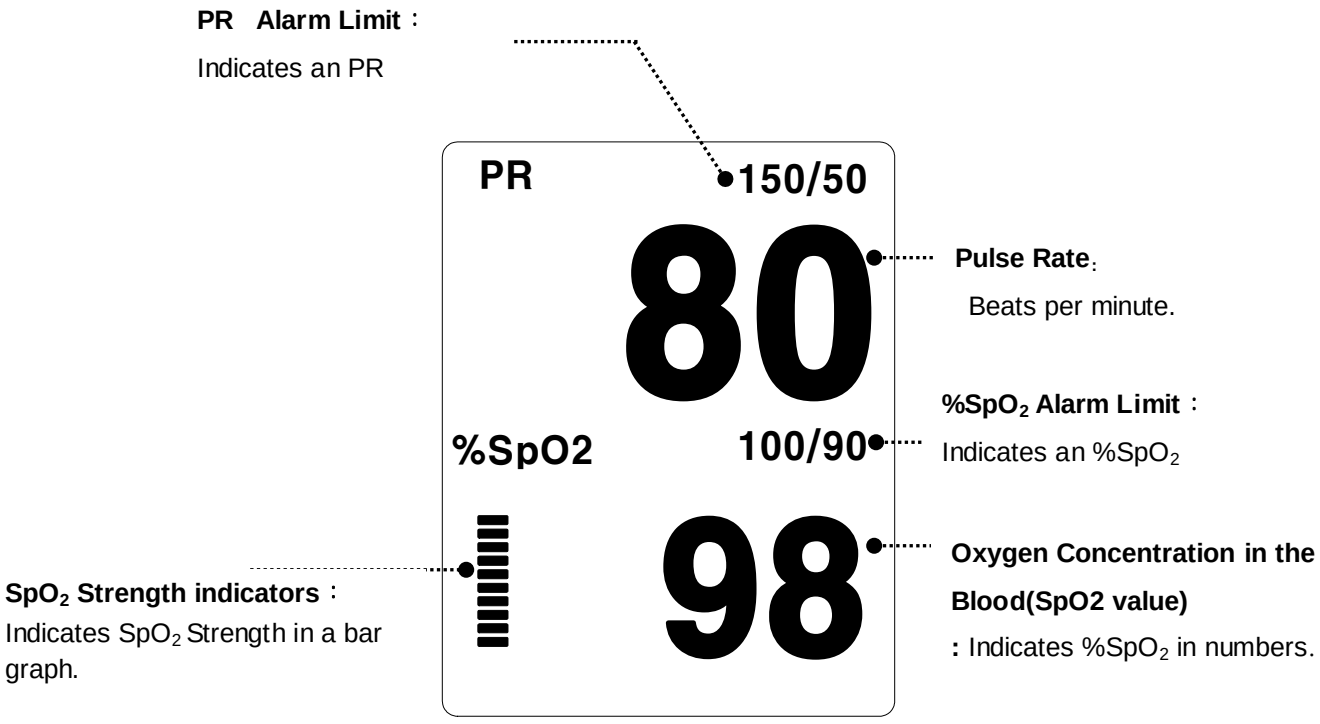


SpO_2 Measuring Cable



Note
The signal input is a high-insulation port and it is defibrillator proof ( )   The insulated input ensures patient safety and protects the device during defibrillation and electrosurgery.

7.2 SpO_2 Data Window



The current SPO2 value and the derived pulse rate (RATE) are displayed. The block sets indicate the strength of the signal (twenty block bars indicate the strongest signal). The SPO2 measurements are averaged over a 6-second period of time.

The monitor display is updated every second.

The SPO2 monitoring features are found in the SPO2 menu. These features include alarm limit adjustment, display of RATE, and RATE volume.

Note
SpO_2 WAVE SIZE is changed automatically.

7.3 SpO_2 Data Setup

Turn the rotary wheel on the blue cursor to position the data window(refer to P.182), Select the menu button, and the following window is displayed

ALARM LIMIT：A menu to set SpO_2 limit.

SWEEP SPEED: A menu to set speed of WAVE display.

RATE VOLUME： A menu to set Rate Volume.

ALARM LIMIT

ALAMRM Numeric Value of %SpO2 is 0 ~ 100.

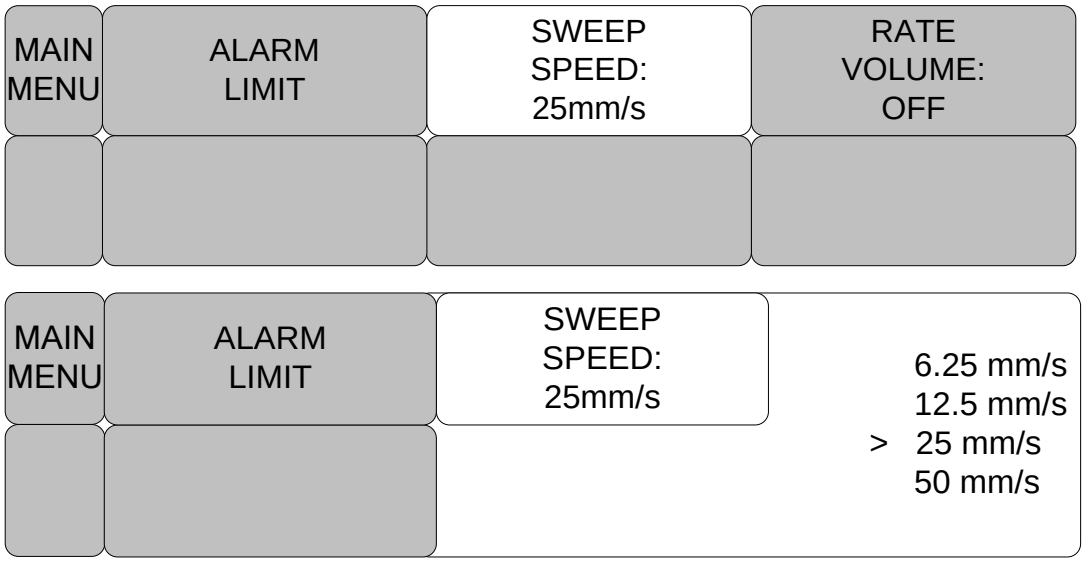
Pulse numeric Value of SpO2 is 20 ~ 300BPM.

SPO2 ALARM LIMIT			
RETURN	UNITS	LOW	HIGH
SPO2-%	%	90	100
SPO2-R	BPM	50	150

SWEEP SPEED

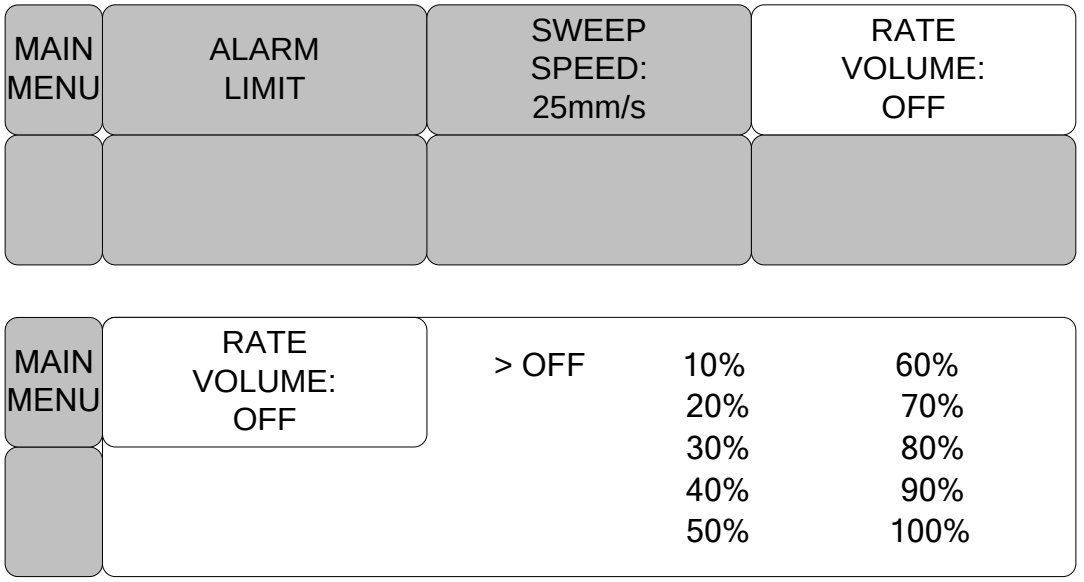
Adjust WAVE DISPLAY speed setup as below.

Numeric value is 6.25, 12.5, 25, 50mm/s



RATE VOLUME

Rate Volume can be adjusted from off and 10% to 100%.



7.4 TROUBLE SHOOTING

PROBE OFF Condition

When using a reusable finger probe, there is a system alarm to alert you when the probe is off the Monitor. The monitor defaults this " PROBE OFF(CABLE OFF)" condition as a System Warning alarm. You can, however, set it as a System ALARM LEVEL in Monitor Defaults.

SPO2 Messages

Below is a list of system status alarm messages which may be displayed in the SPO2 parameter window during monitoring.

CHECK PROBE

Reusable finger probe is off the patient. Check the probe. *The factory default for this alarm is MESSAGE ALARM.*

PULSE SEARCH

Detection by the monitor of a repeatable pulse has ceased. Check the patient and the probe site.

POOR SIGNAL

The SPO2 signal is too low. No SPO2 data is displayed. This can be due to a low patient pulse, patient motion, or some other interference. Check the patient and the probe.

LOST SIGNAL

SPO2 data continues to be displayed, but the quality of the signal is questionable. Check the patient and the probe.

ARTIFACT

The SPO2 signal is patient's motion artifact and noise

No SpO2 data is displayed. One of the following conditions is indicated:

- defective or damaged probe,
- defective or damaged cable
- probe is off the patient, or
- Detection of a repeatable pulse has ceased.
- Check the probe and cable: reposition or replace as needed.

8. TEMPERATURE

8.1 Outline

Temperature Connector and Measuring Cable

8.2 Temperature Data Window

8.3 Temperature Data Setup

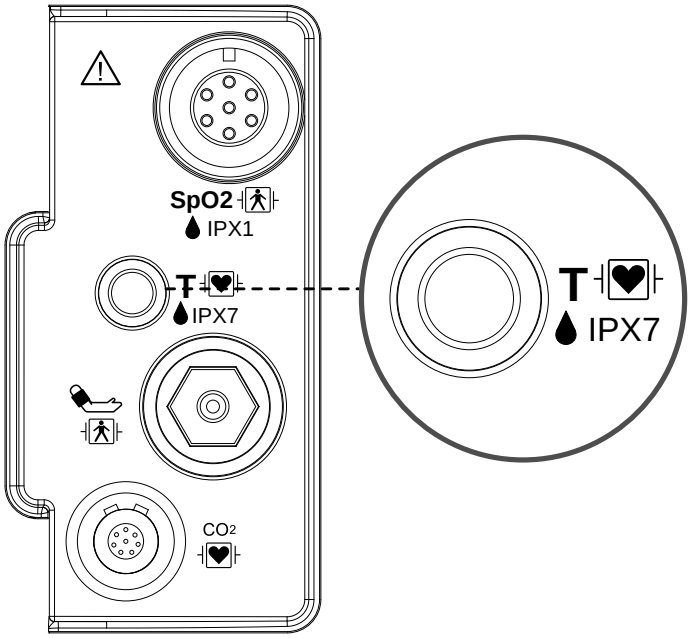
8.4 Trouble Shooting

8.1 Outline

This function is used to indicate the changes of resistance generated by the changes of temperature in numbers. The function involves the process of transferring the changes into electric signals.

Temperature Connector and Measuring Cable

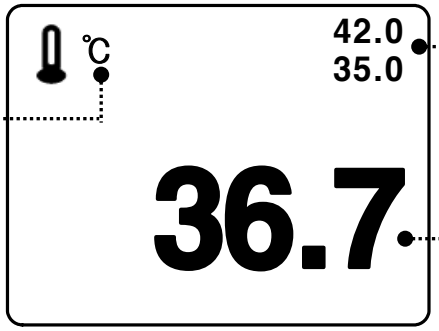
Temperature Connector



Temperature Measuring Cable

Note
Temperature probe is correctly positioned and fixed to do not disconnect on the patient. Temperature cable is attached to the monitor. The TEMP cable connector is a high-insulation port and it is defibrillator-proof( ).

8.2 Temperature Data Window



Unit：
Displays
temperature unit.

Alarm limit on the least low temperature：
Indicates temperature limits

Temperature：
Displays
temperature.

Note
The minimum measuring time required to obtain accurate readings at the specific body site is at least 3 minutes.

8.3 Temperature Data Setup

Turn the rotary wheel on the blue cursor to position the data window(refer to P.188), Select the menu button, and the following window is displayed

ALARM LIMIT： Sets up temperature limit.

TEMP MODE: Displays method of temperature measurement.

PROBE SITE: Displays temperature measurement region.

UNIT: Sets up temperature measurement unit.

MAIN MENU	ALARM LIMIT	TEMP MODE: MONITOR	PROBE SITE: ORAL
			UNIT SELECT: ℃

ALARM LIMIT

Numeric value is 15.0℃ ~ 45.0℃.

MAIN MENU	ALARM LIMIT	TEMP MODE: MONITOR	PROBE SITE: ORAL
			UNIT SELECT: ℃

TEMPERATURE ALARM LIMIT			
RETURN	UNITS	LOW	HIGH
TEMP	°C	30.0	42.0

TEMP MODE

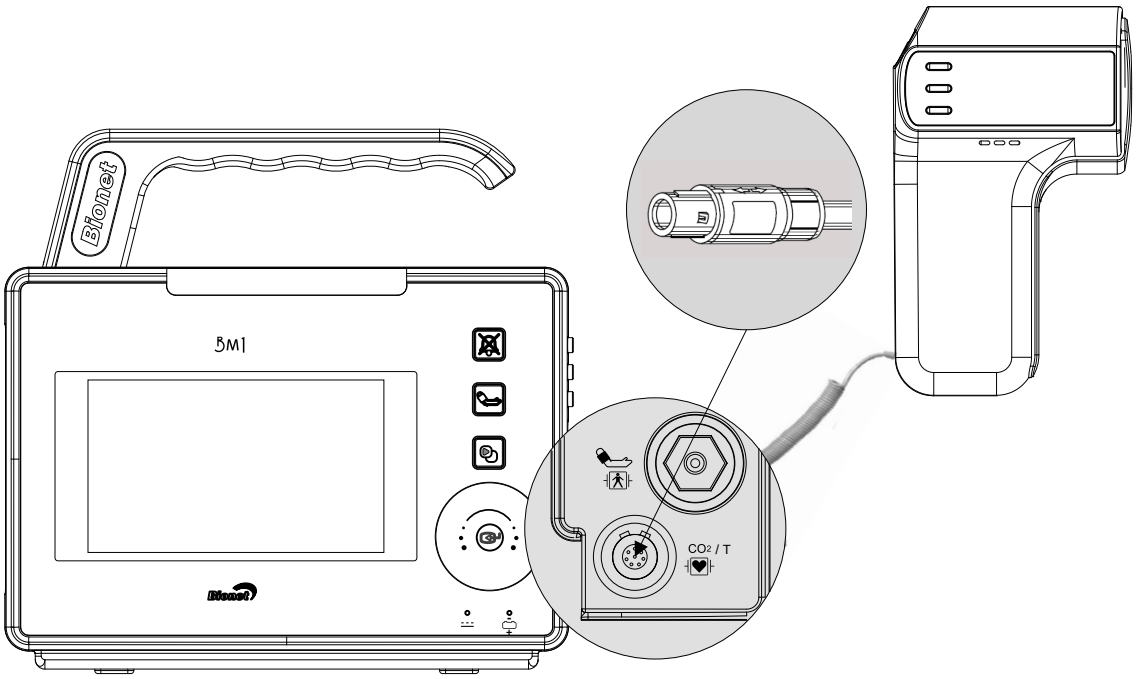
Display temperature measurement method.

MONITOR MODE: the monitor measures the patient's temperature continuously and displays the temperature in the numeric pane as long as the probe is in contact with the patient.

PREDICT MODE: the monitor measures the patient's temperature for approximately 4 seconds for oral measurements and approximately 16 seconds for axillary and rectal measurements.

MAIN MENU	ALARM LIMIT	TEMP MODE: MONITOR	PROBE SITE: ORAL
			UNIT SELECT: ℃

MAIN MENU	ALARM LIMIT	TEMP MODE: PREDICT	PROBE SITE: ORAL
			UNIT SELECT: ℃



Cable Setup for Infrared Thermometer

When your body is hot, you touch your forehead with your hand and that is because the body temperature is reflected on the temporal artery.

Temporal artery is the artery located closest to the skin and is spread on the forehead. If the blood with body temperature reflection passes the temporal artery on forehead, corresponding amount of infrared rays will be generated. From the infrared rays, the body temperature can be measured.

This product is a contactless-typed thermometer and does not directly contact with forehead and measure the temperature 2~3cm away from it. This will decrease discomfort or possible infections caused by contact.

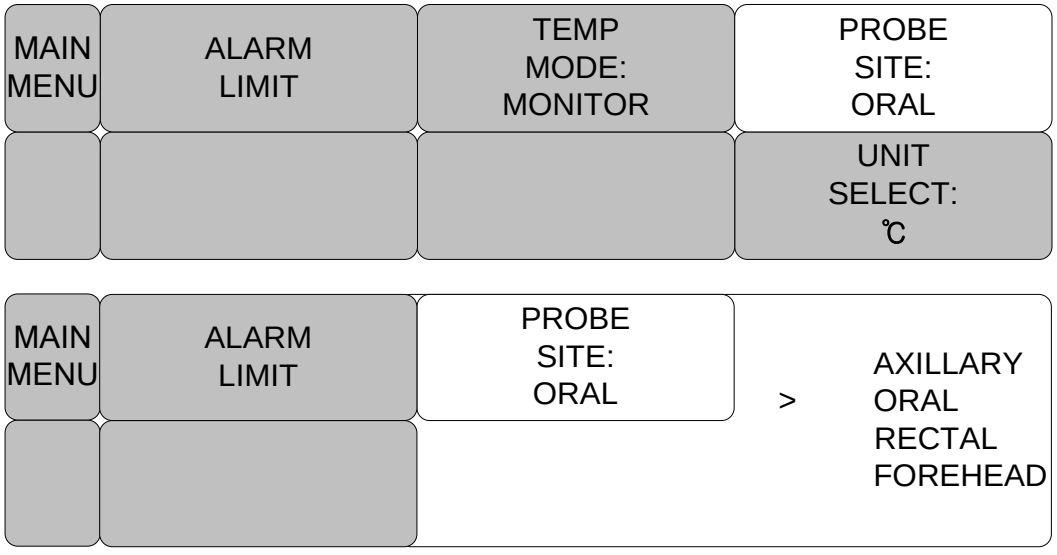
This product is a contactless typed infrared thermometer.

Note
Due to continuing product innovation, A contactless typed infrared thermometer in this manual are subject to change without notice.

PROBE SITE (Measurement Position)

Set up to display temperature measurement region.

Measurement regions are ORAL, AUXILLARY, RECTAL and FOREHEAD.



UNIT SELECT

Able to select unit with °C, °F.

MAIN MENU	ALARM LIMIT	TEMP MODE: MONITOR	PROBE SITE: ORAL
			UNIT SELECT: ℃

MAIN MENU	ALARM LIMIT	TEMP MODE: MONITOR	PROBE SITE: ORAL
			UNIT SELECT: ℃

8.4 TROUBLESHOOTING

Check list

4. The temperature probe(YSI 400 series) is correctly positioned on the patient.
5. Temperature cable is attached to the monitor.
6. Temperature setup is adjusted, if necessary. Follow detailed procedures within this chapter.

TEMP Message

If you experience some problems with temperature monitoring, one of the following messages may be displayed in the TEMP parameter window.

- PROBE OFF : Probe is not properly connected. Check the probe.

- No temperature value will be displayed . Service on the monitor is required.

9. DEFAULT SETTING VALUE

1. Adult Mode

Alarm level

	High	Medium	Low	Message
SpO_2 - %		0		
SpO_2- Rate		0		
NIBP		0		
T(℃/℉)				0
Lead Fault				0
Cable Off				0
Low Battery		0		

Parameter Limits

	Low	High
NIBP-S	80	200
NIBP-M	40	140
NIBP-D	20	120
SpO_2 - %	90	100
SpO_2 - Rate	50	150
T(℃/℉)	30.0 ℃ / 86.0 ℉	42.0 ℃ / 107.6 ℉

Display Defaults

Patient Age	**Adult**
NIBP Auto	**Off**
NIBP Cuff Size	**Adult**
ADULT Cuff Pressure	**170mmHg**
PED Cuff Pressure	**140mmHg**
NEO Cuff Pressure	**120mmHg**
NIBP Limit Type	**Systolic**
NIBP Units	**mmHg**
SpO_2 Check Probe	**Low Alarm**
Pulse Volume	**Off**
Alarm Volume	**50%**
Units for Height	**cm**
Units for Weight	**kg**
Temperature Units	**°C**

2. Neonate Mode

Alarm level

	High	Medium	Low	Message
SpO_2 - %		0		
SpO_2- Rate		0		
NIBP		0		
T(℃/℉)				0
Lead Fault				0
Cable Off				0
Low Battery		0		

Parameter Limits

	Low	High
NIBP-S	40	100
NIBP-M	30	70
NIBP-D	20	60
SpO_2 - %	88	100
SpO_2 - Rate	90	200
T(℃/℉)	30.0 ℃ / 86.0 ℉	42.0 ℃ / 107.6 ℉

Display Defaults

Patient Age	**0~2 years**
NIBP Auto	**Off**
NIBP Cuff Size	**Adult**
ADULT Cuff Pressure	**170mmHg**
PED Cuff Pressure	**140mmHg**
NEO Cuff Pressure	**120mmHg**
NIBP Limit Type	**Systolic**
NIBP Units	**mmHg**
SpO_2 Check Probe	**Low Alarm**
Pulse Volume	**Off**
Alarm Volume	**50%**
Units for Height	**cm**
Units for Weight	**kg**
Temperature Units	**°C**
Units for Weight	**kg**
Temperature Units	**°C**

3. Pediatric Mode

Alarm level

	High	Medium	Low	Message
SpO_2 - %		0		
SpO_2- Rate		0		
NIBP		0		
T(℃/℉)				0
Lead Fault				0
Cable Off				0
Low Battery		0		

Parameter Limits

	Low	High
NIBP-S	60	160
NIBP-M	40	120
NIBP-D	30	100
SpO_2 - %	90	100
SpO_2 - Rate	70	180
T(℃/℉)	30.0 ℃ / 86.0 ℉	42.0 ℃ / 107.6 ℉

Display Defaults

Patient Age	**3~16 years**
NIBP Auto	**Off**
NIBP Cuff Size	**PED**
ADULT Cuff Pressure	**170mmHg**
PED Cuff Pressure	**140mmHg**
NEO Cuff Pressure	**120mmHg**
NIBP Limit Type	**Systolic**
NIBP Units	**mmHg**
SpO_2 Check Probe	**Low Alarm**
Pulse Volume	**Off**
Alarm Volume	**50%**
Units for Height	**cm**
Units for Weight	**kg**
Temperature Units	**°C**
Units for Weight	**kg**
Temperature Units	**°C**

10. SPECIFICATION

Ease of use

Customization

Special Features

Monitor Environmental Specifications

Power adaptor

Monitor Performance Specifications

Graphical and Tabular Trends

SpO2 Performance Specifications

NIBP Performance Specifications

Temperature Unit Performance Specifications

EtCO2 Performance Specifications

Accessories included

OPTION

Ease of use

· Battery operation

· Table and graphic trend

· Nellcor SpO_2 Sensor interchanges

Additional Function

· LAN Connection

· Nurse Call

Monitor Environmental Specifications

· Operating Temperature： 15°C to 30°C (59°F to 86°F)

· Storage Temperature： - 10°C to 60°C (14°F to 140°F)

· Humidity： 20% to 95% RH

· Operating Attitude： 70(700) to 106Kpa(1060mbar)

Power

· AC 100-240V (50/60Hz) 1.0A

· Adapter 15 V, 2.0 A (JMW128KA1503F51)

Monitor Performance Specifications

· Screen： 4.3" TFT LCD (480×272)

· Indicators

- Up to 2 wave patterns
- 3 levels of alarm sound
- Visual alarm
- Pulse sound
- Alarm flashing
- Battery status
- LED external power supply LED

· Interfaces

- Power supply：15V DC, 2.0A max.
- Generating power for LAN, Wireless LAN : 5.0V max 1.0A

· Battery

- Li-ion battery
- Battery status display
- Operating time：4.5hours(with fully charged Battery)

Graphical and Tabular Trends

· Table Trend

- Memory Storage：128 hours
- Data Interval：15 sec
- Display Interval：1MIN, 5, 15, 30, 1HR

· Graphical Trend

- Display Period：30MINS, 60, 90, 3HRS, 6, 12

SpO_2 capacity

· Saturation Range： 0% to 100% oxygen proportion

· Pulse Rate Range： 30 to 254 bpm

· SpO_2 accuracy： 70% to 100% ±2 digits, 0% to 69% unspecified

· pulse accuracy： ±2 bpm

· Sensor Red 660nm, 2mW (typical)

Infrared 880nm, 2-2.4mW (typical)

· Minimum Signal: Amplitude 0.05% modulation (Low perfusion level performance and limitation validation using FLUKE Index 2 Oximetry Simulator)

NIBP capacity

· Technique： Oscillometric

· Measurement mode:

- Manual： Single Measurement
- Auto： automatic Intervals of 1MIN, 2, 3, 4, 5, 10, 15, 20, 30, 1HR, 2, 4, 8

· Pressure Range： 0 to 300 mmHg(Accuracy ±3mmHg)

· Pulse Rate : 30 to 220BPM

· Blood Pressure Measurement Range:

- Adult Pressure : 20 to 260 mmHg
- Pediatric Pressure : 20 to 160 mmHg
- Neonate Pressure : 20 to 130 mmHg

· Accuracy : Meets accuracy requirements of ANSI/AAMI SP10:1992 AND 2002

Temperature Unit Performance Specifications

· Range : 15°C to 45°C (59°F to 113°F)

· Accuracy : 25°C to 45°C ± 0.1°C, 15°C to 24°C±0.2°C

· Sensor : YSI 400 Series compatibility

EtCO2 Module Performance Specifications

· EtCO2 Range : 0 to 150 mmHg , 0 to 19.7% , 0 to 20 kPa

· EtCO2 Accuracy : 0 to 40 mmhg : ± 2mmHg

41 to 70 mmhg : ± 5%

71 to 100 mmhg : ± 8%

101 to 150 mmhg : ± 10%

· Respiration Range : 0 to 150 bpm (breath per minute)

· Respiration Accuracy : ± 1bpm

Accessories Included:

· NIBP tubing, 3m long	1 EA
· Reusable Adult cuff, 25-35 Cm	1 EA
· SpO_2 extension cable 2m	1 EA
· Reusable Adult SpO_2 Probe	1 EA
· DC adapter, 15VDC, 2.0A (JMW128 Made in Bridgepower Co., Ltd.)	1 EA
· IV Clamp	1 EA

Option

· Temperature sensor (skin , YSI 400 Series)

· Temperature (Infrared Thermometer)

· EtCO2 Module and accessories (Refer to the EtCO2 chapter of this manual for details)

· Barcode Reader (USB)

Appendix A.

Electromagnetic Emissions and Immunity

Manufacturer's declaration – electromagnetic emission

The BM1 system is intended for use in the electromagnetic environment specified below. The customer or the user of BM1 system should assure that it is used in such an environment		
Emission test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The BM1 system uses RF energy only for its internal function. Therefore. Its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment
RF emissions CISPR 11	Class B	The BM1 system is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supplies buildings used for domestic purposes.
Harmonics emission IEC 61000-3-2	A	
Voltage fluctuation IEC 61000-3-3	Complies	

Manufacturer's declaration - electromagnetic immunity

The BM1 system is intended for use in the electromagnetic environment specified below. **The customer or the user of the BM1 system should assure that it is used in such an environment**			
Immunity test	**IEC 60601 Test level**	**Compliance level**	**Electromagnetic Environment - guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	6 kV Contact 8 kV Air	6 kV Contact 8 kV Air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %
Electrical fast Transient / burst IEC 61000-4-4	2kV for power supply lines 1kV for input/output lines	2kV for power supply lines 1kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	1 kV differential mode 2 kV common mode	1 kV differential mode 2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.

Power frequency (50/60Hz) Magnetic field IEC 61000-4-8	3.0 A/m	3.0 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Voltage dips, short Interruptions and Voltage variations on power supply input lines IEC 61000-4-11	<5% *U*т (>95% dip in *U*т) for 0.5cycle 40% *U*т (60% dip in *U*т) for 5 cycle 70% *U*т (30% dip in *U*т) for 25 cycle <5% *U*т (<95% dip in *U*т) for 5 s	<5% *U*т (>95% dip in *U*т) for 0.5cycle 40% *U*т (60% dip in *U*т) for 5 cycle 70% *U*т (30% dip in *U*т) for 25 cycle <5% *U*т (<95% dip in *U*т) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the BM1 system requires continued operation during power mains interruptions, it is recommended that the BM1 system be powered from an uninterruptible power supply or a battery
Note: *U*т is the a.c. mains voltage prior to application of the test level.			

The BM1 system is intended for use in the electromagnetic environment specified below. The customer or the user of the BM1 system should assure that it is used in such an environment			
Immunity test	**IEC 60601 Test level**	**Compliance level**	**Electromagnetic environment - guidance**
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms 150 kHz to 80 MHz	Portable and mobile RF communications equipment should be used no closer to any part of the BM1 system, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance** $d = [\frac{3,5}{V_1}]\sqrt{P}$

Radiated RF IEC 61000-4-3	3 V/m 80.0 MHz to 2.5 GHz	3 V/m 80.0 MHz to 2.5 GHz	**Recommended separation distance** $d = [\frac{3,5}{E_1}]\sqrt{P}$ 80 MHz to 800 MHz $d = [\frac{7}{E_1}]\sqrt{P}$ 800 MHz to 2,5 GHz Where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as deter-mined by an electromagnetic site survey, (a) Should be less than the compliance level in each frequency range (b). Interference may occur in the vicinity of equipment marked with the following symbol: 

Note 1) U_T is the A.C. mains voltage prior to application of the test level.

Note 2) At 80 MHz and 800 MHz, the higher frequency range applies.

Note 3) These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the EUT is used exceeds the applicable RF compliance level above, the EUT should be observed to verifynormal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the EUT.

b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than [V1] V / m.

Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the BM1 system.

The BM1 system is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The user of the BM1 system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the BM1 system as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power (W) of transmitter	Separation distance (m) according to frequency of transmitter		
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.5 GHz
0.01	0.12	0.12	0.23
0.1	0.37	0.37	0.74

1	1.17	1.17	2.33
10	3.70	3.70	7.37
100	11.70	11.70	23.30
For transmitters rated at a maximum output power not listed above, the recommended separation distance (d) in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			
Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies **Note 2:** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.			

Immunity and Compliance Level			
Immunity test	IEC 60601 Test Level	Actual Immunity Level	Compliance Level
Conducted RF IEC 61000-4-6	3 Vrms, 150 kHz to 80 MHz	3 Vrms, 150 kHz to 80 MHz	3 Vrms, 150 kHz to 80 MHz
Radiated RF IEC 61000-4-3	3 V/m, 80 MHz to 2.5 GHz	3 V/m, 80 MHz to 2.5 GHz	3 V/m, 80 MHz to 2.5 GHz

Guidance and manufacturer's declaration - electromagnetic immunity

The BM1 system is intended for use in the electromagnetic environment specified below. The customer or the user of the BM1 system should assure that it is used in such an environment			
Immunity test	**IEC 60601 Test level**	**Compliance level**	**Electromagnetic environment - guidance**
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80MHz	3 Vrms 150 kHz to 80 MHz	BM1 system must be used only in a shielded location with a minimum RF shielding effectiveness and, for each cable that enters the shielded location with a minimum RF shielding effectiveness and, for each cable that enters the shielded location
Radiated RF IEC 61000-4-3	3 V/m 80.0 MHz to 2.5 GHz	3 V/m 80.0 MHz to 2.5 GHz	Field strengths outside the shielded location from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than 3V/m.**a** Interference may occur in the vicinity of equipment marked with the following symbol: 
Note 1) These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people. **Note 2)** It is essential that the actual shielding effectiveness and filter attenuation of the shielded location be verified to assure that they meet the minimum specification.			
a- Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength outside the shielded location in which the EUT is used exceeds 3V/m, the EUT should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as relocating the EUT or using a shielded location with a higher RF shielding effectiveness and filter attenuation.			

Abbreviations and Symbols

Abbreviations and symbols which you may encounter while reading this manual or using the monitor are listed below with their meanings.

Abbreviations

	A
A	amps
AC	alternating current
ADT	adult
Auto, AUTO	automatic
AUX	Auxiliary
	B
BPM	beats per minute
	C
C	Celsius
CAL	calibration
cm, CM	centimeter
	D
D	diastolic
DC	direct current
DEFIB, Defib	defibrillator
DIA	diastolic
	E
EMC	electromagnetic compatibility
EMI	electromagnetic interference
ESU	Electrosurgical Surgical Unit
	F
F	Fahrenheit

G

g	gram

H

HR	heart rate, hour
Hz	hertz

I

Inc	incorporated

K

kg, KG	kilogram
kPa	kilopascal

L

L	liter, left
LBS	pounds
LCD	liquid crystal display
LED	light emitting diode

M

M mean,	minute
m	meter
MIN,	min minute
MM, mm	millimeters
MM/S	millimeters per second
MMHG, mmHg	millimeters of mercury
mV	millivolt

N

NIBP	noninvasive blood pressure
NEO, Neo	neonatal

P

PED	pediatric

R

RESP	respiration
RR	respiration rate

S

S	systolic
sec	second
SpO2	arterial oxygen saturation from pulse oximetry
SYS	systolic

T

Temp, TEMP	temperature

V

V	precordial lead
V	volt

X

X	multiplier when used with a number (2X)

Symbols

&	and
°	degree(s)
>	greater than
<	less than
–	minus
#	number
%	percent
±	plus or minus

PRODUCT WARRANTY

Product Name	**Patient Monitor**
Model Name	**BM1**
Approval Number	
Approval Date	
Serial Number	
Warranty Period	**1 year from date of purchase**
Date of Purchase	
Customer Section	**Hospital Name :** **Address :** **Name :** **Phone :**
Sales Agency	
Manufacturer	

* Thank you for purchasing BM1.

* The product is manufactured and passed through strict quality control and through inspection.

International Sales & service

Bionet Co., Ltd. :

#1101 11F E&C Venture Dream Tower3 38-21, Digital-Ro, 31-Gil,

Guro-Gu, Seoul 152-719, REPUBLIC OF KOREA

Tel : +82-2-6300-6413 / Fax : +82-2-6499-7788 / e-mail: sales@ebionet.com

Website: www.ebionet.com

U.S.A sales & service representative

Bionet America, Inc. :

2691, Dow Ave, Suite B

Tustin, CA 92780 U.S.A.

Toll Free : 1-877-924-6638 FAX : 1-714-734-1761 / e-mail: support@bionetus.com

Website : www.bionetus.com

European sales & service representative

MGB Endoskopische Geräte GmbH Berlin :

Schwarzschildstraße 6

D-12489 Berlin, Germany

Tel. +49(0)306392-7000 / Fax. +49(0)306392-7011 / e-mail: sales@mgb-berlin.de

Website: www.mgb-berlin.de

BIONET CO., LTD.

Product Name: BM1