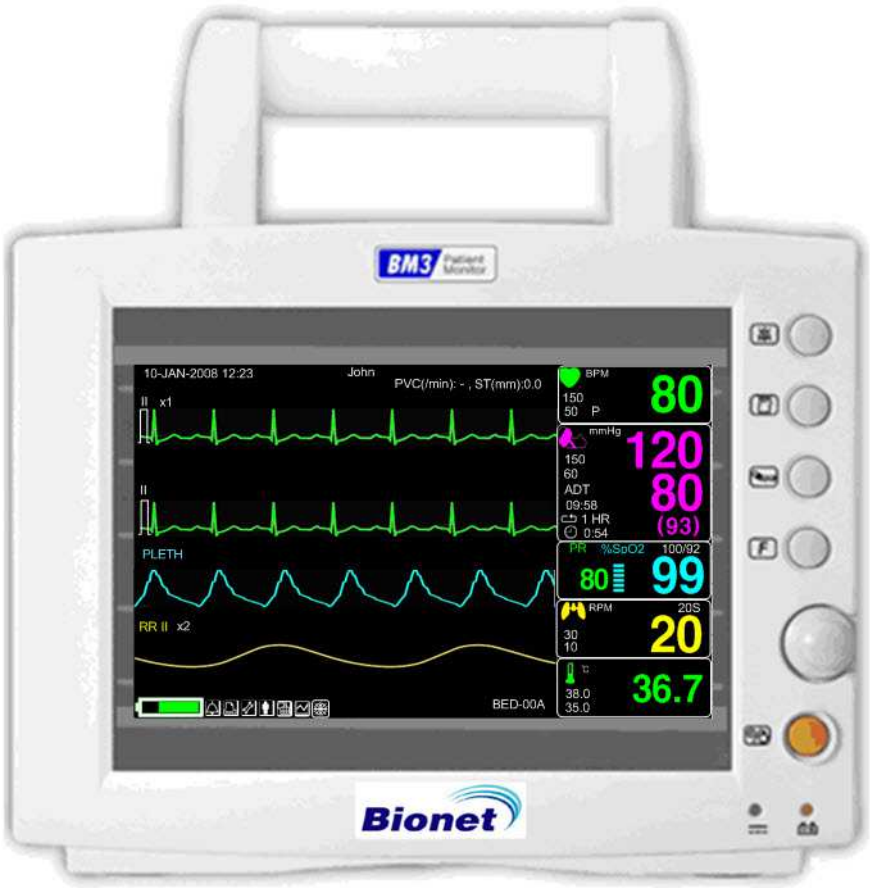
BM3 User's Manual

Patient Monitor



Bionet

Rev. 2.61

Table of Contents

1. BASIC

1.1 CE Standard Information

1.2 Read before Use

Warranty Period

Warning, Caution, Note

General Precaution on Environment

General Precaution on Electric Safety

Equipment Connection, Maintenance & Washing Equipment Connection

1.3 Product Components

Product Outline

Principal Characteristics of Product

Product Configuration and Option Product

Product Body Configuration

1.4 Function and Key

External Function

Operation Key

1.5 Standard Power Supply Application

1.6 Battery Power Supply Application

1.7 General Menu Operation

Screen Composition

Menu Selection

Menu Composition

1.1 CE Standard Information

Electromechanical safety standards met:

- EN 60601-1: 1990 + A1:1993 + A2: 1995 Medical Electrical Equipment, Part 1, General Requirements for Safety.
- IEC/EN 60601-1-2 :2001 Electromagnetic compatibility -Requirements and tests.
- EN 1060-1:1995 Non-invasive sphygmomanometers - Part 1: General requirements
- EN 1060-3:1997 Non-invasive sphygmomanometers - Part 3: Supplementary requirements for electro-mechanical blood pressure measuring systems
- EN ISO 9919:2005 Medical electrical equipment - Particular requirements for the basic safety and essential performance of pulse oximeter equipment for medical use (ISO 9919:2005)
- EN 60601-2-27:2006 Medical electrical equipment - Part 2-27: Particular requirements for the safety, including essential performance, of electrocardiographic monitoring equipment
- EN 60601-2-30:2000 Medical electrical equipment - Part 2-30: Particular requirements for the safety, including essential performance, of automatic cycling non-invasive blood pressure monitoring equipment
- EN 12470-4:2000 Clinical thermometers - Part 4: Performance of electrical thermometers for continuous measurement
- EN 60601-2-49:2001 Medical electrical equipment - Part 2-49: Particular requirements for the safety of multifunction patient monitoring equipment

1.2 Read before Use

BIONET services are always available to you.
The followings are address and phone number for contacting information, services, and product supplies.

How to Contact Us

Product Supply Information	**Bionet Co.,Ltd.** **#1101 11F E&C Venture Dream Tower3 38-21, Digital-Ro, 31-Gil, Guro-Gu, Seoul , REPUBLIC OF KOREA (ZIP 08376)** Overseas sales dept. Tel:++82-2-6300-6418 Fax : ++82-2-6300-6454 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 we will provide you with it.

The information in this manual only applies to BM3 patient monitor software version 1.10 . Due to continuing product innovation, specifications in this manual are subject to change without notice.

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 Korea Fair Trade Commission.

- We provide a 1-year warranty period.(Two years in Europe)
- We will repair or replace any part of the BM3 found to be defective in usual operating circumstance for free to you.

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

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.

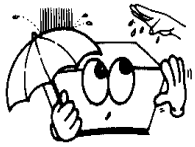
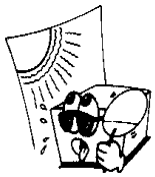
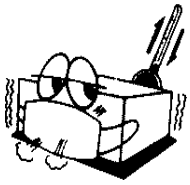
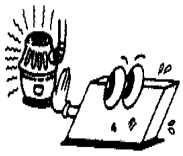
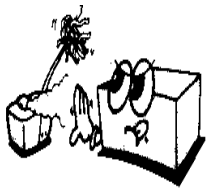
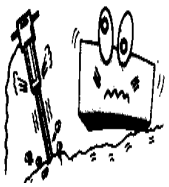
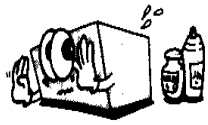
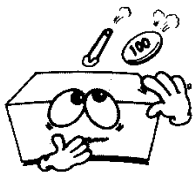
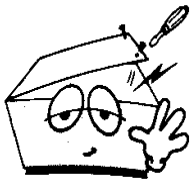
Warning
To inform that it may cause serious injury or death to the patient, property damage, material losses against the "warning" sign

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 moist. Do not touch the equipment with wet hand.		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 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 an excessive shock or vibration.
	Avoid placing in an area where chemicals are stored or where there is danger of gas leakage.		Avoid being inserted dust and especially metal material into the equipment
	Do not disjoint or disassemble the equipment. We take no responsibility for it.		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

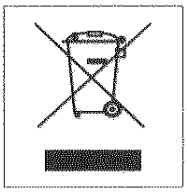
Patient signal inputs labeled with the CF and BF symbols with paddles are protected against damage resulting from defibrillation voltages. To ensure proper defibrillator protection, use only the recommended cables and lead wires.

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.

WARNING
This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm.

Electrocute Precautions

To prevent skin burns, apply electrocute electrodes as far as possible from all other electrodes, a distance of at 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 source of interference as they may emit higher levels of electromagnetic radiation.
Also, keep cellular phones to 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 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 that 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.)

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 Precaution on Electric 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. (DC18V, 2.8A , BPM050S18F02)
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, there might be the problem occur in the product.)
5. The equipment should not be placed in the vicinity of electric generator, X-ray, broadcasting apparatus to eliminate the electric noise during operation. Otherwise, it may cause incorrect result.

Note
The Equipment should be placed far from generator, X-ray equipment, broadcasting equipment or transmitting wires, so as to prevent the electrical noises from being generated during the operation, When these devices are near the Equipment, it can produce inaccurate measurements. For BM3, 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 contacts with the patient while operate 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 damaged, do not use on patient, and contact to the medical equipment technician of the hospital or the equipment supply division.

Note
BM3 is classified as follows: - BM3 classifies as Class **I,** BF **&** CF concerning electric shock. It is not proper to operate this Equipment around combustible anesthetic or dissolvent. - Noise level is B class regarding IEC/EN 60601-1 and the subject of Nose is B level concerning IEC/EN60601-1-2.

Equipment Connection

Caution
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  .

Manufacturer's declaration - electromagnetic emission

The BM3 system is intended for use in the electromagnetic environment specified below. The customer or the user of BM3 system should assure that it is used in such an environment		
Emission test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The BM3 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 BM3 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 **BM3** system is intended for use in the electromagnetic environment specified below. The customer or the user of the **BM3** 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_T (>95% dip in U_T) for 0.5cycle 40% U_T (60% dip in U_T) for 5 cycle 70% U_T (30% dip in U_T) for 25 cycle <5% U_T (<95% dip in U_T) for 5 s	<5% U_T (>95% dip in U_T) for 0.5cycle 40% U_T (60% dip in U_T) for 5 cycle 70% U_T (30% dip in U_T) for 25 cycle <5% U_T (<95% dip in U_T) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the **BM3** system requires continued operation during power mains interruptions, it is recommended that the BM3 system be powered from an uninterruptible power supply or a battery
Note: U_T is the a.c. mains voltage prior to application of the test level.			

The **BM3** system is intended for use in the electromagnetic environment specified below. The customer or the user of the **BM3** 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 BM3 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 G Hz	3 V/m 80.0 MHz to 2.5 G Hz	**Recommended separation distance** $d = [\frac{3,5}{E1}]\sqrt{P}$ 80 MHz to 800 MHz $d = [\frac{7}{E1}]\sqrt{P}$ 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 verify normal 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 **BM3** system.

The **BM3** system is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The user of the **BM3** system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the BM3 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 **BM3** system is intended for use in the electromagnetic environment specified below. The customer or the user of the **BM3** 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	**BM3** 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.

Note
For Type A Professional ME Equipment intended for use in domestic establishment instructions for use includes a warning: This ME equipment is intended for use by professional healthcare personnel only.

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

Using various methods can clean BM3 and its accessories. Please follow the methods mentioned below to avoid unnecessary damage or contamination to the Equipment.

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

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

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

At least once a month, clean and wipe off the frame by using the soft cloth after wetting it with water and alcohol. Do not use lacquer, thinner, ethylene, and oxidizer which may leads 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 any liquid not to penetrate into the Equipment or probe.

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 single use probe to any hazard place, Always think about environmental contamination.

Caution
There is back-up battery on board inside system. When users dispose this battery, Please waste proper place for environmental protection.

Warning
Check the electrodes of batteries before changing them.

· Operate BM3 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 without any damage.

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

1.3 Product Components

Product Outline

BM3 monitor is a product used for monitoring biological information and occurrence of a patient. Main function ns of the product include displaying information such as ECG, respiration, SpO2, NIBP and temperature on its LCD screen and monitoring parameter, and alarming. It also prints out waves and parameters via a printer.

Principal Characters of Product

BM3 is a small-size multifunctional monitoring equipment for a patient designed to an easy usage during movement. It features devices for DC power supply (DC 18V, BPM050S18F02) as well as installing its handle to the patient's bed. The equipment also measures major parameters such as ECG, SpO2, NIBP, temperature and pulse, displaying it on a 7-inch color LCD screen. It also enables users to check waves and parameters and other vital signs of a patient via the 58mm thermal printer and 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 BM3 Monitor 1 EA
2. 3-Lead Patient Cable 1EA
3. Disposable electrodes 10 EA
4. NIBP extension hose (3M long) 1EA
5. Adult cuff (25-35 Cm) 1EA
6. SpO2 extension cable (2M) 1EA
7. Reusable Adult SpO_2 Probe 1 EA
8. DC Adaptor (BPM050S18F02 made in Bridge power Co., Ltd.) 1 EA

Option Product

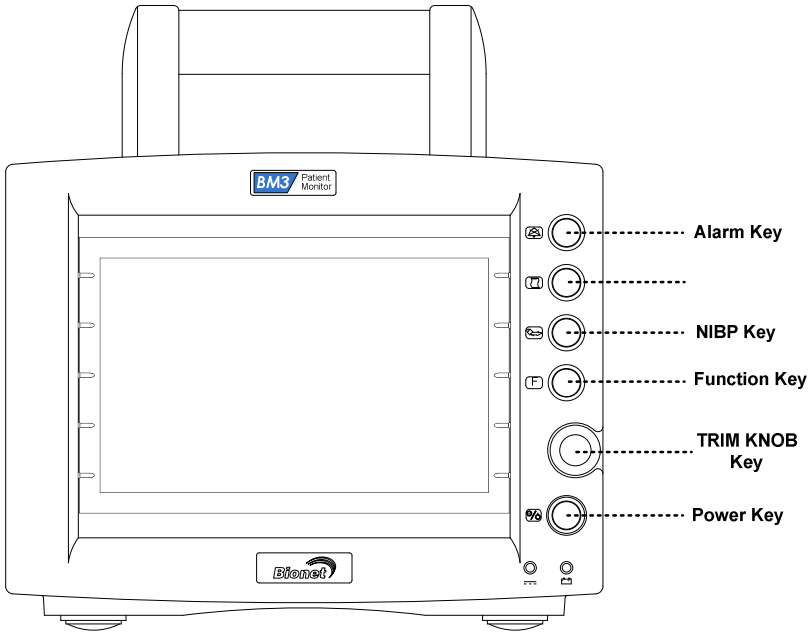
1. Temperature
2. Thermal printer and Thermal Paper

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

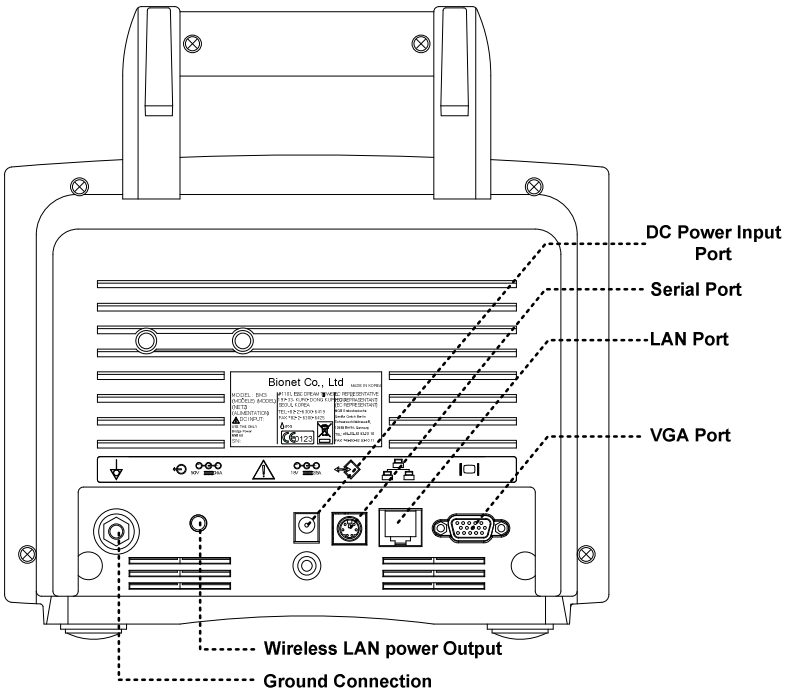
Warning
Users must pay attention on connection any auxiliary device via LAN port or nurse calling. Always consider about summation of leakage current, please check if the auxiliary device is qualified by IEC 60601-1, or consult your hospital biomedical engineer.

Product Body Configuration

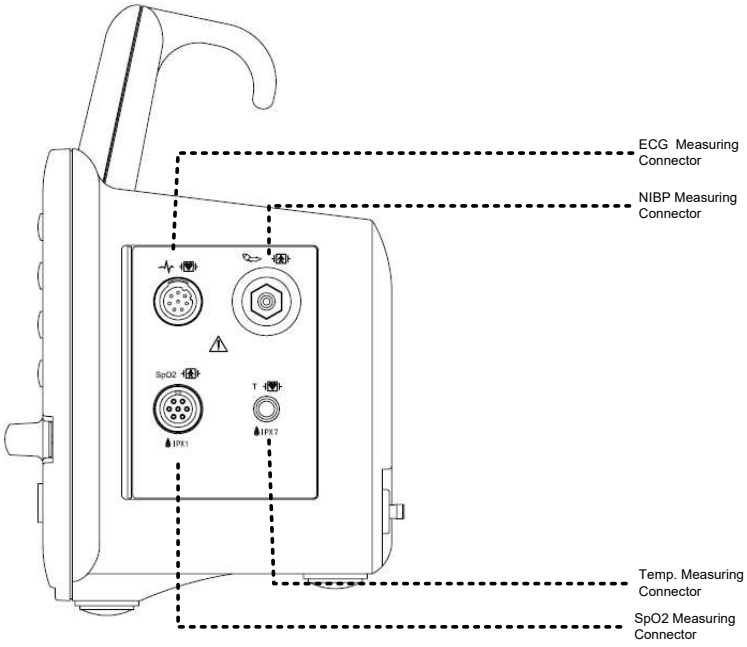
FRONT



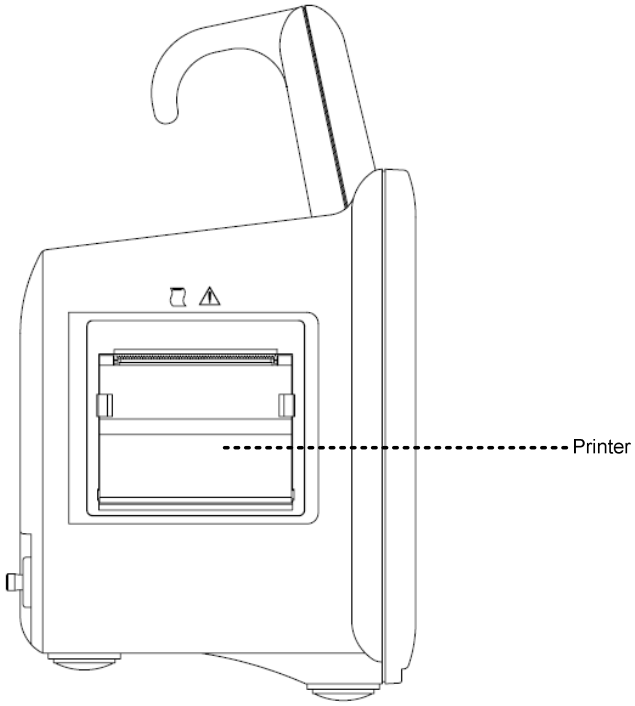
BACK


DC Power Input Port
Serial Port
LAN Port
VGA Port
Wireless LAN power Output
Ground Connection

Right Side



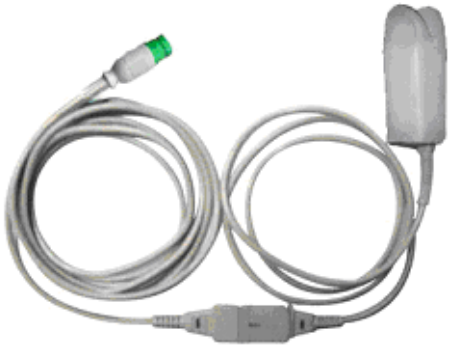
Left Side


Printer

Accessories

ECG Cable +
Extension Cable

SpO_2 Cable +
Extension Cable

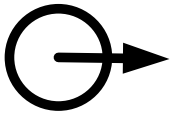
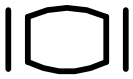
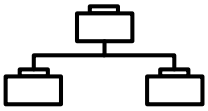
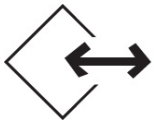
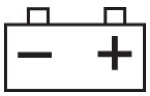


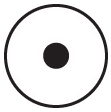
NIBP Cuff+
Extension cable

Temperature
sensor (Option)

Equipment Sign

	ATTENTION : Consult accompanying documents
	Defibrillator-proof 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 BF applied parts.
	Defibrillator-proof 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 B applied parts.

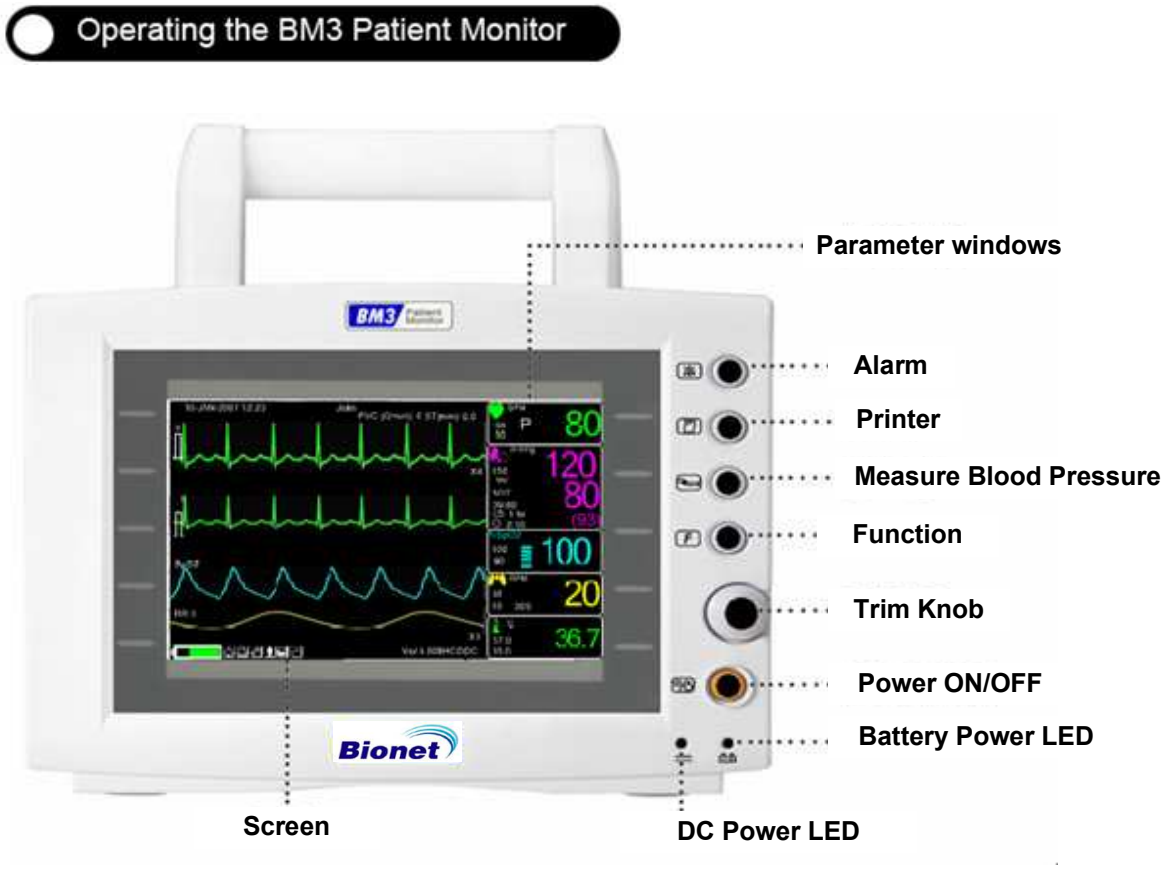
	**Ground**
	**Output port**
	**DC Power Output**
	**Printer**
	**VGA Output**
	**Serial Port**
	**LAN Port**
	**AUX Connector Port**
	**DC Input Indicator**
	**Battery Operation Indicator**
	**DC Power Input port**

	**NIBP**
T	**Temperature**
PR	**Pulse Rate**
	**Respiration**
	**ECG**
	**Heart Pulse**
	**Alarm Off**
F	**Function**
	**Power On**
	**Power Off**

1.4 Function and Key

External Function

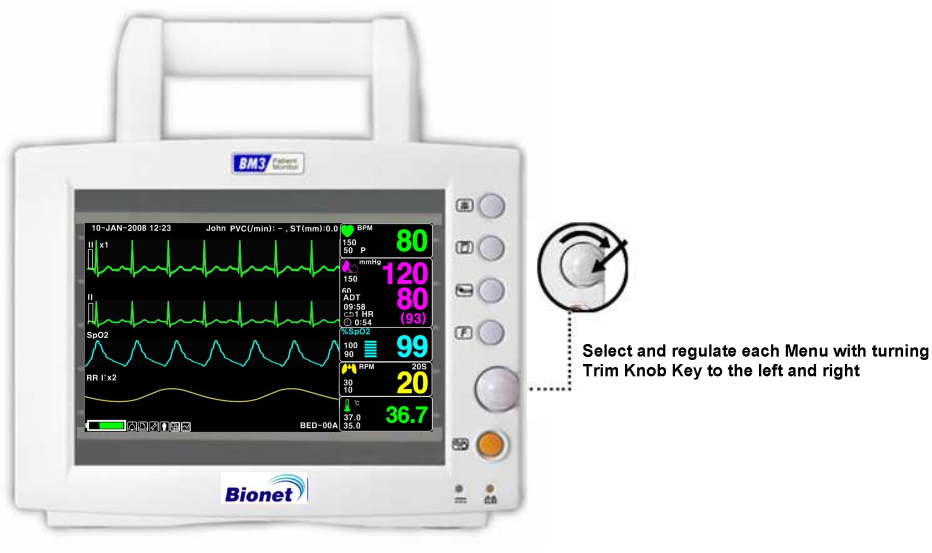
The front panel of this product consists of an LCD screen and five function keys and one trim knob.

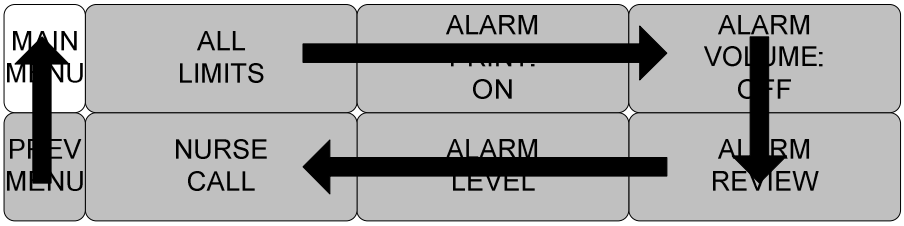


Operation Key

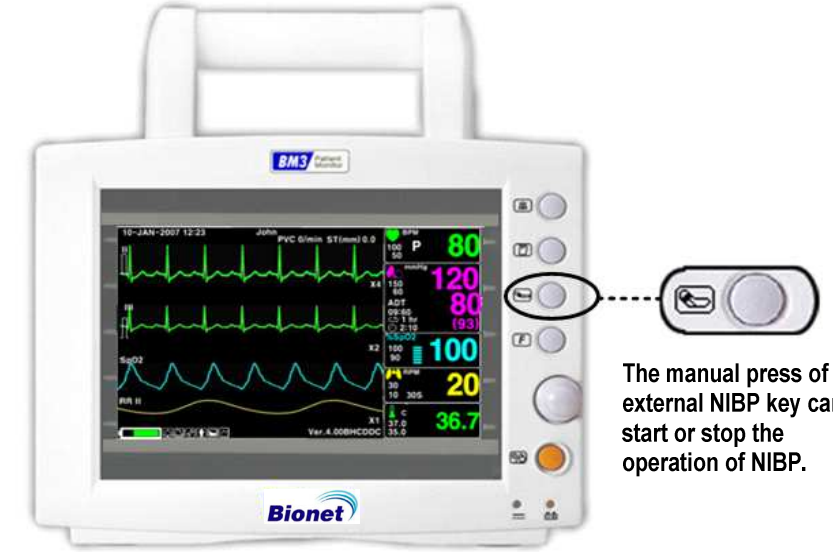
1. Power：Switches on and off the Power.
2. Function Key
3. Blood Pressure：Manually completes measuring blood pressure.
4. Printer：Prints out the waves selected from the menu until the key is pressed to stop.
5. Alarm： Stop alarm sound.
   First press stops the current alarm for one minute
   Second press stops the all alarm for two minutes.
   Third press stops the all alarm off.
   Fourth press makes the alarm back to the original setting.
6. Trim Knob：This key is used to select menu by turning it clock or anticlockwise to move cursors.

Movement and Selection in Menu





NIBP KEY

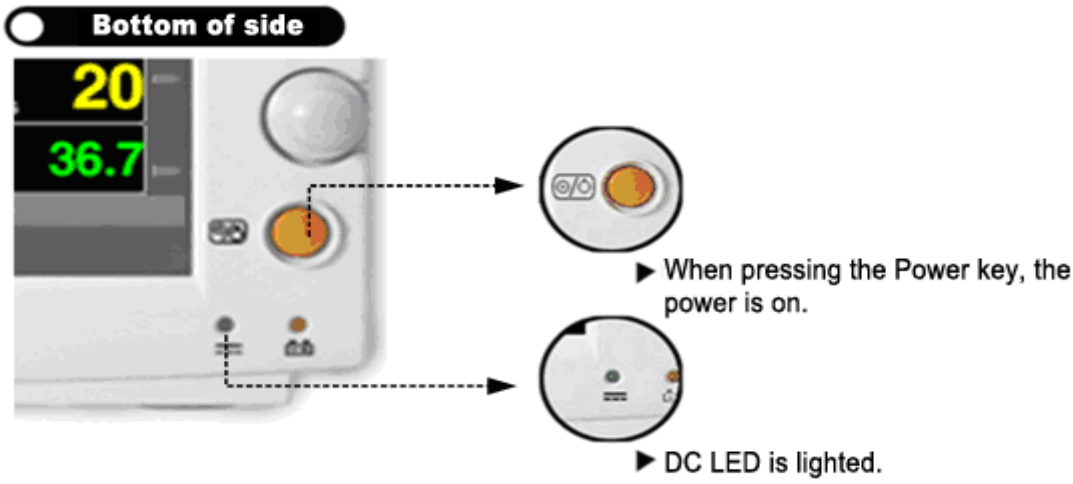


1.5 Standard Power Supply Application

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 power key makes the machine ready for use.



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 a 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 1 hour.

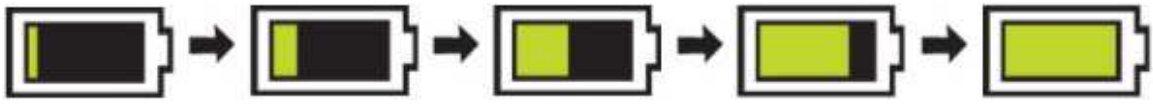
3. Battery is automatically charged when the machine is connected to DC Power Supply. Battery LED is lighted on after blinking.

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

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

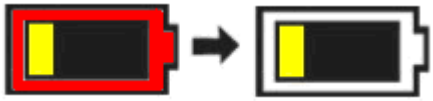
- Battery code: ICR18605 22F-031PpTC (10.8V - 2200mA, Li-ion)

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 remained battery is less than 25%, the battery icon box is turned to red one with blink. The device will be turned off automatically after 5 minutes from that warning sign. In case of that warning sign with red and blink at icon box, charge the device immediately with DC power adaptor which is provided from BIONET.

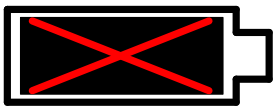


-Battery charging time: More than 6 hours

-Continuous battery use time: Lowest 1 hour to highest 2 hours continuous use (buffering)

Warning
Check the electrodes of batteries before charging them.

6. Battery status indication: When battery is apart from equipment and 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 16V, the battery indication disappears and the ”LOW” indication is active.

Display of Low power supply

Note
Battery is not charged when the LOW power is used.

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 full 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

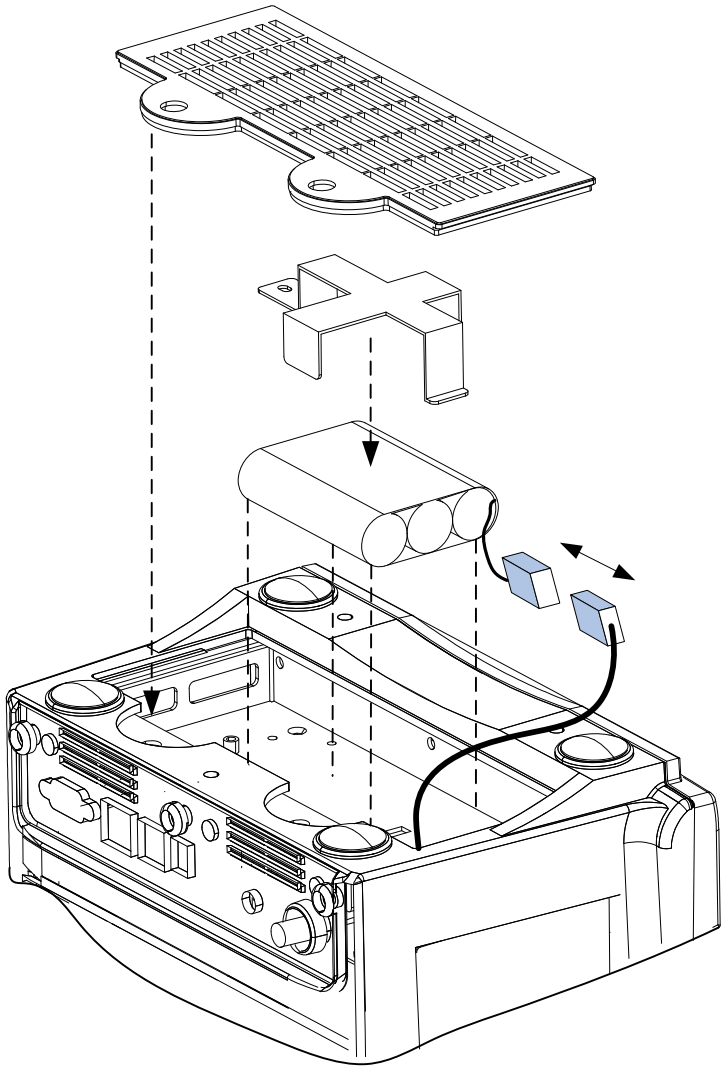
When the battery no longer holds a charge, it should be replaced. The battery is recyclables.

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.

To insert and remove the battery pack.

Assembly or replacement, as shown in the figure below.

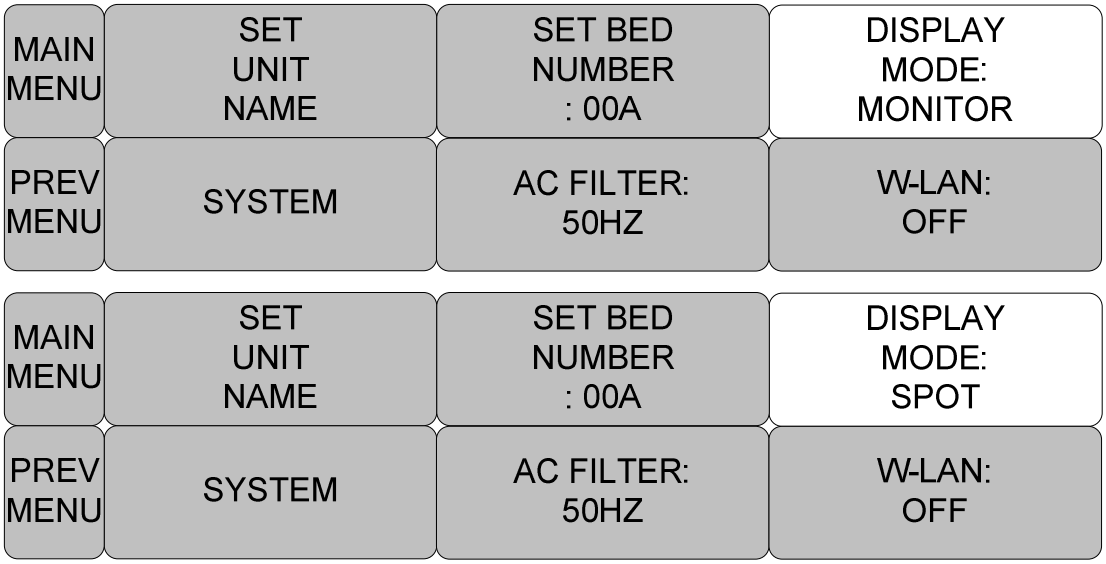


1.7 DISPLAY MODE (MONITOR OR SPOT)

You can selected display mode in user service (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.



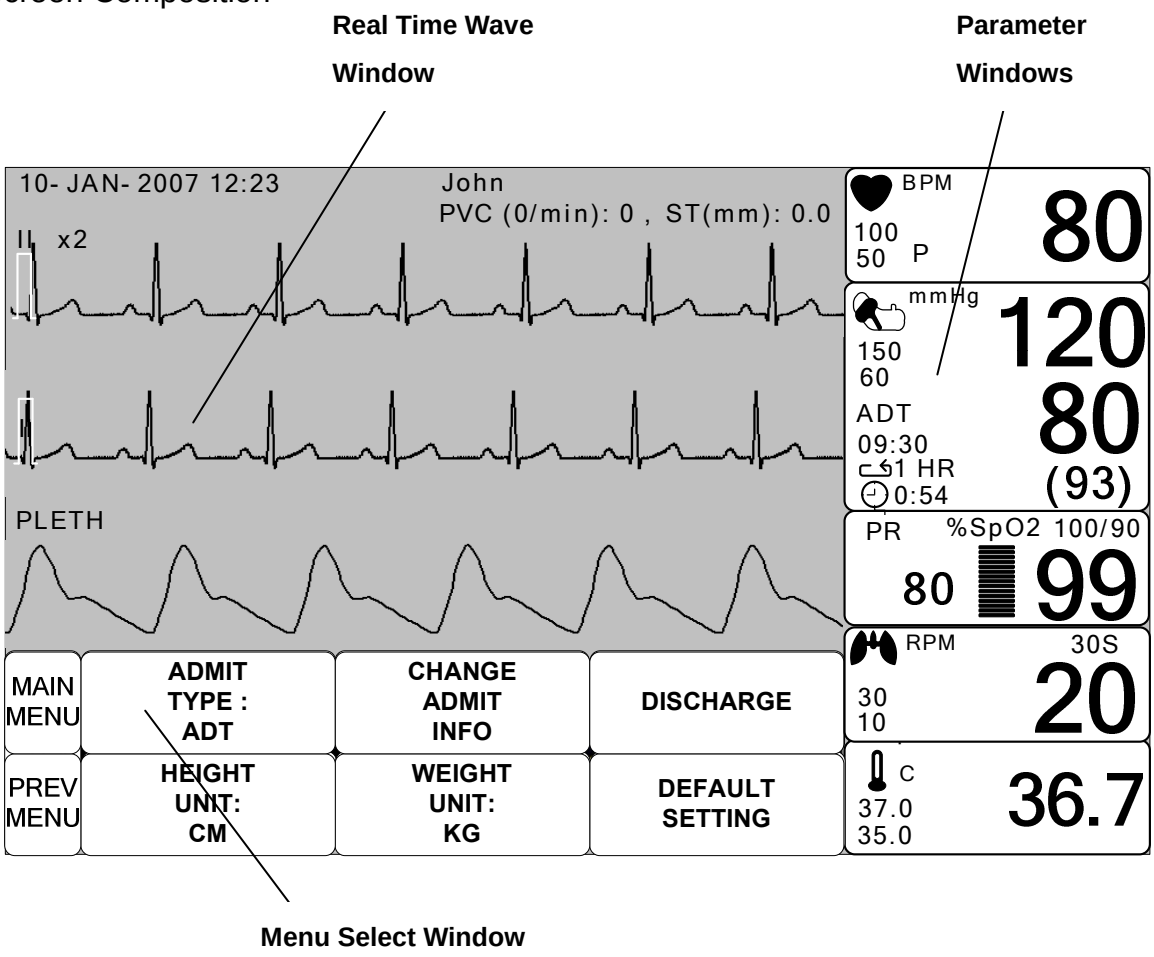
MONITORING MODE

1. General Operation
2. Patient/Data Management
3. Setup
4. Trend
5. ECG
6. SpO2
7. Respiration
8. NIBP
9. Temperature
10. PRINT
11. Message List
12. Default Setting Value

1. General Operation

1.1 General Manu Operation

Screen Composition

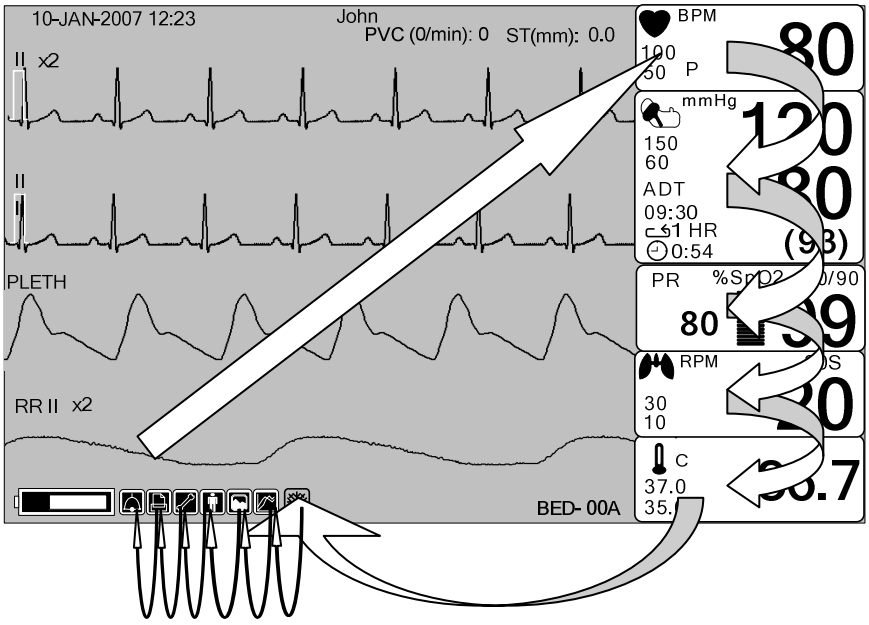


Real Time Wave Window：Displays measured results by up to three waves.

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

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

Menu Selection



Turn or press the knob.

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 MORE MENU → ECG → NIBP →SpO_2 → RESP → TEMP. An inactivated window is jumped off.

Menu Composition

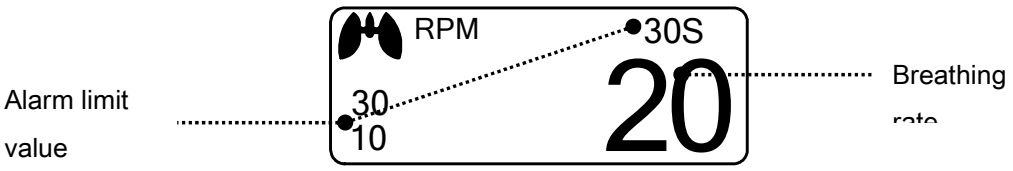
More Menu Window

When the additional menu is selected it will set and cancel the functions.

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

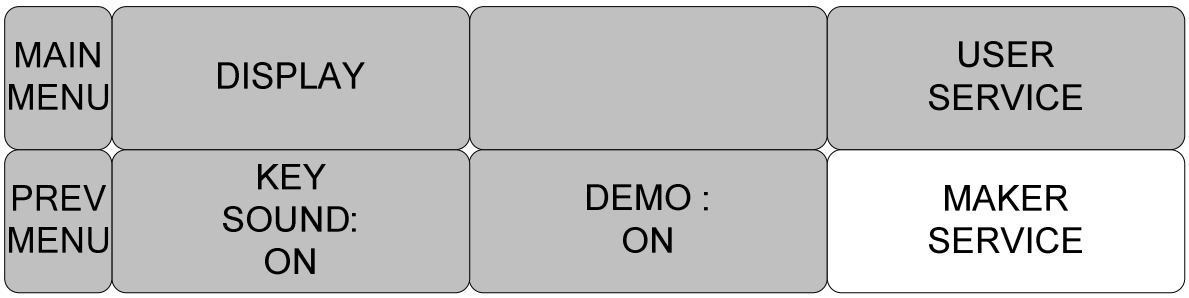
Numerical value sign widow

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



Menu selection by using Trim Knob key

As the key is turn to the right, the menu selection moves clockwise. As the key is turn to the left, the menu selection moves counterclockwise. The menu selection is activated when you depress Trim Knob key.

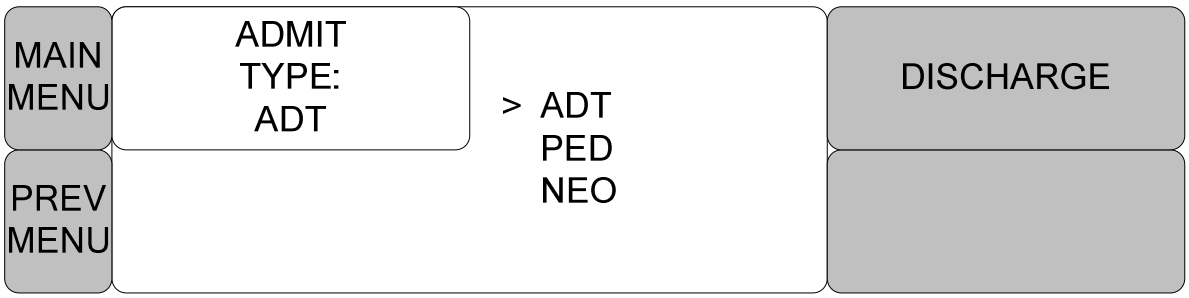


Menu selection with arrows

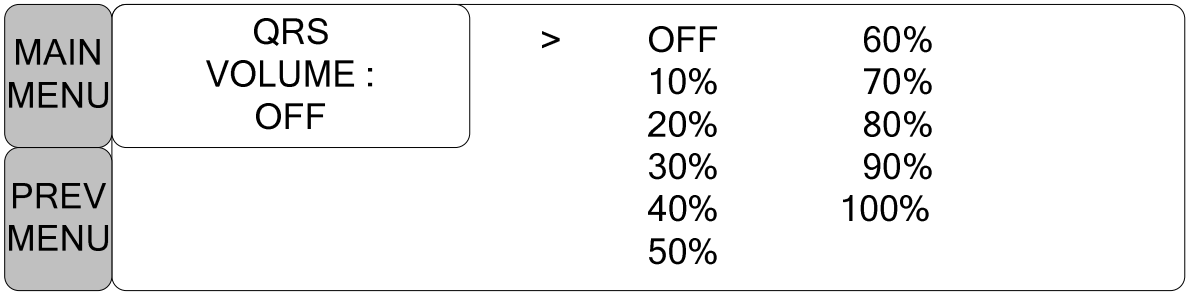
Upward Movement: Turns the Trim Knob key to the left.

Downward Movement: Turns the Trim Knob key to the right.

Selection is made by pressing the Trim Knob key. One comes out of the menu after the selection.

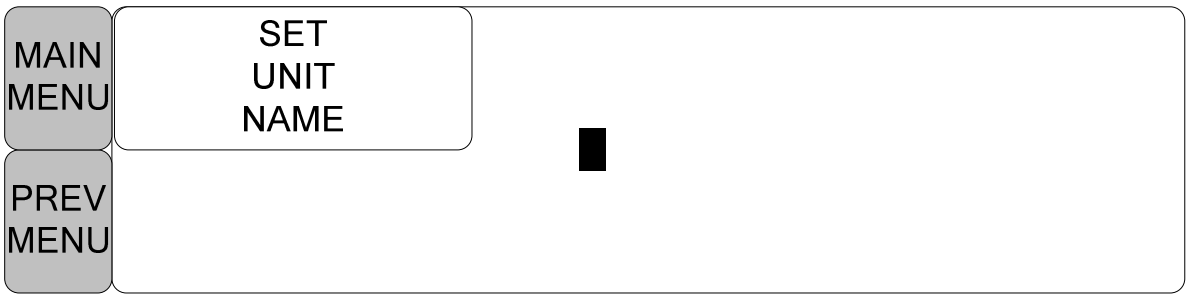


When moving the within quadrilateral, the letter reverses, and the numeric value reflects immediately.

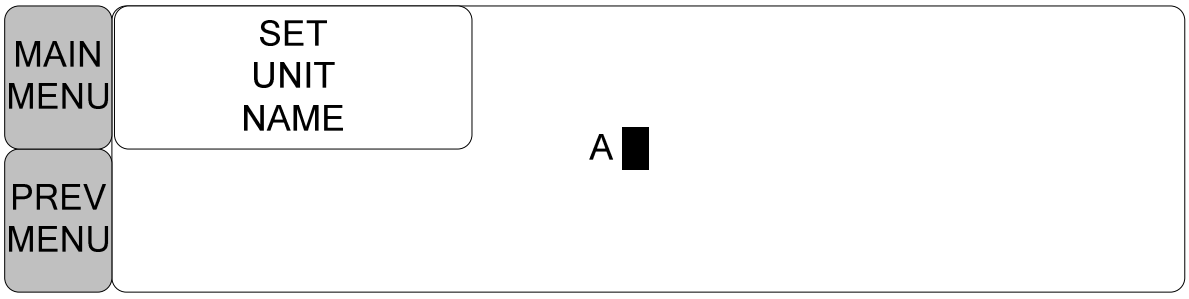


Word feature menu

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 Trim Knob 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 Trim Knob Key is turned. Press the Trim Knob key if you want to change a letter currently on the screen.

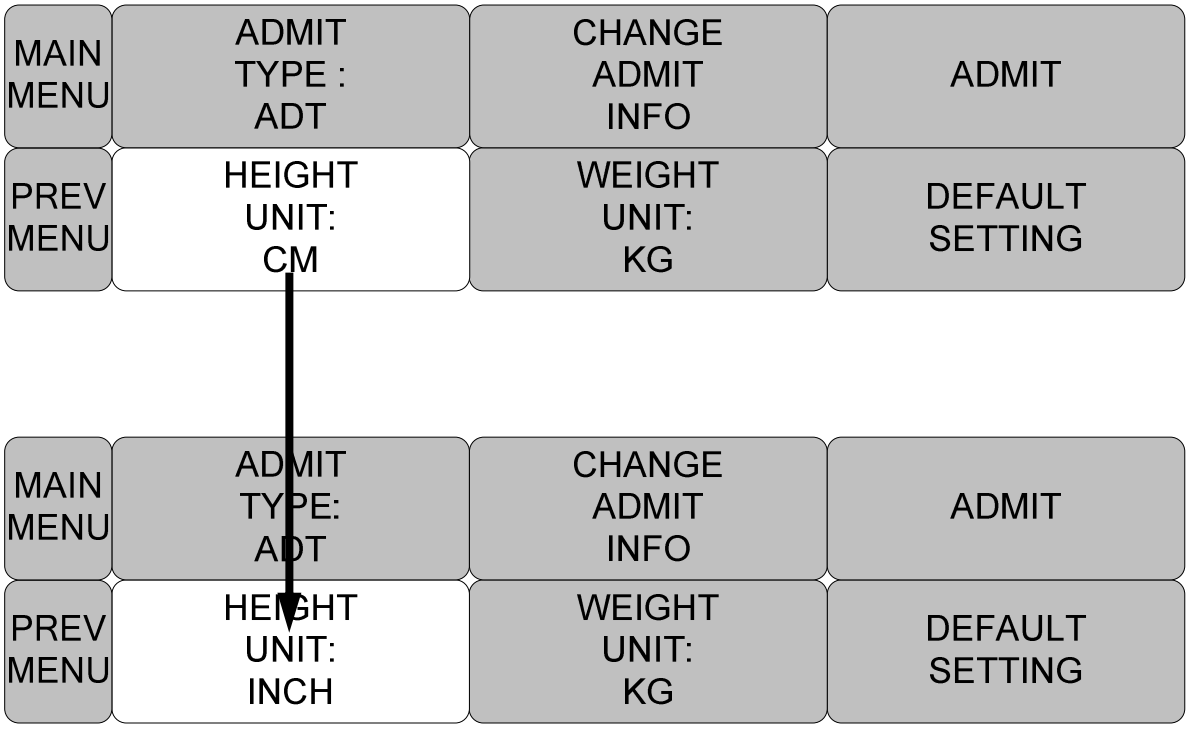


The above figure shows how the cursor is selected to change a letter. Right-hand turning of the Trim Knob Key makes it possible to select in the order of 0-9,A-Z, and a blank, while left-hand turning makes the movement in the opposite direction. Once a letter or a number is selected, the screen comes 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 pressing Trim Knob 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

ADMIT TYPE

CHANGE ADMIT INFO

DISCHARGE

ADMIT

HEIGHT

WEIGHT

DEFAULT SETTING

2.2 ALARM

ALL LIMITS

ALARM PRINT

ALARM VOLUME

PARAMETER LEVEL

ARRHYTH LEVEL

ALARM REVIEW

ALARM LIST

SAVE CONDITION

NURSE CALL

2.1 ADMIT

ADMIT TYPE : Set the exercise environment of equipment in discharge status.

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, WEIGHT UNIT : these options change the units of measure for height and weight.

DEFAULT 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

Set the exercise environment of equipment in discharge status.

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 (11 characters)

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

DISCHARGE (Discharge Patient)

Patient information and all numbers change to standard, and the screen displays, "ALL ALARMS OFF ADMIT PATIENT TO ACTIVE ALARMS."

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.

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

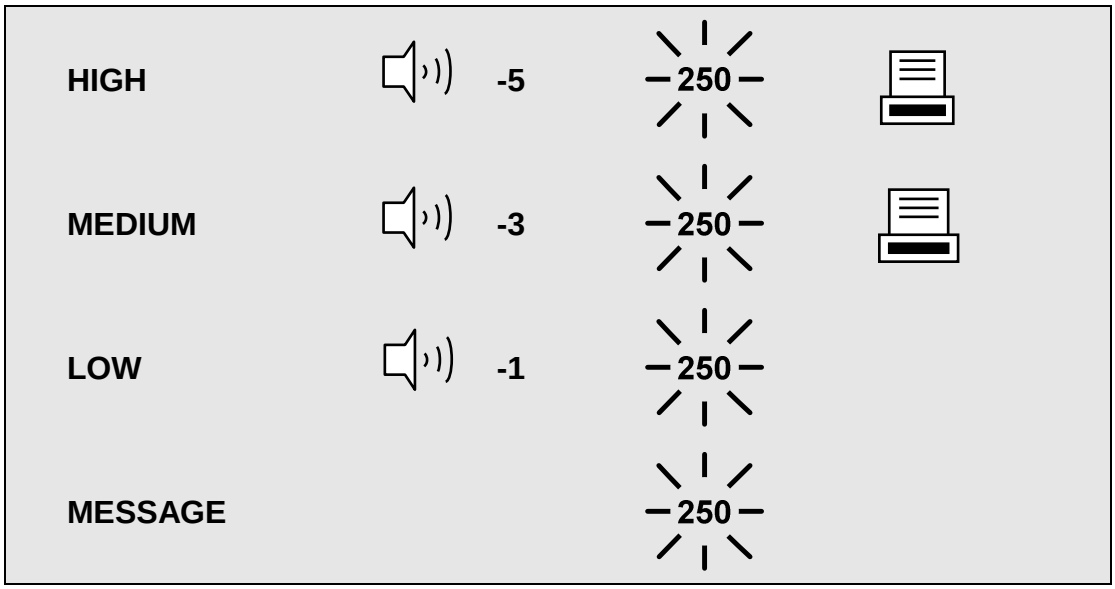
DEFAULT SETTING

Resets the Alarm Limit settings to factory defaults as in "12.DEFAULT SETTING VALUE" section.

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

2.2 ALARM

Alarm is divided into two, alarm for the patient's condition and for the product's condition.
The patient's alarm sounds when the diagnostic functions (ASYSTOLE, VTAC/VFIB, and VTAC) are detected. Each alarm sound differs in order in order and volume according to the levels of HIGH, MEDIUM, LOW and MESSAGE.



 : Alarm sounds

: Number flashes

 : Waves are printed out

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

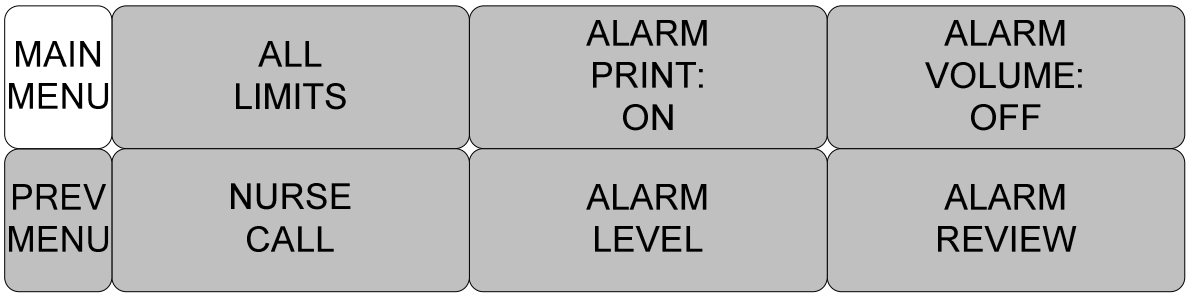
ALARM PRINT：with an ON/OFF setup, the related information is printed out whenever an alarm is given.

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 feature of the NURSE CALL.



ALL LIMITS

It is able to see all the alarm range and change of measurement function.

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

ALL LIMITS			
RETURN	UNITS	LOW	HIGH
HR	BPM	50	150
SPO2-%	%	90	100
SPO2-R	BPM	50	150
RESP	RPM	10	30
RESP-A	SEC	0	20
NIBP-S	mmHg	80	200
NIBP-M	mmHg	60	140
NIBP-D	mmHg	20	120
TEMP	℃	30.0	42.0
ST	mm	-10.0	10.0
PVC	/min	0	20

ALARM PRINT

Set ON/OFF functions automatically. When the alarm is activated the corresponding information is printed on heat sensitive paper. Alarm level upper than MEDIUM Level. But, LEAD FAULT AND LOW BATTERY Alarm isn't activated the alarm print when alarm is set.

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

ALARM VOLUME

Set the alarm volume to be set at 10 grades.

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

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

ALARM LEVEL

Set the order of priority in each alarm.

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

PARAMETER LEVEL

MAIN MENU	PARAMETER LEVEL	ARRHYTH LEVEL	
PREV MENU			

PARAMETER ALARM LEVELS	
RETURN	ALARM LEVEL
HR	MEDIUM
SPO2-%	MEDIUM
SPO2-R	LOW
RESP	MESSAGE
RESP-A	MESSAGE
NIBP	MEDIUM
TEMP	MESSAGE
LOW BATTERY	MEDIUM

ARRHYTH LEVEL

One can set up priorities when he or she uses the alarm for the diagnostic function.

MAIN MENU	PARAMETER LEVEL	ARRHYTH LEVEL	
PREV MENU			

ARRHYTHMIA ALARM LEVELS	
RETURN	ALARM LEVEL
ASYSTOLE VTAC/VFIB VTAC	HIGH HIGH HIGH

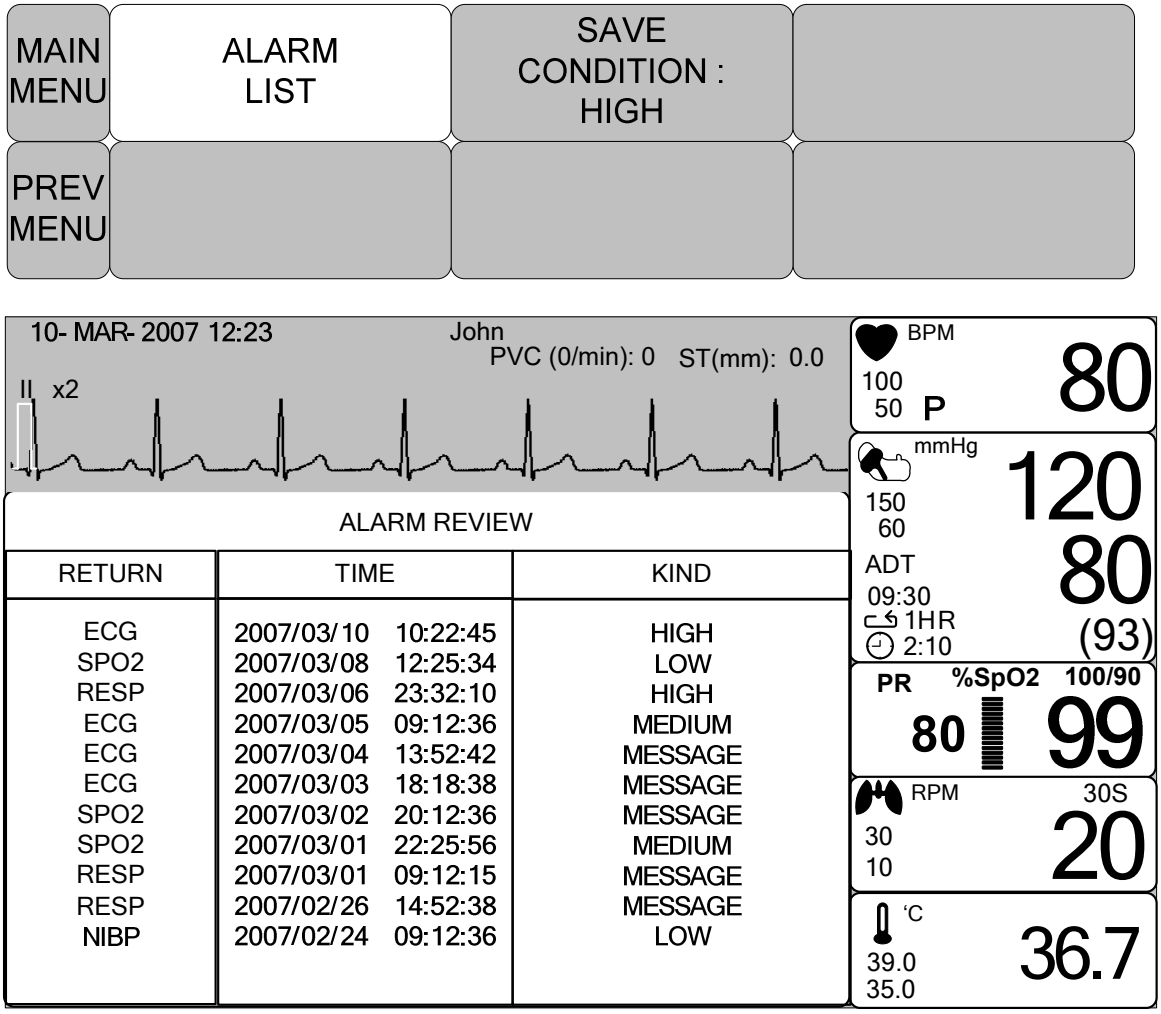
ALARM REVIEW

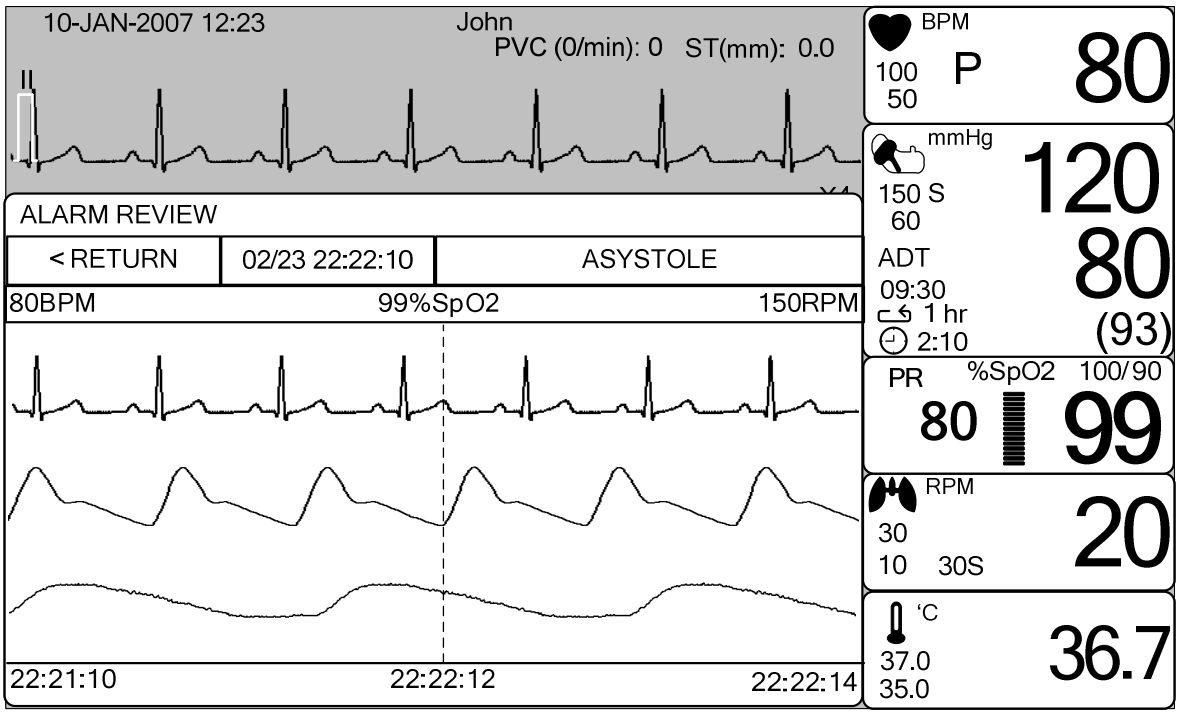
After an alarm is triggered the alarms and data wave pattern can be reviewed. Set up for priority of each parameter alarm.

MAIN MENU	ALL LIMITS	ALARM PRINT: ON	ALARM VOLUME: OFF
PREV MENU	NURSE CALL	ALARM LEVEL	ALARM REVIEW
MAIN MENU	ALARM LIST	SAVE CONDITION : HIGH	
PREV MENU			

ALARM LIST

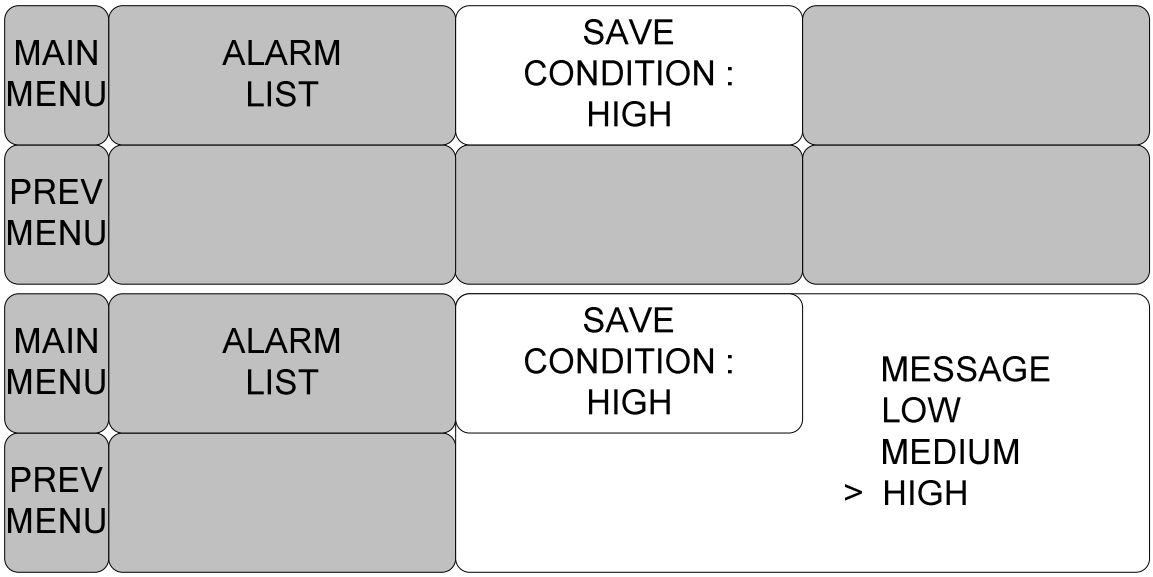
When an alarm activates, this shows the order of the alarms.





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 PRINT: ON	ALARM VOLUME: OFF
PREV MENU	NURSE CALL	ALARM LEVEL	ALARM REVIEW

NURSE CALL SETUP	
RETURN	CONTENTS
NURSE CALL	OFF
NORMAL MODE	NORMAL OPEN
CALL MODE	ONE TIME

1. NURSE CALL : ON/OFF
   - The nurse call function is enable or disable.
2. NORMAL MODE
   - NORMAL OPEN : Select this option when the hospital's call system is set to NORMAL OPEN.
   - NORMAL CLOSE : Select this option when the hospital's call system is set to NORMAL CLOSE.
3. CALL MODE
   - ONE TIME : When ONE TIME is selected. a nurse call signal is a pulse signal lasting 3s. When multiple alarms occur simultaneously, only one pulse signal will be output..
   - CYCLING : When CYCLING is selected, the duration of a nurse call signal is the same with the alarm, namely, from the time that the alarm occurs to the time it disappears. On and off repeatedly at intervals of 1 second.
   - CONTINUE : When CONTINUE is selected, the duration of a nurse call signal is the same with the alarm, namely, from the time that the alarm occurs to the time it disappears. However, lasts only one minute, then stops.

3. SETUP

3.1 SETUP

DISPLAY

SET PARA

WAVE SELECT

SET DATE & TIME

HR SOURCE

SWEEP SPEED

KEY SOUND

DEMO

USER SERVICE

SET UNIT NAME

SET BED NUMBER

AC FILTER

SYSTEM

W-LAN

DISPLAY MODE

MAKER SERVICE

FREEZING AND UNFREEZING

3.1 SETUP

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

DISPLAY

SET PARA：Measurement function selected.

WAVE SELECT：Set wave pattern source at the bottom of the WINDOW with LARGE

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

HR SOURCE ：Set and select ECG(HR) / SpO2(PR) source.

SWEEP SPEED : Set speed of ECG, SpO2 WAVE DISPLAY

MAIN MENU	SET PARA	WAVE SELECT: ECG	SET DATE & TIME
PREV MENU	SWEEP SPEED: 25mm/s		HR SOURCE: ECG

SET PARA

Select measurement function to use

MAIN MENU	SET PARA	WAVE SELECT: ECG	SET DATE & TIME
PREV MENU	SWEEP SPEED: 25mm/s		HR SOURCE: ECG

PARAMETER WINDOW SET	
RETURN	WINDOW ON/OFF
ECG	ON
SPO2	ON
RESP	OFF
NIBP	OFF
TEMP	ON

WAVE SELECT

Select waveform to display in large parameter display.

MAIN MENU	SET PARA	WAVE SELECT: ECG	SET DATE & TIME
PREV MENU	SWEEP SPEED: 25mm/s		HR SOURCE: ECG

MAIN MENU	SET PARA	WAVE SELECT: ECG	> ECG SPO2 RESP
PREV MENU	SWEEP SPEED: 25mm/s		

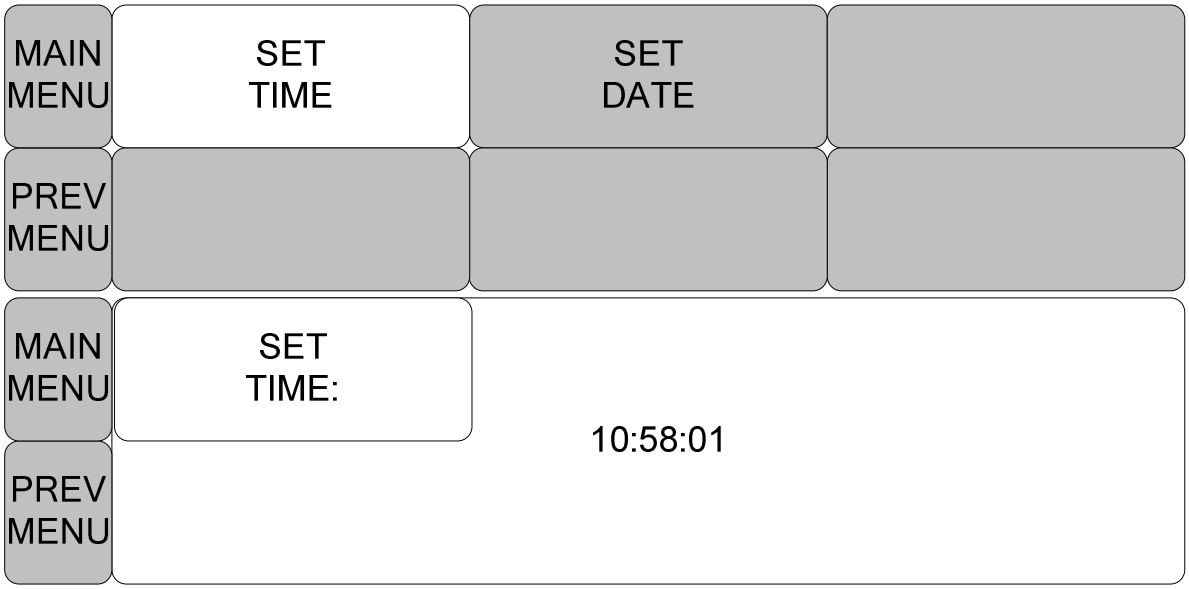
SET DATE & TIME

It has sub menu to set date and time.

MAIN MENU	SET PARA	WAVE SELECT: ECG	SET DATE & TIME
PREV MENU	SWEEP SPEED: 25mm/s		HR SOURCE: ECG

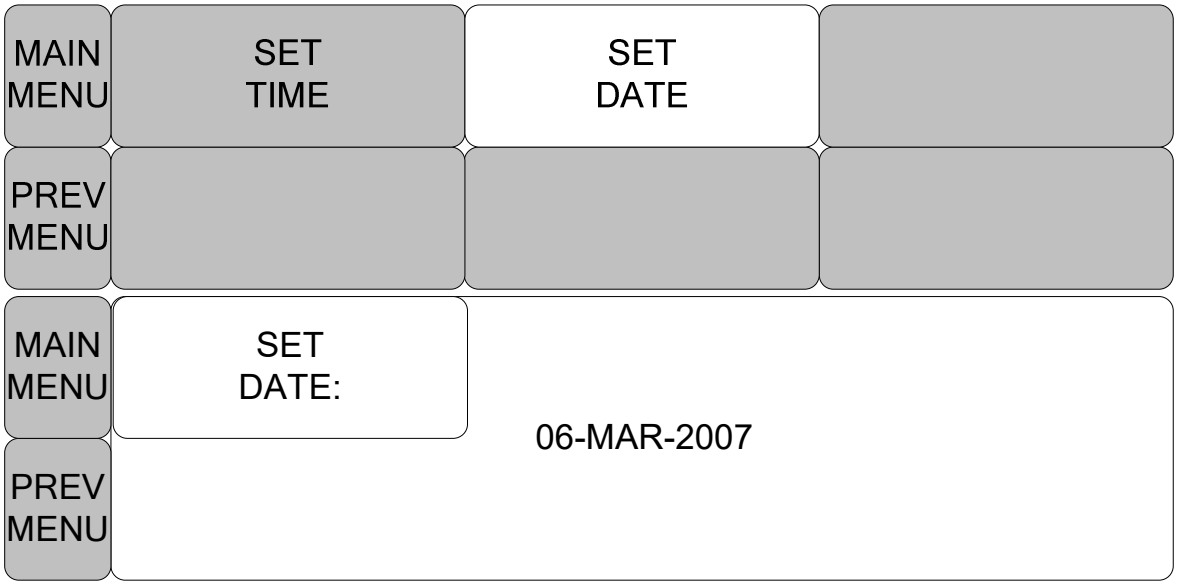
SET TIME

Set time of equipment.



SET DATE

Set date of equipment



HR SOURCE

This menu is used to set the source that detects heart and pulse rate.

The source can select among ECG and SPO2.

MAIN MENU	SET PARA	WAVE SELECT: ECG	SET DATE & TIME
PREV MENU	SWEEP SPEED: 25mm/s		HR SOURCE: ECG
MAIN MENU	SET PARA	HR SOURCE: ECG	> ECG SPO2
PREV MENU	SWEEP SPEED: 25mm/s		

SWEEP SPEED

Set speed of drawing wave signal pattern in this widow.

MAIN MENU	SET PARA	WAVE SELECT: ECG	SET DATE & TIME
PREV MENU	SWEEP SPEED: 25mm/s		HR SOURCE: ECG
MAIN MENU	SWEEP SPEED: 25mm/s	> 6.25 mm/s 12.5 mm/s 25 mm/s 50 mm/s	SET DATE & TIME
PREV MENU			HR SOURCE: ECG

KEY SOUND

Set ON/OFF Key Sound of equipment.

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

DEMO

Set ON/OFF DEMONSTRATION of equipment.

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

USER SERVICE

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

MAIN MENU	DISPLAY		USER SERVICE
PREV MENU	KEY SOUND: ON	DEMO : ON	MAKER SERVICE
MAIN MENU	SET UNIT NAME	SET BED NUMBER : 00A	DISPLAY MODE: MONITOR
PREV MENU	SYSTEM	AC FILTER: 50HZ	W-LAN: OFF

SET UNIT NAME

Set up for UNIT(CCU,ICU,ER,etc.) name.

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

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	DISPLAY MODE: MONITOR
PREV MENU	SYSTEM	AC FILTER: 50HZ	W-LAN: OFF

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

SYSTEM

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

SYSTEM INFO SET	
RETURN	CONTENTS
MAIN VER	1.10.BHCDDCA
CENTRAL	ON
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 : 02 : A8 : 80 : CB : 00
VGA OUTPUT	OFF
DHCP	OFF
HL7	OFF
HL7 SERVER IP	192 . 168 . 030 . 200
HL7 SERVER PORT	04200
EXPORT INTERVAL	5 Min
NAK	OFF

VGA OUTPUT : VGA output on the output board provides.

CENTRAL : ON / OFF function of the network system used to set.

HL7 : ON/OFF function of HL7 network protocol.

Will turn ON after setting the equipment off and connected to the Central system or HL7 system

NAK : ON/OFF function of transmission control of HL7 protocol

DHCP : ON/OFF function of allocation IP address automatically.

HOST IP, DEVICE IP, SUBNET and GATEWAY: Set the information for connecting to the Central system.

Warning
We recommend to use a static IP outside the DHCP range

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	DISPLAY MODE: MONITOR
PREV MENU	SYSTEM	AC FILTER: 60HZ	W-LAN: OFF

DISPLAY MODE (MONITOR or SPOT)

You can selected Monitoring display mode or Spot display mode.

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

MAKER SERVICE

Maker service is a menu is used by manufacturers.

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

Freezing and Unfreezing

- This icon is pressed to freeze waveforms. All displayed waveforms are frozen.
  The waveforms are frozen for 1 minutes or until they are unfrozen.
  Press the "F" key is unfrozen with large parameter mode.
  When the waveforms are frozen, the "FREEZE" message appears with the frozen time.

- Press the FREEZE icon (Unfreezing icon) on the control panel again. After exiting the frozen screen, new real time waveforms are displayed.

4. TREND

4.1 TREND

GRAPHIC TREND

TABULAR TREND

TREND WINDOW SETUP

4.1 TREND

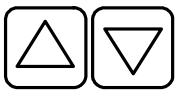
TREND shows saved data graphically displayed with numeric values.

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	TREND WINDOW SETUP
PREV MENU			

: Move to main screen

: Move within the tables



: Move up and down to other analysis function

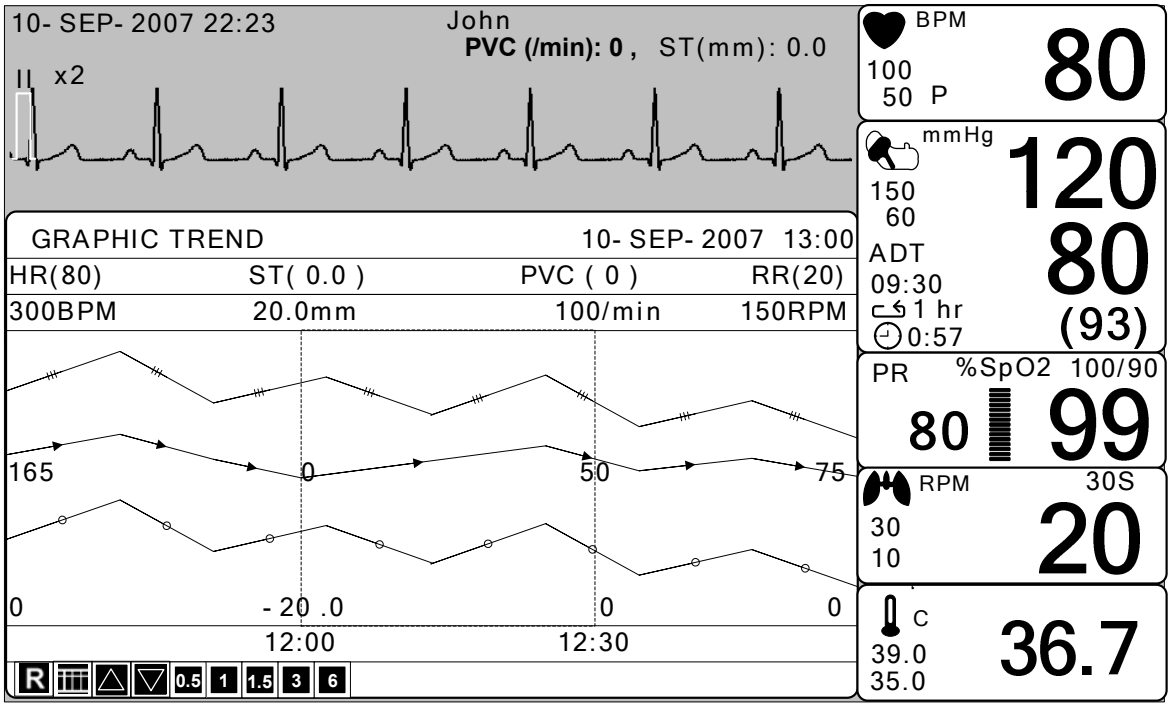
: Time(HOURS) period set menu at Graphic Trend

: Time(MIN) period set menu at Tabular Trend

GRAPHIC TREND

Wave Data can be stored and seen according to section.

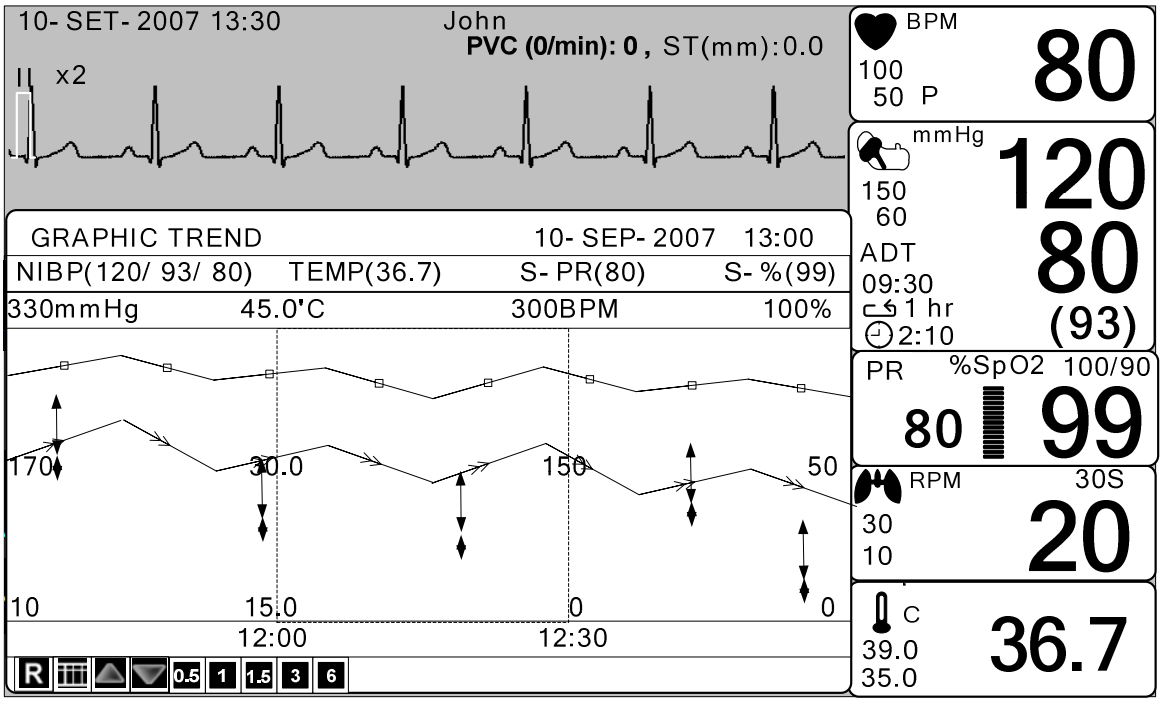
MAIN MENU	GRAPHIC TREND	TABULAR TREND	TREND WINDOW SETUP
PREV MENU			



TIME PERIOD

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

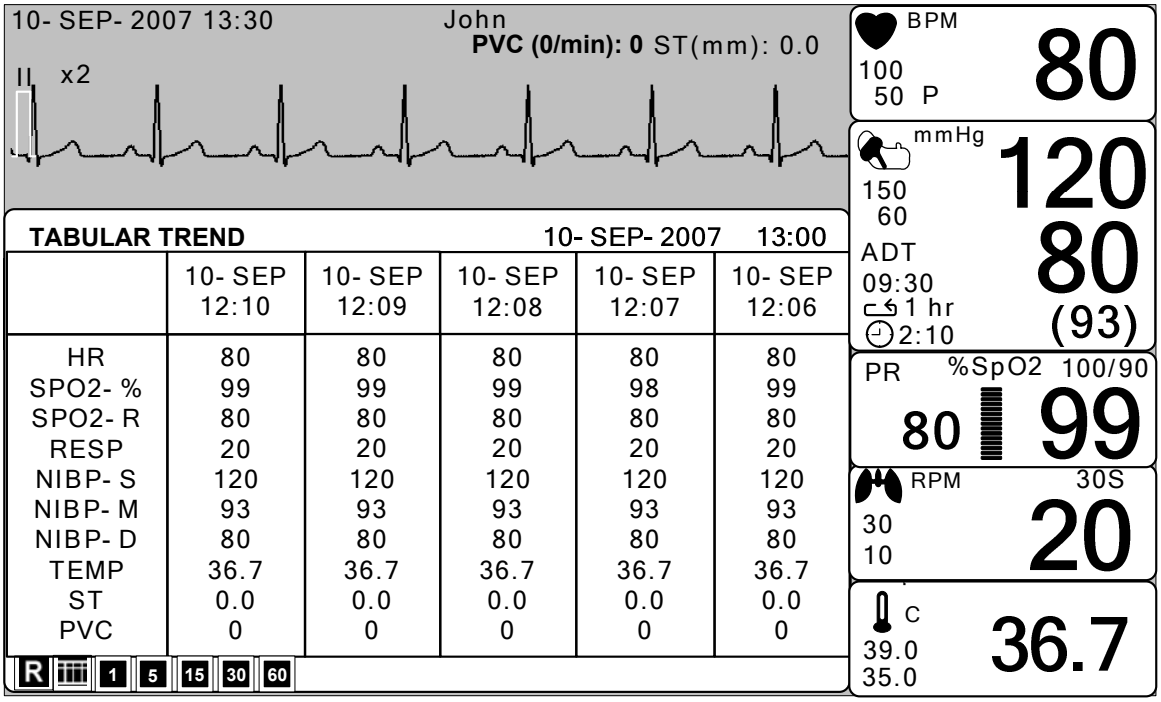
0.5 | 1 | 1.5 | 3 | 6



TABULAR TREND

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

MAIN MENU	GRAPHIC TREND	TABULAR TREND	TREND WINDOW SETUP
PREV MENU			

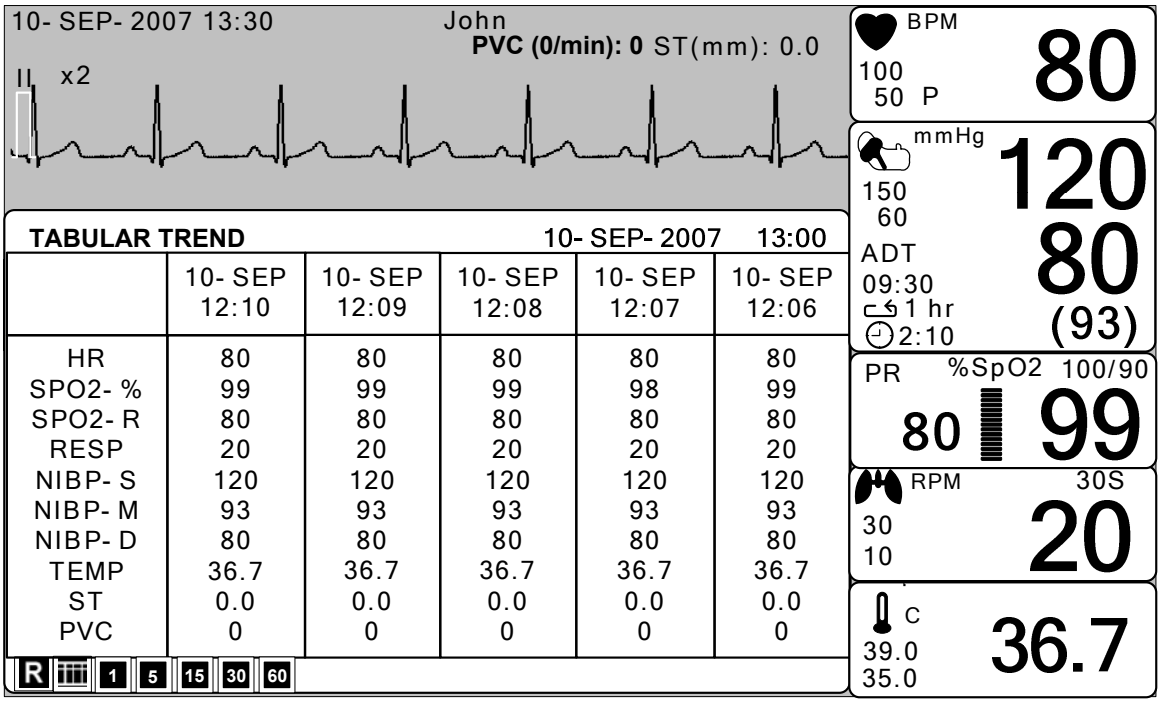


	10- SEP 12:10	10- SEP 12:09	10- SEP 12:08	10- SEP 12:07	10- SEP 12:06
HR	80	80	80	80	80
SPO2- %	99	99	99	98	99
SPO2- R	80	80	80	80	80
RESP	20	20	20	20	20
NIBP- S	120	120	120	120	120
NIBP- M	93	93	93	93	93
NIBP- D	80	80	80	80	80
TEMP	36.7	36.7	36.7	36.7	36.7
ST	0.0	0.0	0.0	0.0	0.0
PVC	0	0	0	0	0

TIME INTERVAL

One can store data and set up time.

1	5	15	30	60

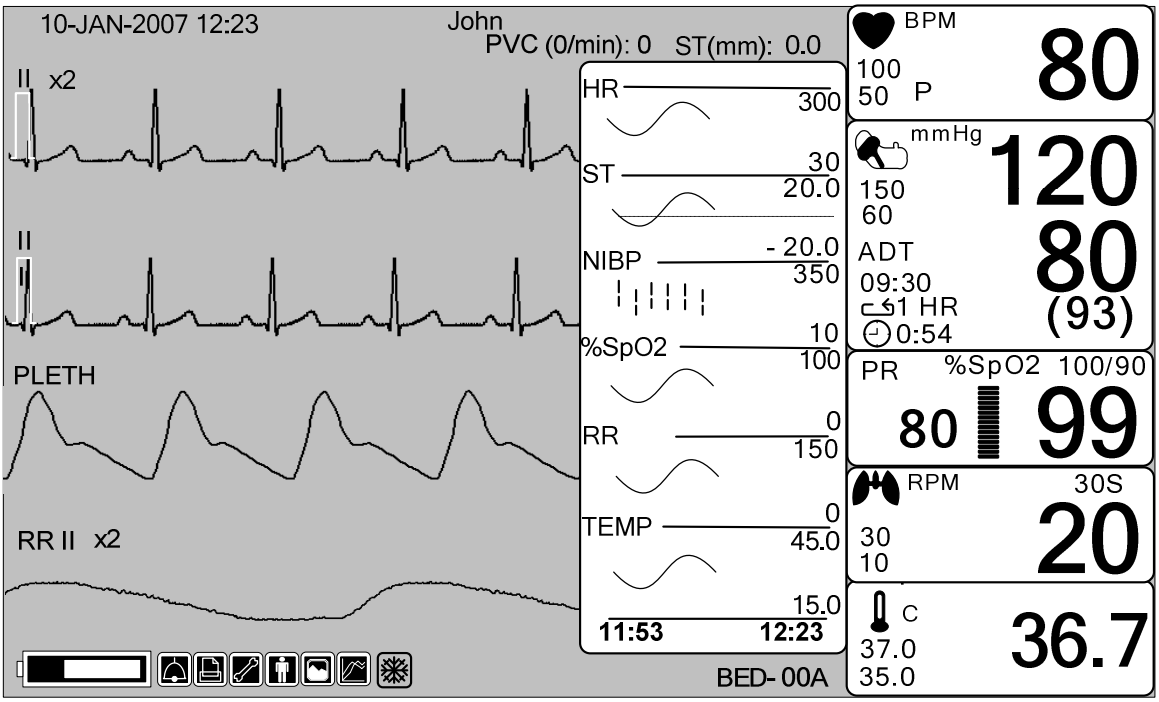


	10- SEP 12:10	10- SEP 12:09	10- SEP 12:08	10- SEP 12:07	10- SEP 12:06
HR	80	80	80	80	80
SPO2- %	99	99	99	98	99
SPO2- R	80	80	80	80	80
RESP	20	20	20	20	20
NIBP- S	120	120	120	120	120
NIBP- M	93	93	93	93	93
NIBP- D	80	80	80	80	80
TEMP	36.7	36.7	36.7	36.7	36.7
ST	0.0	0.0	0.0	0.0	0.0
PVC	0	0	0	0	0

TREND WINDOW SETUP

Set the trend display window that will show the real time wave window.

MAIN MENU	GRAPHIC TREND	TABULAR TREND	TREND WINDOW SETUP
PREV MENU			



TIME PERIOD

Set visible time period in a screen.

MAIN MENU	TIME PERIOD: 30MINS	SET TREND PARA	
PREV MENU			

MAIN MENU	TIME PERIOD: 30MINS	> 30MINS 60MINS 90MINS 3HOUR 6HOUR 12HOUR	
PREV MENU			

SET TREND

Set parameter for display in a screen.

MAIN MENU	TIME PERIOD: 30MINS	SET TREND	
PREV MENU			

PARAMETER WINDOW SET	
RETURN	ON / OFF
HR	ON
ST	ON
SPO2	ON
PR	ON
RESP	ON
NIBP	ON
TEMP	ON

TREND PRINT

Graphic: select the number which selects a graphic trend and press print to prints the selected trend.

Table: select the table number to be print and press print to receive print all the data in the selected patient admit (Admit) table.

5. ECG

5.1 Outline

Color and Standards of Cables

Position of ECG Connector and Measurement Cable

Attaching Electrodes to the Patient

Choosing an ECG lead for Arrhythmia Monitoring

Information on the ECG waveform

5-Lead Electrode Placement

3-Lead Electrode Placement

Electrode Placement for Neonates

5.2 ECG Data Window

5.3 ECG Setup

LEAD SELECT

ALARM LIMIT

ALARM LEVEL

ALARM SOUND

QRS VOLUME

DISPLAY

ECG SWEEP SPEED

ECG SIZE

HR SOURCE

ANALYSIS SETTING

5.1 Outline

It calculates the heart rate with 3 or 5 leads ECG signal acquisition and perform the alarm according to the setting value.

Colors and Standards of Cables

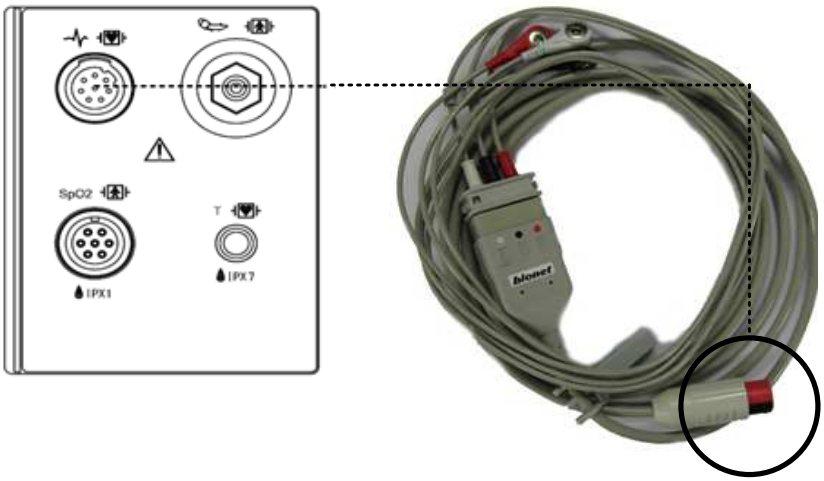
Leadwire	AHA Color code	AHA Label	IEC Color code	IEC Label
Right arm	White	RA	Red	R
Left arm	Black	LA	Yellow	L
Right leg	Green	RL	Black	N
Left leg	Red	LL	Green	F
V1(precordial)	Brown	V1	White	C1

AHA：American Heart Association (U.S.A. standard)

IEC：International Electro technical Commission (Europe standard)

Position of ECG Connector and Measuring Cable

ECG connecter +detect cable



Attaching Electrodes to the Patient

1. Shave excess hair. With a piece of cotton pad moistened with alcohol, clean the patient's skin where the electrodes should be mounted. Avoid wrinkled or uneven skin areas. Wipe off the alcohol with a dry cotton pad.

2. Open the electrode package and take out the electrode.

3. Remove the backing paper from the electrode. Be careful not to touch the adhesive side.

4. Attach the disposable electrode to the previously cleaned skin. Avoid wrinkled and uneven skin areas.

5. The electrode lead which is connected to the monitor onto the electrode.

6. Fasten the electrode lead to the skin with surgical tape with an extra length of wire between the tape and the electrode. This prevents body movement from moving the electrode lead.

Note
✓ To maintain good contact between the electrode and skin, check that the paste of the disposable electrode is not dry.
✓ When contact of the disposable electrode becomes poor, replace the electrode with a new one immediately. Otherwise, contact impedance between the skin and electrode increase and the correct ECG cannot be obtained.
✓ If the contact is bed before the expiration date on the package, replace the electrode with a new one.
✓ To obtain a stable ECG waveform rub the skin with "skin Pure" skin preparation gel or tincture of Benzion.
✓ Shall use only the CE certified disposable electrode.

Choosing an ECG lead for Arrhythmia Monitoring

It is very important to select a suitable lead for arrhythmia monitoring.

Guidelines for non-paced patients:

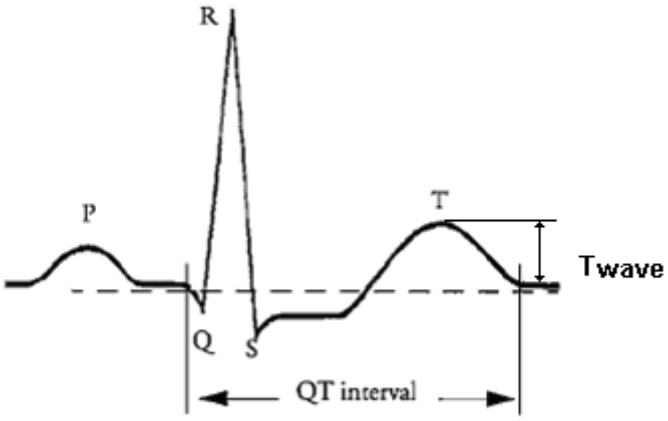
- ✓ QRS should be tall and narrow(recommended amplitude > 0.5mV)
- ✓ R wave should be above or below the baseline (but not bi-phasic)
- ✓ T wave should be smaller than 1/3 R-wave height.
- ✓ The P-wave should be smaller than 1/5 R-wave height.

For paced patients, in addition to the above,:

- ✓ Not wider than the normal QRS
- ✓ The QRS complexes should be at least twice the height of pace pulses.
- ✓ Large enough to be detected, with no re-polarization.

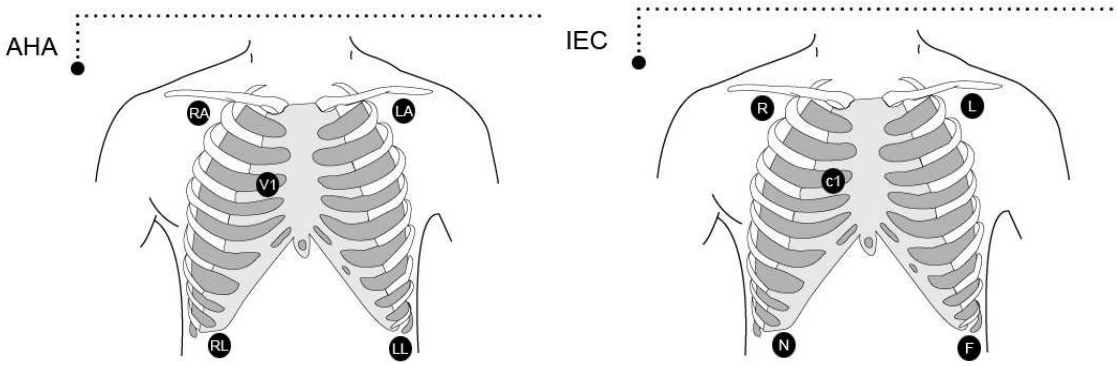
To prevent detection of P-waves or baseline noises as QRS complexes, the minimum detection level for QRS complexes is set at 0.15mV. Adjusting the ECG wave size on the monitor display(gain adjustment)does not affect the ECG signal which is used for arrhythmia analysis. If the ECG signal is too small, you may get false alarms for asystole.

Information on the ECG waveform

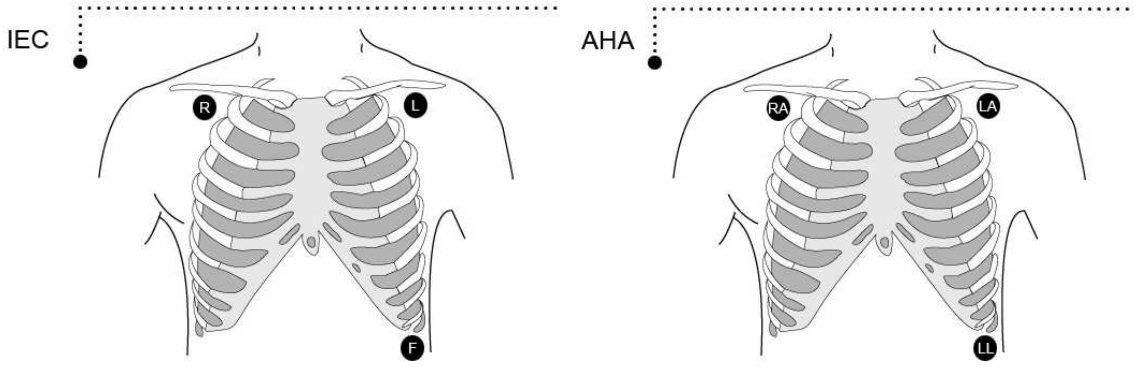


When ECG signal is 80bpm T-wave duration is 180ms, and the QT interval is 350ms.

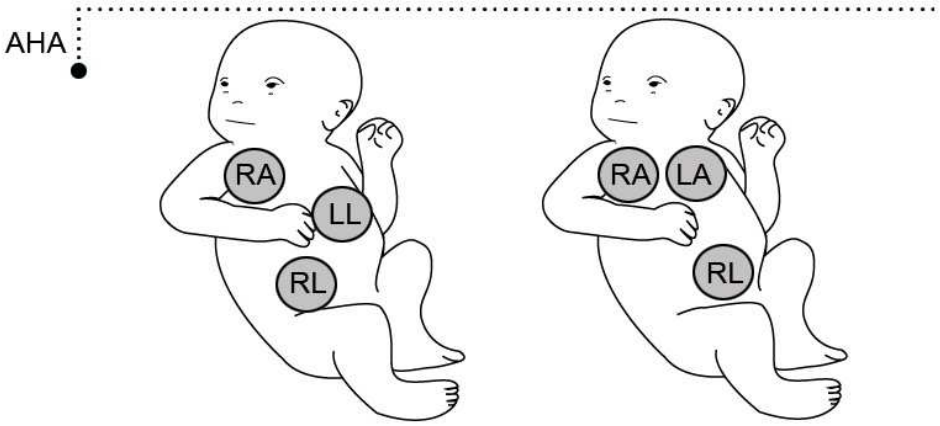
5-Leadwire Electrode Placement

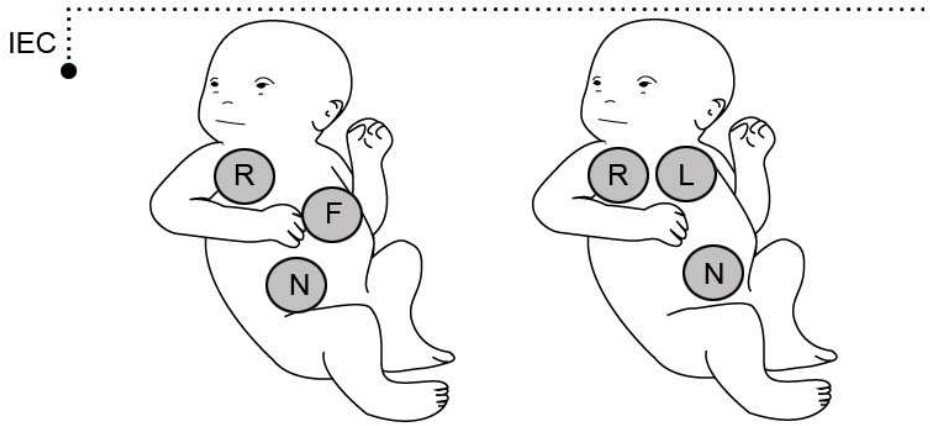


3-Leadwire Electrode Placement

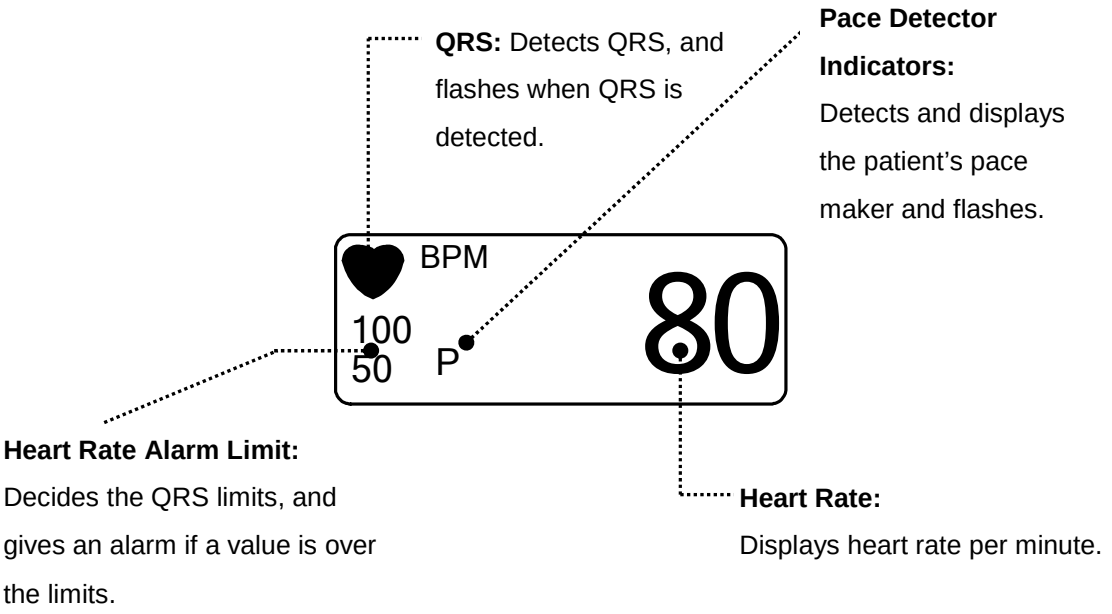


Electrode Placement for Neonates





5.2 ECG Data Window



Note
ECG Wave Display is always on when the cable is connected.

The heart rate is calculated by a moving average. The monitor detects 8 consecutive beats, averages the R-R intervals of the latest 8 beats and uses this average to calculate the current heart rate. When a new beat is detected, the heart rate is recalculated using the latest 8beats. The heart rate display is updated every 3 seconds.

Heart rate meter updates a new heart rate for a step increase or decrease in 10 seconds maximum. When ventricular tachycardia is detected, the alarm set in 5 seconds maximum.

Check that the delay time of the output signal (alarm trigger 80ms maximum) is within the range of the connected equipment.

Safety Precautions

Warning
CABLES — Route all cables away from patient's throat to avoid possible strangulation. **CONDUCTIVE CONNECTIONS** — Extreme care must be exercised when applying medical electrical equipment. Many parts of the human/machine circuit are conductive, such as the patient, connectors, electrodes, transducers. It is very important that these conductive parts do not come into contact with other grounded, conductive parts when connected to the isolated patient input of the device. Such contact would bridge the patient's isolation and cancel the protection provided by the isolated input. In particular, there must be no contact of the neutral electrode and ground. **DEFIBRILLATION** — Do not come into contact with patients during defibrillation. Otherwise serious injury or death could result. To avoid the risk of serious electrical burn, shock, or other injury during defibrillation, all persons must keep clear of the bed and must not touch the patient or any equipment connected to the patient. After defibrillation, the screen display recovers within 10seconds if the correct electrodes are used and applied in accordance with the manufacturer's instructions. ECG cables can be damaged when connected to a patient during defibrillation. Check cables for functionality before using them again. The peak of the synchronized defibrillator discharge should be delivered within 60ms of the peak of the R wave. The signal at the ECG output on the patient monitors is delayed by a maximum of 30ms. If the ECG waveform on the screen is too unstable to synchronize with the patient's heart beat because of the following reason, remove the cause of an alarm, message, or unstable ECG, and then use a stable ECG lead for synchronization. ✓ ECG electrode is detached or broken. Lead wire is detached or broken. ✓ Lead wire moves. AC interference, EMG noise or noise from ESU is superimposed. ✓ Connection cable is broken or has a short circuit. Connector has poor contact.

INTERFACING OTHER EQUIPMENT — Devices may only be interconnected with each other or to parts of the system when it has been determined by qualified biomedical engineering personnel that there is no danger to the patient, the operator, or the environment as a result. In those instances where there is any element of doubt concerning the safety of connected devices, the user must contact the manufacturers concerned (or other informed experts) for proper use. In all cases, safe and proper operation should be verified with the applicable Manufacturer's instructions for use, and system standards IEC 60601-1-1/EN 60601-1-1 must be complied with.

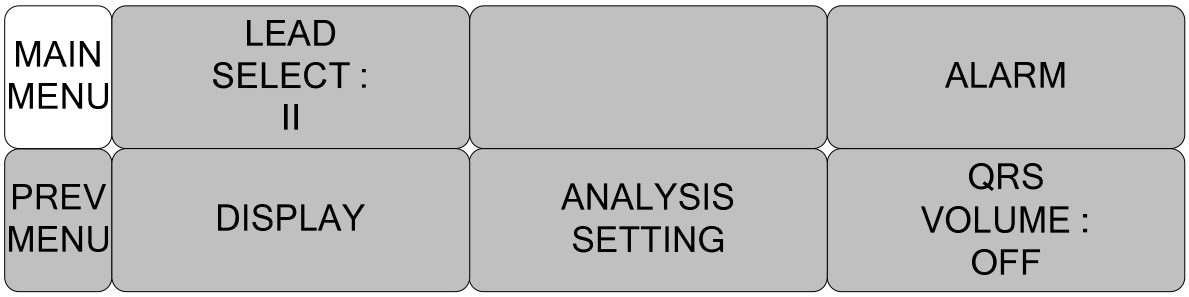
Electrosurgery Unit

- ✓ Electrosurgical units(ESU) emit a lot of RF interference. If the monitor is used with an ESU,RF interference may affect the monitor operation.
- ✓ Locate the monitor as far as possible from the ESU. Locate them on opssite sides of the operating table, if possible.
- ✓ Connect the monitor and ESU to different AC outlets located as far as possible from each other.
- ✓ When using this monitor with an electrosurgical unit, its return plate and the electrodes for monitoring must be firmly attached to the patient. If the return plate is not attached correctly,it may burn the patient's skin where the electrodes are attached.

5.3 ECG Setup

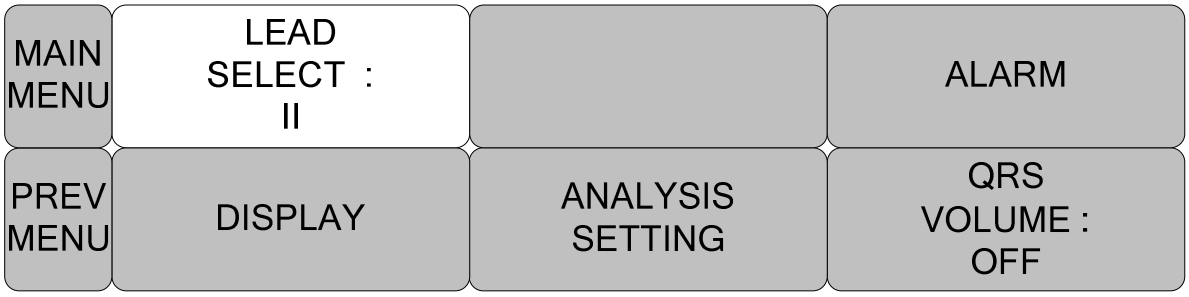
A setup window appears at lower part of the screen when the Trim Knob Key is pressed in the ECG Parameter Window.

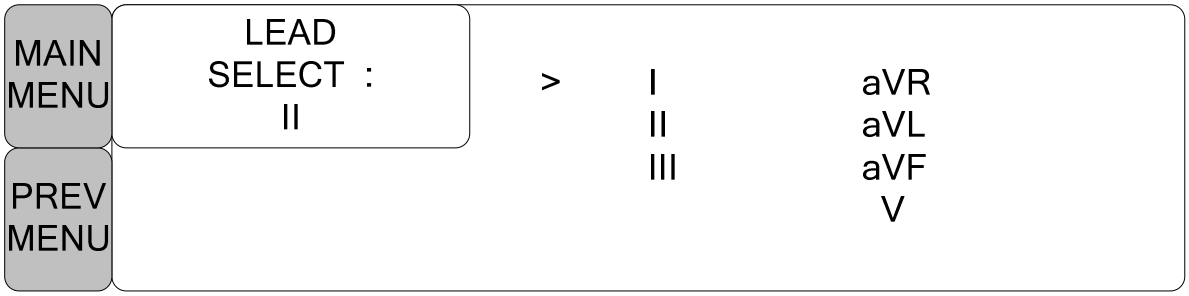
Selection is made by pressing the Trim Knob Key, while movement across the menu is performed by turning the key either clock or anticlockwise.



LEAD SELECT

Select channels from I to V in ECG





ALARM LIMIT

Alarm Limit is 0 ~ 300.

MAIN MENU	LEAD SELECT : II		ALARM
PREV MENU	DISPLAY	ANALYSIS SETTING	QRS VOLUME : OFF

MAIN MENU	ALARM LIMIT	ALARM SOUND	
PREV MENU	ALARM LEVEL		

ECG ALARM LIMIT			
RETURN	UNITS	LOW	HIGH
HR	BPM	60	120

ALARM LEVEL

Set the order of priority in each alarm.

MAIN MENU	ALARM LIMIT	ALARM SOUND	
PREV MENU	ALARM LEVEL		

ALARM LEVELS	
RETURN	ALARM LEVEL
HR LEAD FAULT	MEDIUM MESSAGE

ALARM SOUND

Set ON/OFF of ECG alarm sound.

MAIN MENU	LEAD SELECT : II		ALARM
PREV MENU	DISPLAY	ANALYSIS SETTING	QRS VOLUME : OFF

MAIN MENU	ALARM LIMIT	ALARM SOUND	
PREV MENU			

ECG ALARM SOUND	
RETURN	ECG ALARM SOUND
HR	ON
ARRHYTHMIA	ON
ST	ON
PVC	OFF

QRS VOLUME

Move the Key to select a volume rate from OFF, 10% to 100%.

MAIN MENU	LEAD SELECT : II		ALARM
PREV MENU	DISPLAY	ANALYSIS SETTING	QRS VOLUME : OFF

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

DISPLAY

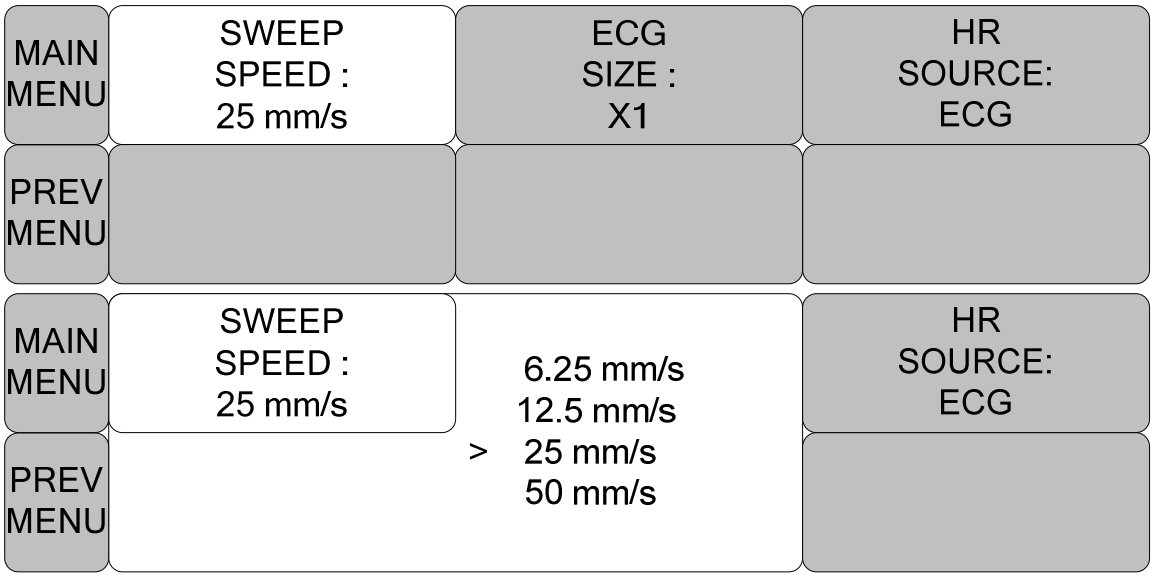
Set the sweep speed and waveform size.

MAIN MENU	LEAD SELECT : II		ALARM
PREV MENU	DISPLAY	ANALYSIS SETTING	QRS VOLUME : OFF

ECG SWEEP SPEED

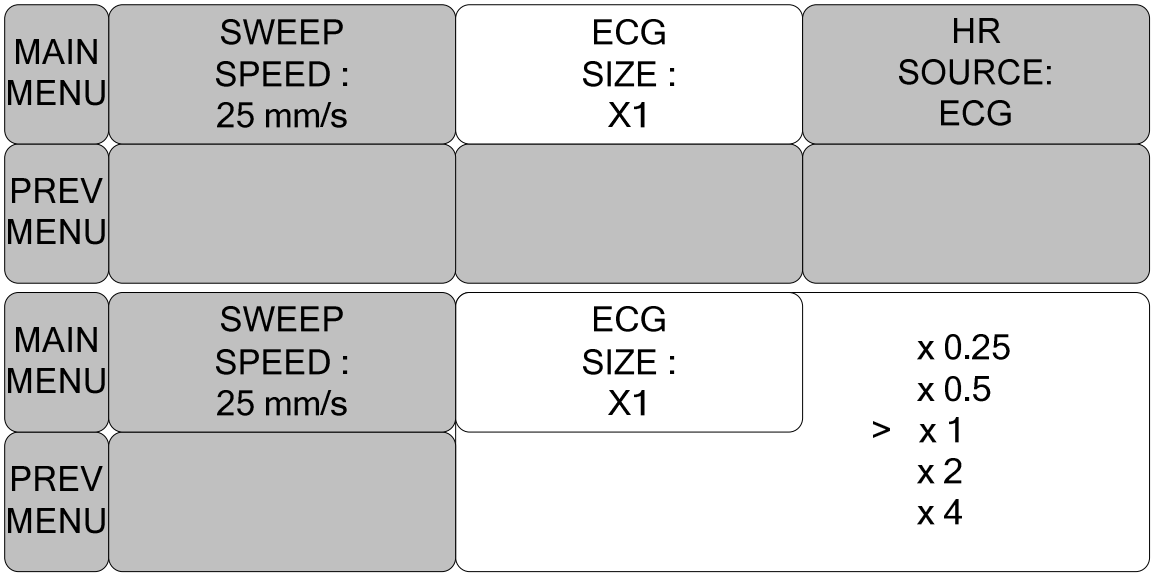
ECG speed is 25 mm/s.

Speed is changeable to 6.25, 12.5, 25, 50mm/s.



ECG SIZE

The size is changeable to X0.25, X0.5, X1, X2, X4.



HR SOURCE

MAIN MENU	SWEEP SPEED : 25 mm/s	ECG SIZE : X1	HR SOURCE: ECG
PREV MENU			

MAIN MENU	SWEEP SPEED : 25 mm/s	HR SOURCE: ECG	> ECG SPO2
PREV MENU			

ANALYSIS SETTING

Analysis setting divided to 3 menus.

ECG FILTER：One may select from three frequency types for WAVE FILTER.

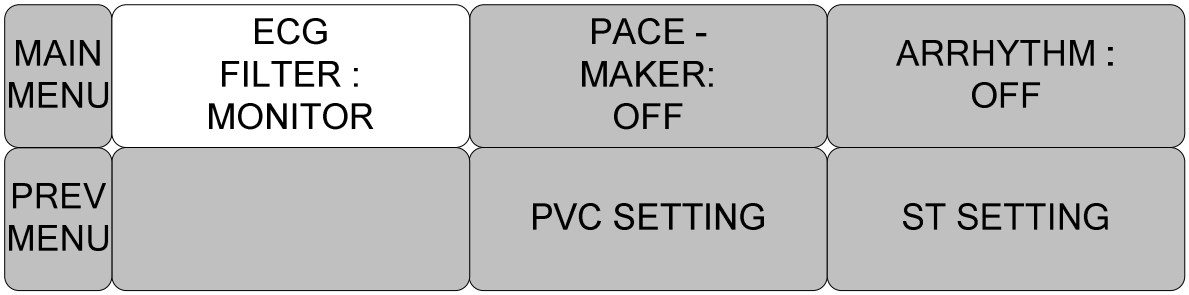
MONITOR 0.5Hz ~ 40Hz

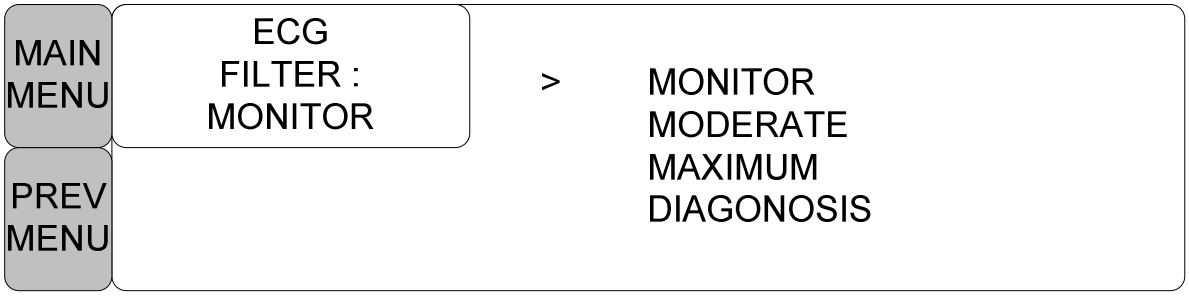
MODERATE 0.5Hz ~ 25Hz

MAXIMUM 5Hz ~ 25Hz

DIAGONOSIS 0.05Hz ~ 150Hz

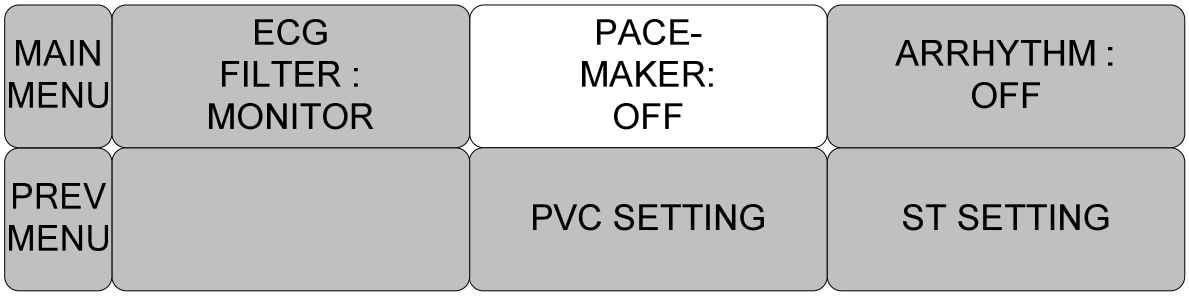
MAIN MENU	LEAD SELECT : II		ALARM
PREV MENU	DISPLAY	ANALYSIS SETTING	QRS VOLUME : OFF





PACE MAKER：Sets up ON/OFF to indicate that the patient has PACE MAKER.

The PACE MAKER menu option enables/disables the pacemaker detection program.



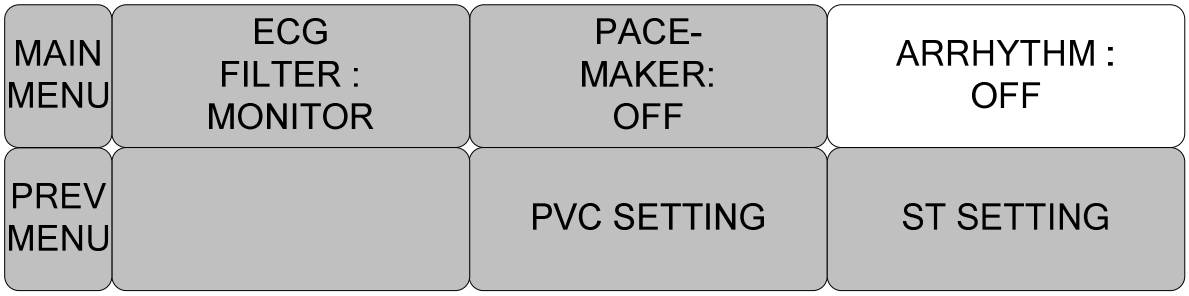
Be aware of the following when monitoring a patient with a pacemaker.

Warning
FALSE CALLS—False low heart rate indicators or false asystole calls may result with certain pacemakers because of electrical overshoots. MONITORING PACEMAKER PATIENTS—Monitoring of pacemaker patients can only occur with the pace program activated. PACEMAKER SPIKE—An artificial pacemaker spike is displayed in place of the actual pacemaker spike. All pacemaker spikes appear uniform. Do not diagnostically interpret

pacemaker spike size and shape.
PATIENT HAZARD—A pacemaker pulse can be counted as a QRS during asystole in either pace mode. Keep pacemaker patients under close observation.

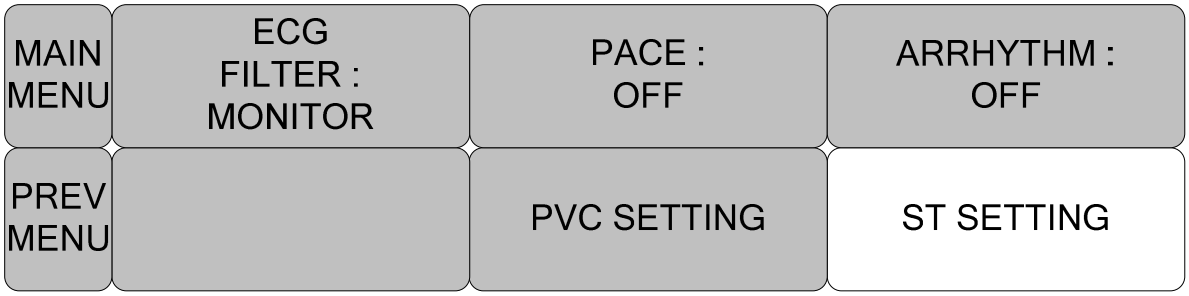
PACEMAKER PATIENTS. Rate meters may continue to count the pacemaker rate during occurrences of cardiac arrest or some arrhythmias. Do not rely entirely upon rate meter ALARMS. Keep pacemaker patients under close surveillance.

ARRHYTH : Sets up ON/OFF to indicate detection of diagnosis (ASYS, VTAC/VFIB, VTAC). The Analysis algorithm simultaneously uses leads I, II, III, and the V lead for ECG and arrhythmia analysis.



ASYSTOLE: Ventricular asystole occurs whenever the displayed heart rate drops to zero.
VTAC/VFIB: Ventricular fibrillation occurs when the ECG waveform indicates a chaotic ventricular rhythm With an average heart rate greater than or equal to 200beats per minute.
VTAC: Ventricular tachycardia occurs when a run of six or more ventricular beats is detected With an average heart rate greater than or equal to 150beats per minute.

ST SETTING : ST signal and setting related ST menu.

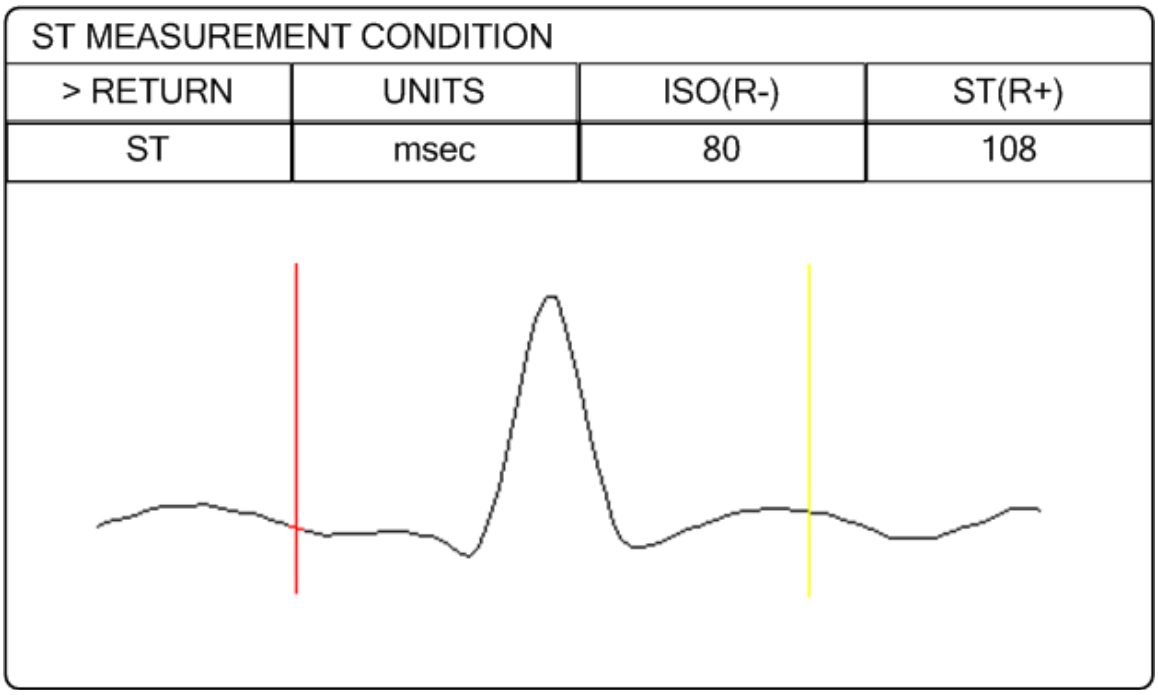


ST ANALYSIS: ON/OFF ST analysis signal.

MAIN MENU	ST ANALYSIS : ON	MEASUREMENT CONDITION	ST ALARM LIMIT
PREV MENU			ST ALARM LEVEL

MEASUREMENT CONDITION: ST measurement condition setting

MAIN MENU	ST ANALYSIS : ON	MEASUREMENT CONDITION	ST ALARM LIMIT
PREV MENU			ST ALARM LEVEL



ST ALARM LIMIT: ST alarm limit range setting

MAIN MENU	ST ANALYSIS : ON	MEASUREMENT CONDITION	ST ALARM LIMIT
PREV MENU			ST ALARM LEVEL

ST ALARM LIMIT			
RETURN	UNITS	LOW	HIGH
ST	mm	-10.0	10.0

ST ALARM LEVEL: ALARM LEVEL setting

MAIN MENU	ST ANALYSIS : ON	MEASUREMENT CONDITION	ST ALARM LIMIT
PREV MENU			ST ALARM LEVEL

ST ALARM LEVEL	
RETURN	ST ALARM LEVEL
ST	MEDIUM

PVC SETTING: PVC ON/OFF and ALARM limit range setting

MAIN MENU	ECG FILTER : MONITOR	PACE-MAKER: OFF	ARRHYTHM : OFF
PREV MENU		PVC SETTING	ST SETTING

PVC ANALYSIS: Decision maker to display PVC value sign with ON/OFF

MAIN MENU	PVC ANALYSIS : ON		PVC ALARM LIMIT
PREV MENU			PVC ALARM LEVEL

PVC ALARM LIMIT: Set alarm indicate to PVC

MAIN MENU	PVC ANALYSIS : ON		PVC ALARM LIMIT
PREV MENU			PVC ALARM LEVEL

PVC ALARM LIMIT			
RETURN	UNITS	LOW	HIGH
PVC	/min	0	20

PVC ALARM LEVEL: Set PVC ALARM LEVEL

MAIN MENU	PVC ANALYSIS : ON		PVC ALARM LIMIT
PREV MENU			PVC ALARM LEVEL

PVC ALARM LEVEL	
RETURN	PVC ALARM LEVEL
PVC	MEDIUM

Warning
Display Hart Beat Equipment Signal Hart Beat equipment signal displays when the PACE mode is. the signal appears series form. The signal size or form are meaningless clinically **Number Of Heart Beat** Attention to the patient with heart beat equipment. The heart beat equipment can show heart beat even during arrhythmia continuously. Therefore, do not depend on heart beat alarm excessively.

CAUTION

FDA POSTMARKET SAFETY ALERT

The United States FDA Center for Device and Radiological Health issued a safety bulletin October 14, 1998. this bulletin states "that minute ventilation rate-adaptive implantable pacemakers can occasionally interact with certain cardiac monitoring and diagnostic programmed rate."

The FDA further recommends precautions to take into consideration for patients with these types of pacemakers. These precaution for patients with these types of pacemakers. These precautions include disabling the rate responsive mode and enabling an alternate pace mode. For more information contact:

Office of Surveillance and Biometrics, CDRH, FDA
1350 Packard Drive, Mail Stop HFZ-510 Rockville, MD 20850 U.S.A

NOTE

ECG monitoring with patients in non-invasive trans coetaneous pacemakers may not be possible due to large amounts of energy produced by these devices. Monitoring ECG with an external device may be needed.

WARNINGS

VENTRICULAR ARRHYTHMISAS

The arrhythmia analysis program is intended to detect ventricular arrhythmias. It is not designed to detect a trial or supra ventricular arrhythmias. Occasionally it may incorrect identify the presence or absence of an arrhythmia. Therefore, a physician must analyze the arrhythmia information in conjunction with other clinical findings.

SUSPENDED ANALYSIS

Certain conditions suspend arrhythmia analysis. When suspended, arrhythmia conditions are not detected and alarms associated with arrhythmias do not occur. The messages which alert you to the conditions causing suspended arrhythmia analysis are : ARR OFF, ARRHYSUSPEND, LEADS FAIL, ALARM PAUSE, ALL ALARMS OFF, and DISCHARGED.

Trouble shooting

Problem :

Inaccurate heart rate and/or false a systole.

Solution :

Check ECG signal from patient:

1. Check/adjust lead placement.
2. Check/perform skin preparation.
3. Check/replace electrodes.

Check amplitude of ECG waveform:

1. Select ECG parameter label.
2. Select DISPLAY LEAD,
3. Scroll through all ECG leads and check for 0.5mV amplitude at normal (1X) size. (at least 0.5mV amplitude is required for QRS detection.) for borderline signals, validate on a graph.
4. If amplitudes are low, electrodes may need to be repositioned or replaced.

Problem :

False ventricular calls.

Solution :

Check ECG signal from patient: (the chest lead may exhibit polarity changes which may occasionally cause an inaccurate call.)

1. Check/adjust lead placement.
2. Check/perform skin preparation.
3. Check/replace electrodes. (if chest lead is a problem, move the chest lead to another chest position or leg position.)

Problem :

Inaccurate pacemaker detection

Solution :

Use pacemaker processing:

1. Select ECG parameter label.
2. Display the lead of ECG with the greatest amplitude in the top waveform position.
3. Select ANALYSIS SETTINGS.
4. SELECT DETECT PACE.

6. SpO_2

6.1 Outline

SpO_2 Connector Location and Measuring Cable

6.2 SpO2 Data Window

Signal and Data Validity

Stability of SPO2 Values

6.3 SpO2 Setup

RATE VOLUME

ALARM

ALARM LIMIT

ALARM LEVEL

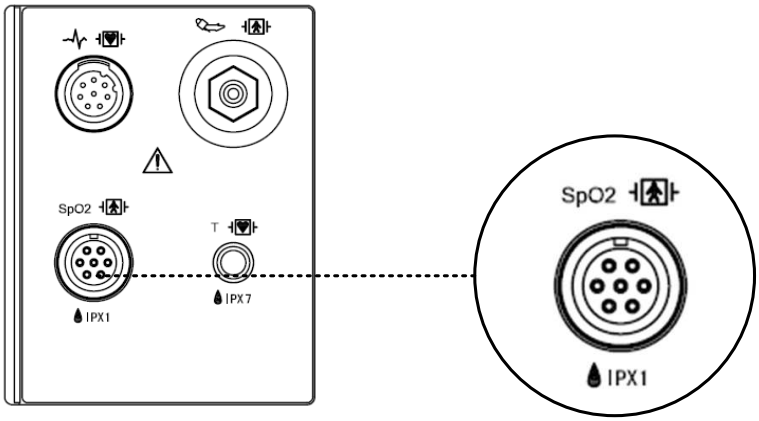
ALARM SOUND

6.1 Outline

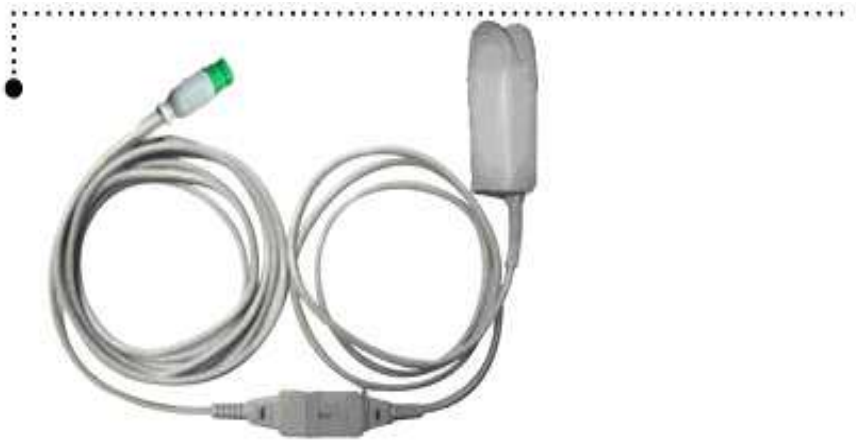
SPO2 monitoring is a noninvasive technique used to measure the amount of oxygenated hemoglobin and pulse rate by measuring the absorption of selected wavelengths of light. The light generated in the probe passes through the tissue and is converted into an electrical signal by the photodetector in the 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

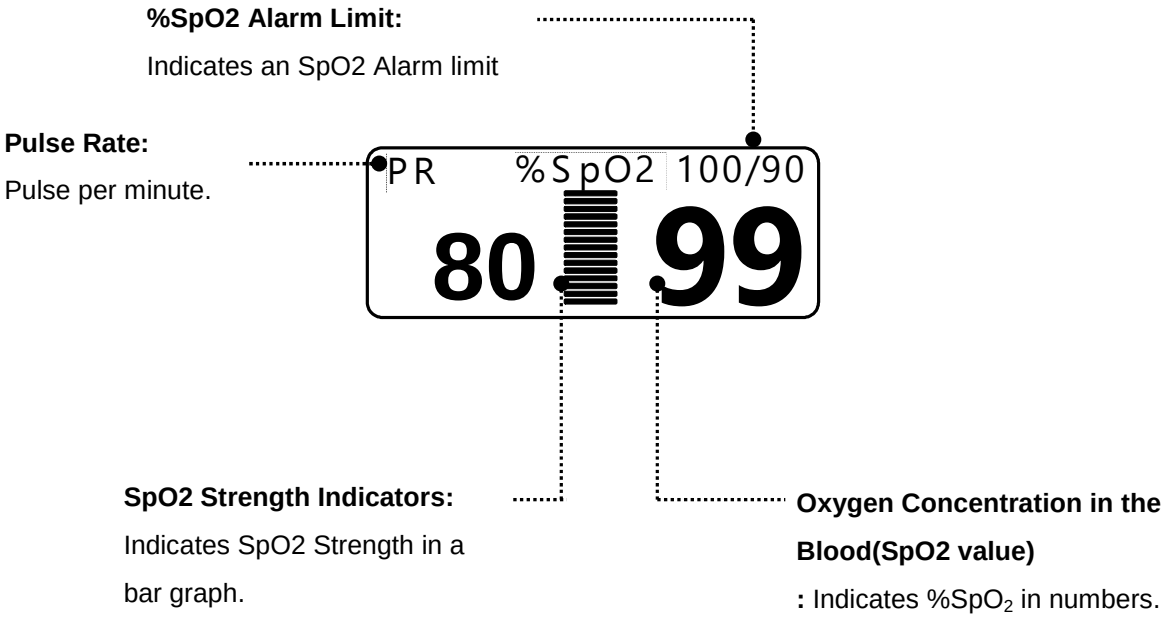


SpO_2 Measuring Cable



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.

6.2 SpO2 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

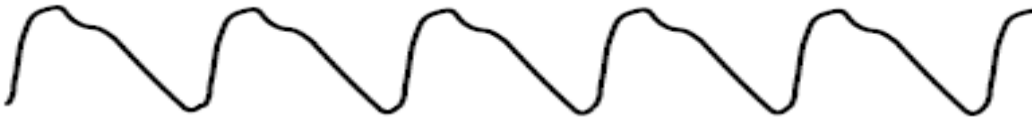
It is extremely important to determine that the probe is attached to the patient correctly and the data is verifiable. To make this determination, three indications from the monitor are of assistance—signal strength bar, quality of the SPO2 waveform, and the stability of the SPO2 values. It is critical 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 20 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

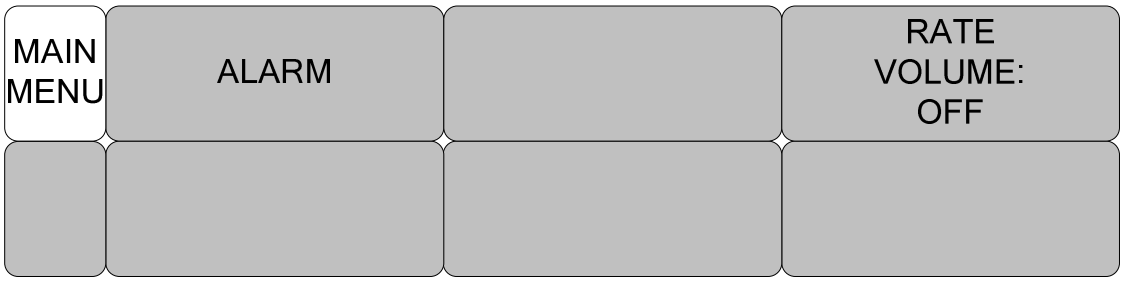
The stability of the displayed SPO2 values can also be used as an indication of signal validity. Although stability is a relative term, with a small amount of practice one can get a good feeling for changes that are artifactual or physiological and the speed of each. Messages are provided in the SPO2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

6.3 SpO2 Setup

ALARM : Menu in which SpO_2 alarm are set up.

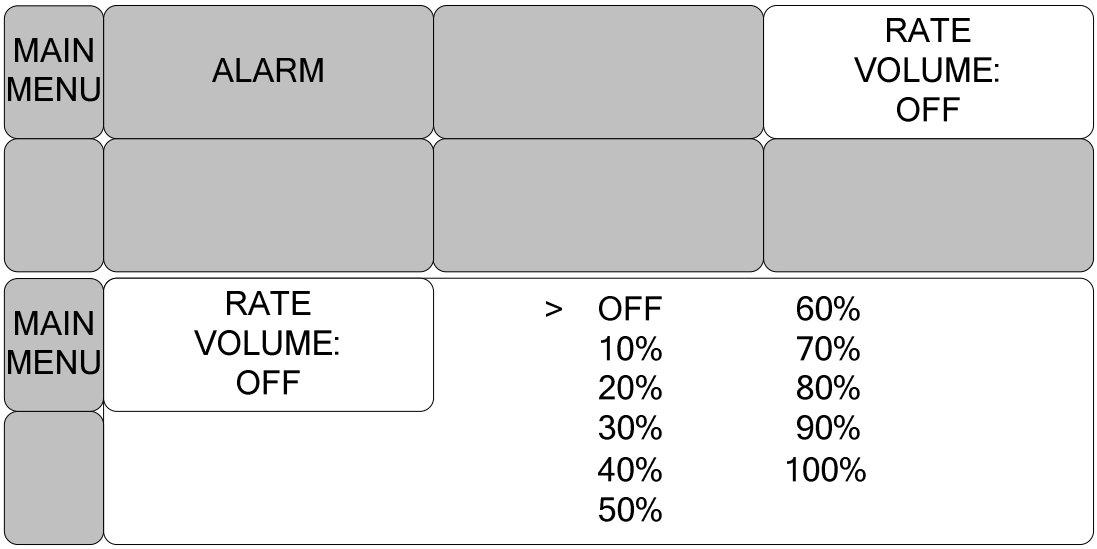
RATE VOLUME：Menu in which RATE VOLUME is set up



RATE VOLUME

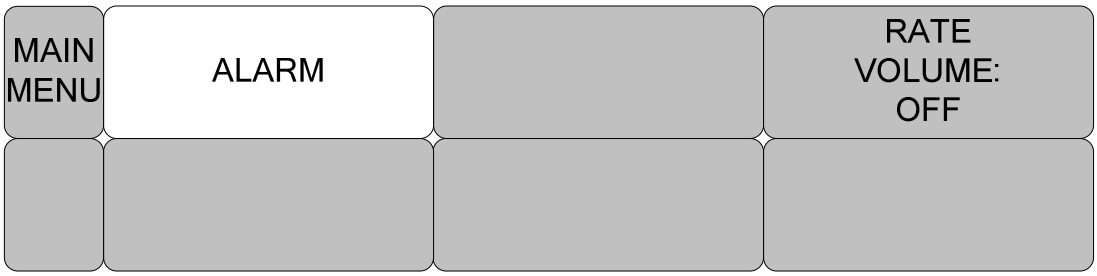
Move the KEY to select the volume from OFF to 100%.

When the ECG volume rate is set, it turns OFF automatically.



ALARM

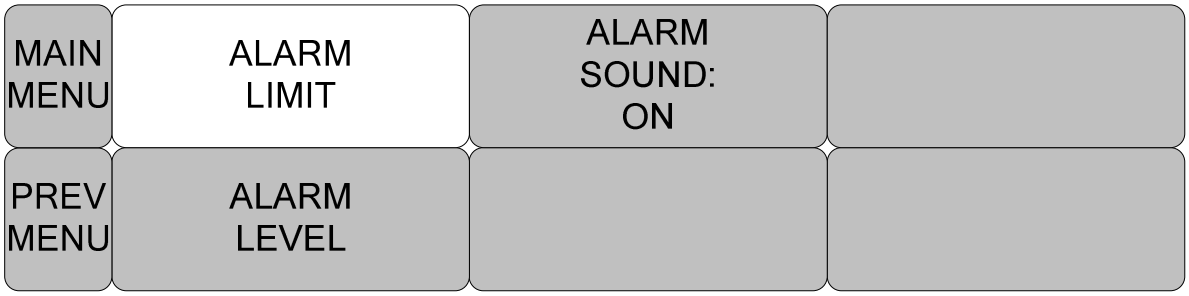
Two menus: ALARM LIMIT, LEVEL and ALARM SOUND provided in the alarm menu



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.



SPO2 ALARM LIMIT

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

ALARM LEVEL

Set the order of priority in each alarm.

MAIN MENU	ALARM LIMIT	ALARM SOUND	
PREV MENU	ALARM LEVEL		

ALARM LEVELS	
RETURN	ALARM LEVEL
SPO2-%	LOW
SPO2-R	MESSAGE
PROBE OFF	MESSAGE
CHECK PROBE	MESSAGE
LOST PULSE	LOW
POOR SIGNAL	LOW
ARTIFACT	LOW

ALARM SOUND

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

MAIN MENU	ALARM LIMIT	ALARM SOUND: ON	
PREV MENU	ALARM LEVEL		

MAIN MENU	ALARM LIMIT	ALARM SOUND: OFF	
PREV MENU	ALARM LEVEL		

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" condition as a System Warning alarm. however, You can 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.

7. RESPIRATION

7.1 Outline

Respiration Connector and Measuring Cable

7.2 RESPIRATION Data Window

7.3 RESPIRATION Setup

Respiration SWEEP SPEED

Respiration SIZE

APNEA DETECT

ALARM

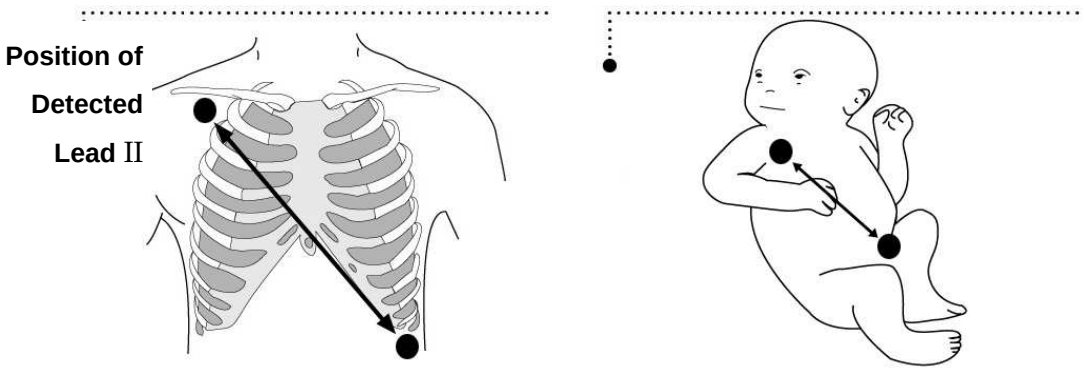
ALARM LIMIT

ALARM LEVEL

ALARM SOUND

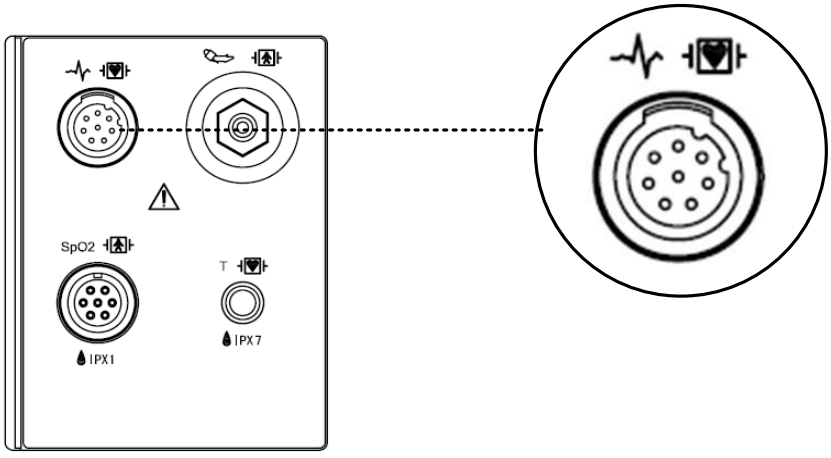
7.1 Outline

Respiration via ECG Lead II electrode makes the skin area of the chest enlarged, causing changes in the resistance of skin. Through this it calculates respiration value per minutes and performs the alarm function according to limit value.



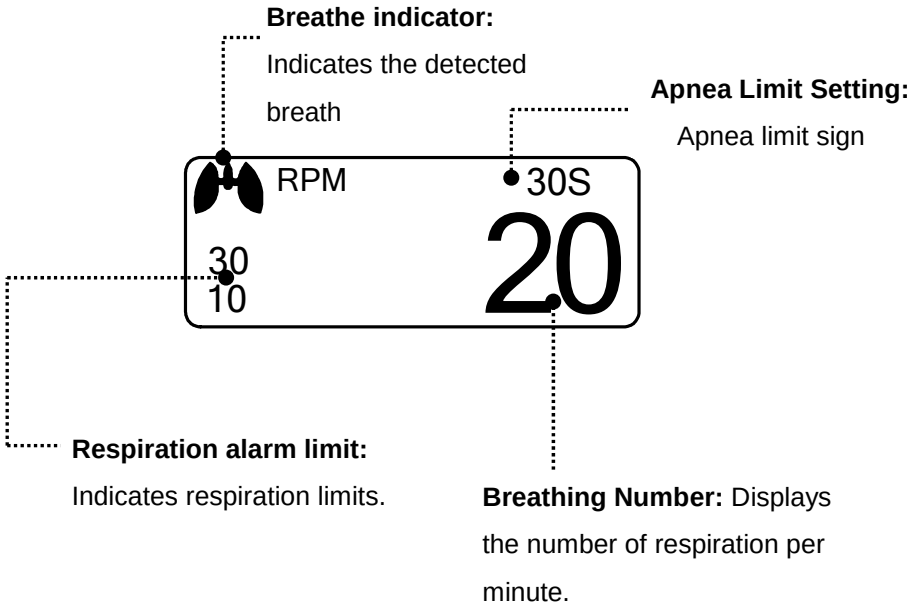
Respiration Connector and Measuring Cable

Respiration Connecter



Respiration Measuring

7.2 Respiration Data Window



7.3 Respiration Setup

ALARM: Respiration alarm setting menu

RESP SIZE: A menu to setup Wave Display

SWEEP SPEED: A menu to setup Wave Display of speed

APNEA DETECT: A menu to setup APNEA alarm display

MAIN MENU	ALARM	SWEEP SPEED : 25mm/s	RESP SIZE : X 2
	APNEA DETECT : ON		

RESPIRATION SPEED

Wave pattern speed is 6.25 , 12.5 , 25 mm/s.

MAIN MENU	ALARM	SWEEP SPEED : 12.5mm/s	RESP SIZE : X 2
	APNEA DETECT : ON		

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

RESPIRATION SIZE

Set wave pattern size X2~ X10.

MAIN MENU	ALARM	SWEEP SPEED : 12.5mm/s	RESP SIZE : X 2
	APNEA DETECT : ON		

MAIN MENU	ALARM	RESP SIZE : X 2	> X 2 X 4 X 6 X 8 X10
	APNEA DETECT : ON		

APNEA DETECT

Deciding function of activating Apnea Alarm

MAIN MENU	ALARM	SWEEP SPEED : 12.5mm/s	RESP SIZE : X 2
	APNEA DETECT : ON		

MAIN MENU	ALARM	SWEEP SPEED : 12.5mm/s	RESP SIZE : X 2
	APNEA DETECT : OFF		

ALARM

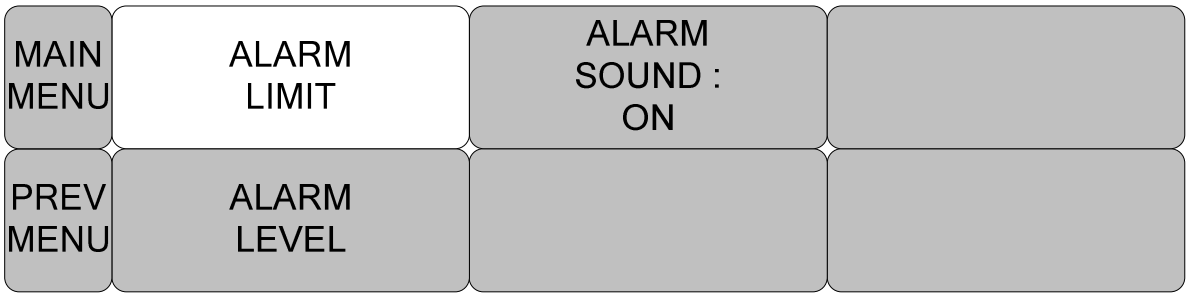
Alarm menu provide ALARM LIMIT ,LEVEL and ALARM SOUND .

MAIN MENU	ALARM	SWEEP SPEED : 12.5mm/s	RESP SIZE : X 2
	APNEA DETECT : ON		

ALARM LIMIT

Alarm Limit of Respiration Numeric Value is 5 ~ 150bpm

Alarm Limit of RESPIRATION APNEA Numeric Value is 3 ~ 30sec.



1. Move the □ mark to select RETURN, RESP or RESP-A, and press.
2. After a press in RESP, move the cursor right or left to LOW, and press.
3. After the color changed, move the cursor right or left to the selected value, and press.
4. Place the cursor to HIGH, and press. When the color has changed, move the cursor again to select the value and press. Move to the RESP and press again. (You may decide to perform the process in the opposite order, LOW to HIGH, to have the same result.)
5. Once RESP-A is pressed, move to LOW and press.
6. When the color has changed, move the cursor to select the value, and press.
7. A press in the HIGH position, the color changes. Then move the cursor to select the value and press. Move again to RESP-A, and press.
8. Select RETURN to get out of the window.

RESP ALARM LIMIT

RETURN	UNITS	LOW	HIGH
RESP	RPM	10	30
RESP-A	SEC	0	20

ALARM LEVEL

Set the order of priority in each alarm.

MAIN MENU	ALARM LIMIT	ALARM SOUND	
PREV MENU	ALARM LEVEL		

ALARM LEVELS	
RETURN	ALARM LEVEL
RESP RESP-A	MESSAGE MESSAGE

ALARM SOUND

Warning sound or message displays activation setting when Respiration ALRAM occurs.

MAIN MENU	ALARM LIMIT	ALARM SOUND : ON	
PREV MENU	ALARM LEVEL		
MAIN MENU	ALARM LIMIT	ALARM SOUND : OFF	
PREV MENU	ALARM LEVEL		

8. NIBP

8.1 Outline

Position of NIBP Connector and Cuff

8.2 NIBP Data Window

8.3 NIBP Setup

ALARM

ALARM LIMIT

ALARM LEVEL

ALARM SOUND

NIBP STAT

CUFF SIZE

UNIT SELECT

INTERVAL

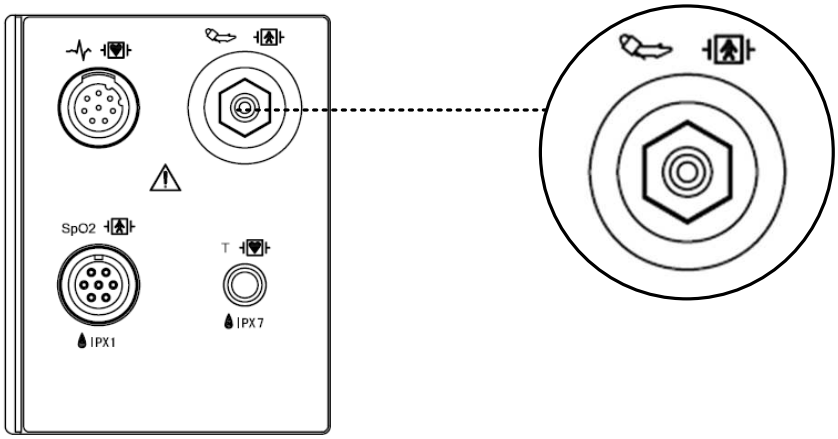
INFLATION SET

8.1 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 hypotension, hypertension, arrhythmias or extremely high or low heart rate. The software algorithm cannot accurately compute NIBP or patients with these conditions.

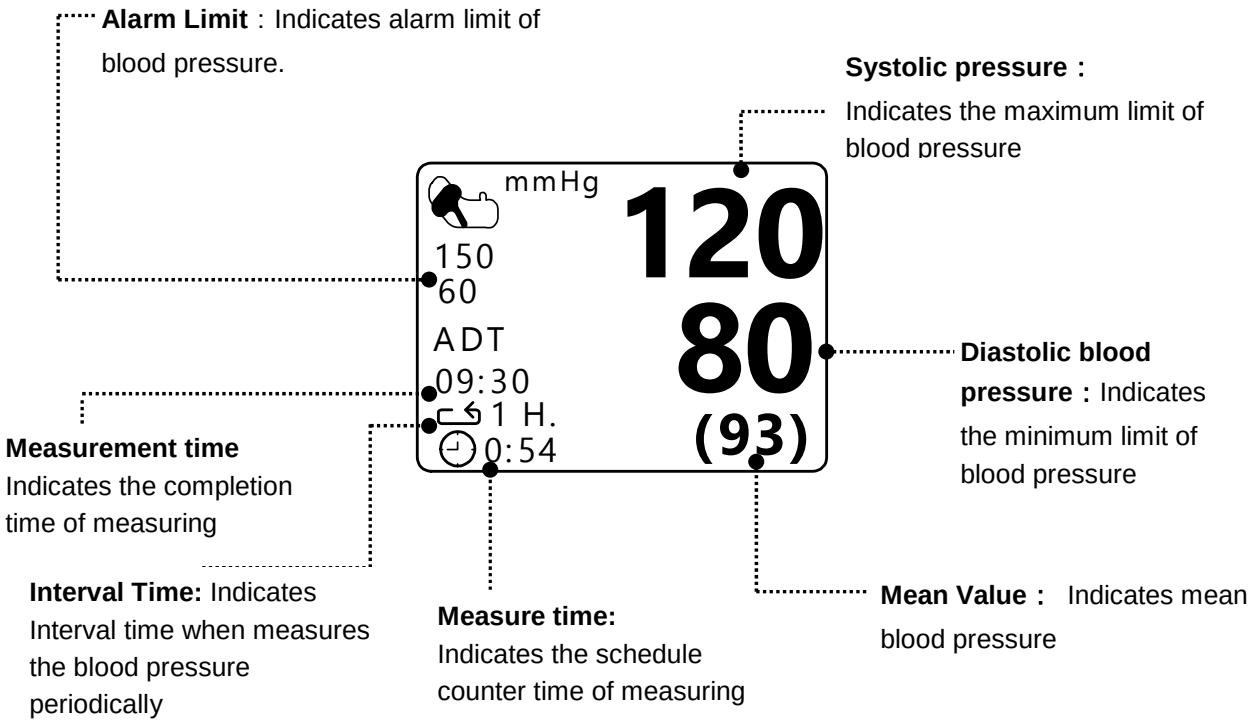
Note
As the value of NIBP can vary according to the age and sex of a patient, the user needs to set up right data in parameter Menu before measurement. Tubes between the cuff and the monitor are not kinked or blocked. The air pad should be exactly over the branchial artery. Tubing is immediately to the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

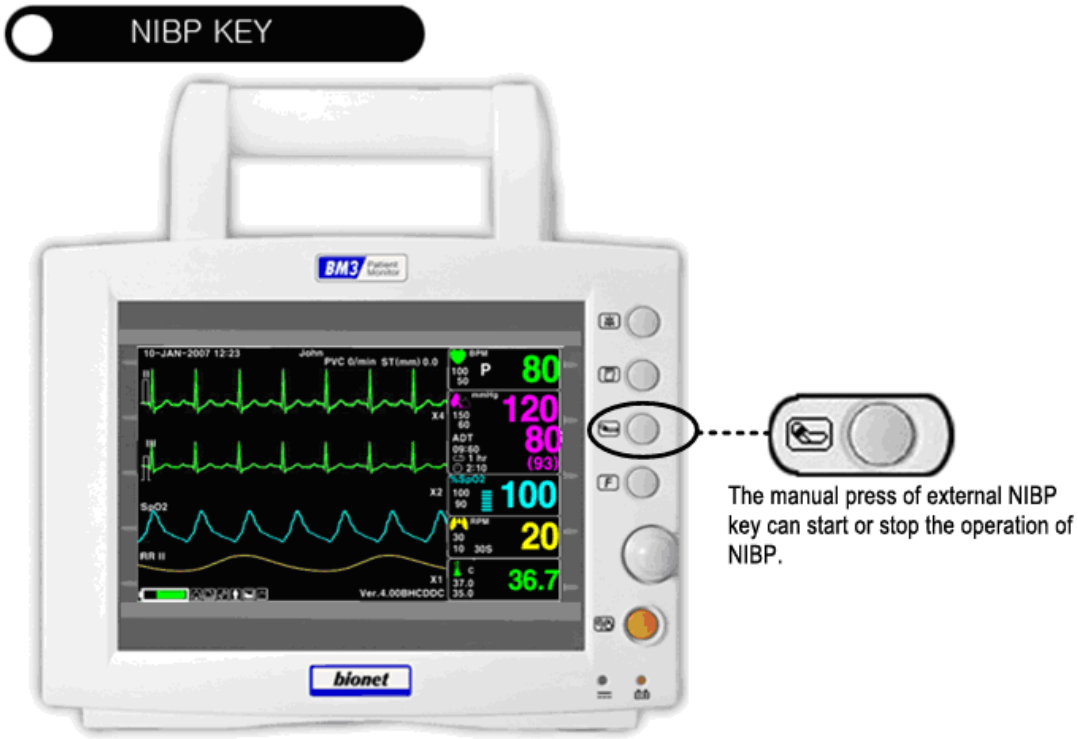
The maintenance is performed every 2 years.

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.

8.2 NIBP Data Window





8.3 NIBP Setup

ALARM： A menu to set the Alarm

STAT : Start 5 minutes of continuous, sequential NIBP measurements.

CUFF SIZE：A menu to select cuff size

UNIT SELECT: A menu to select the pressure unit

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

INFLATION: Initial Pressurization setting menu

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

ALARM

The alarm provides ALARM LIMIT, LEVEL and ALARM SOUND.

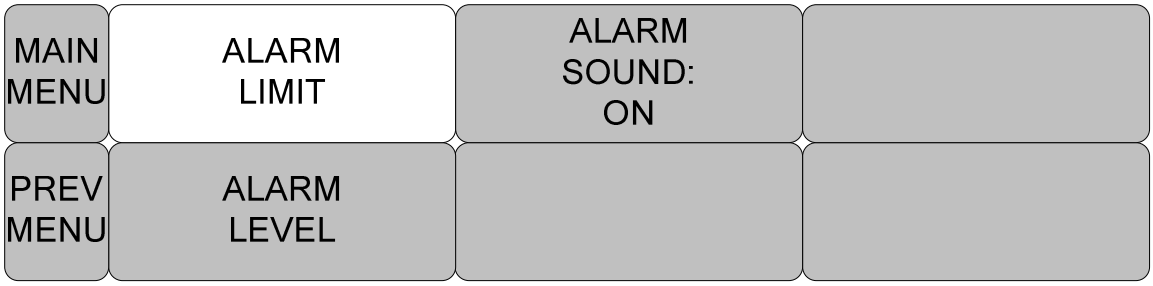
MAIN MENU	ALARM	NIBP STAT: OFF	CUFF SIZE: ADT
	UNIT SELECT: mmHg	INFLATION SET: 170mmHg	INTERVAL: OFF

MAIN MENU	ALARM LIMIT	ALARM SOUND: ON	
PREV MENU	ALARM LEVEL		

ALARM LIMIT

Alarm setting Numeric Value of Systolic, Diastolic, and mean pressure is 10 ~ 360mmHg.

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 LEVEL

Set the order of priority in alarm.

MAIN MENU	ALARM LIMIT	ALARM SOUND	
PREV MENU	ALARM LEVEL		

ALARM LEVELS	
RETURN	ALARM LEVEL
NIBP	MEDIUM

ALARM SOUND

The menu which decide activate of warning sign and message display when the respiration alarm is on.

MAIN MENU	ALARM LIMIT	ALARM SOUND: ON	
PREV MENU	ALARM LEVEL		

NIBP STAT

Start 5 minutes of continuous, sequential NIBP measurements.

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

CUFF SIZE

The user can select a CUF between ADULT , PEDIATRIC and NEONATAL.

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

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

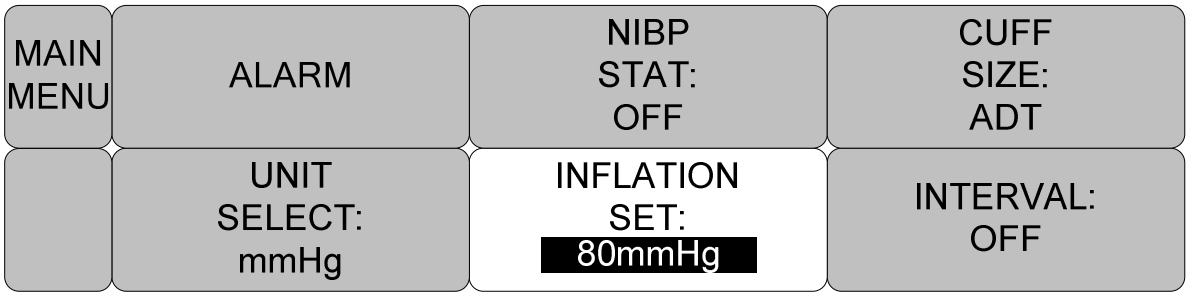
MAIN MENU	INTERVAL: OFF	> OFF 1MIN. 2MIN. 3MIN. 4MIN. 5MIN. 10MIN.	15MIN. 20MIN. 30MIN. 1H 2H 4H 8H

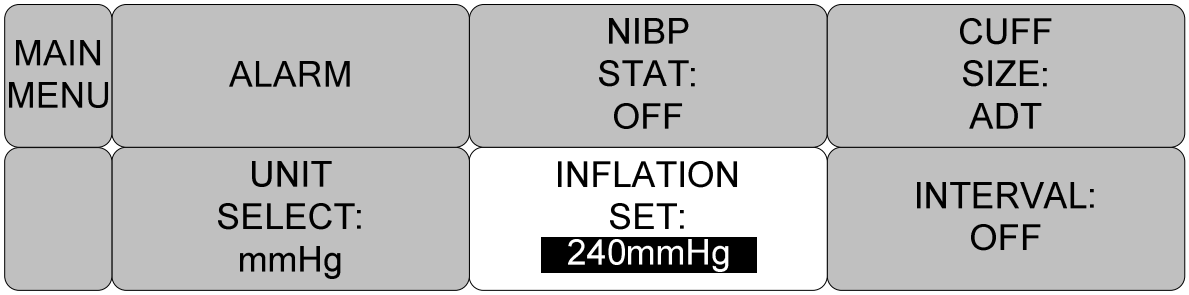
INFLATION SET

It is a function for pressurization pressure.

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

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





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.

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.
PULSE TOO 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	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
  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.

9. TEMPERATURE

9.1 Outline

Temperature Connector and Measuring Cable

9.2 Temperature Data Window

9.3 Temperature Setup

ALARM

ALARM LIMIT

ALARM LEVEL

ALARM SOUND

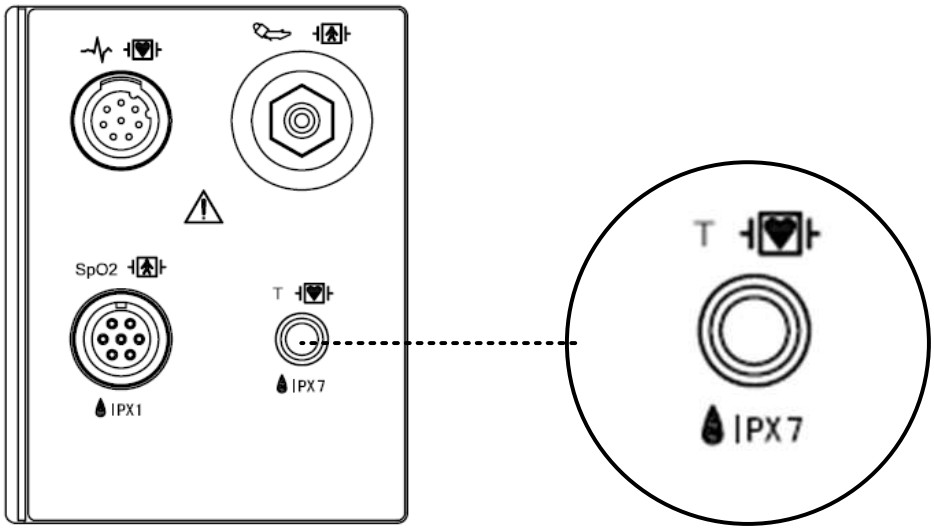
UNIT SELECT

9.1 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

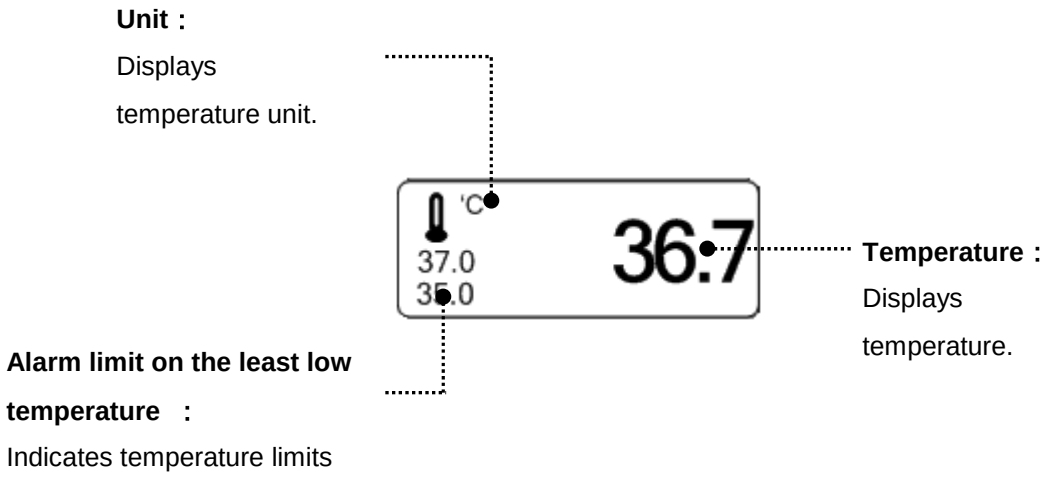
Temperature Connector



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( ) .

9.2 Temperature Data Window

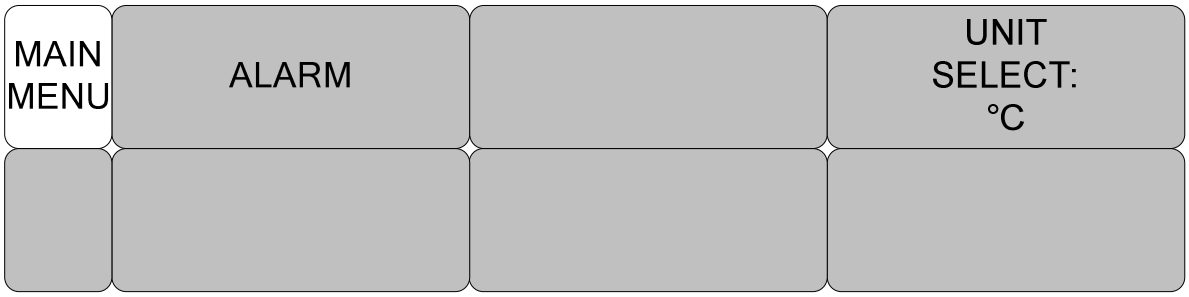


Note
The minimum measuring time required to obtain accurate readings at the specific body site is at least 3 minutes.

9.3 Temperature Setup

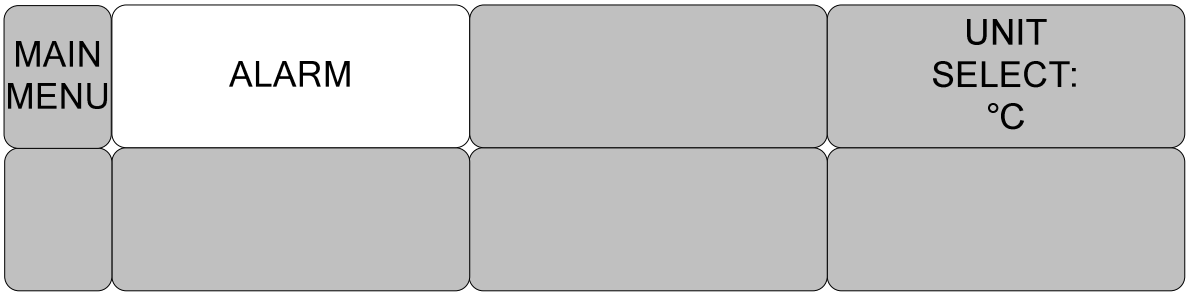
ALARM : Temperature measurement alarm set

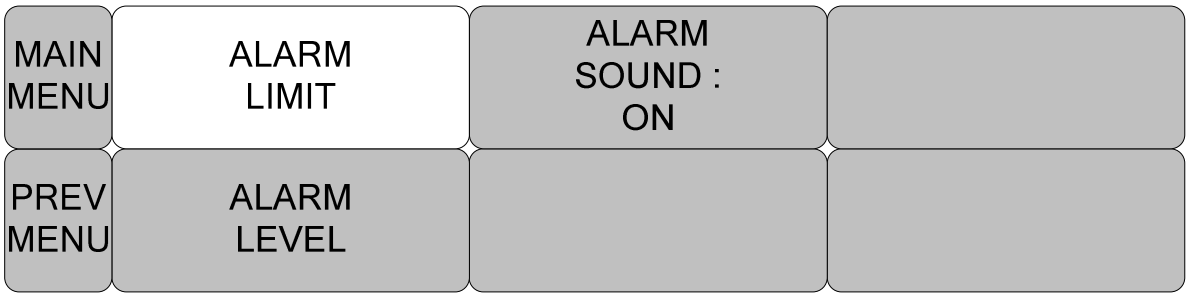
UNIT SELECT : Temperature measurement unit set



ALARM

Alarm menu provide ALARM LIMIT, LEVEL and ALARM SOUND.

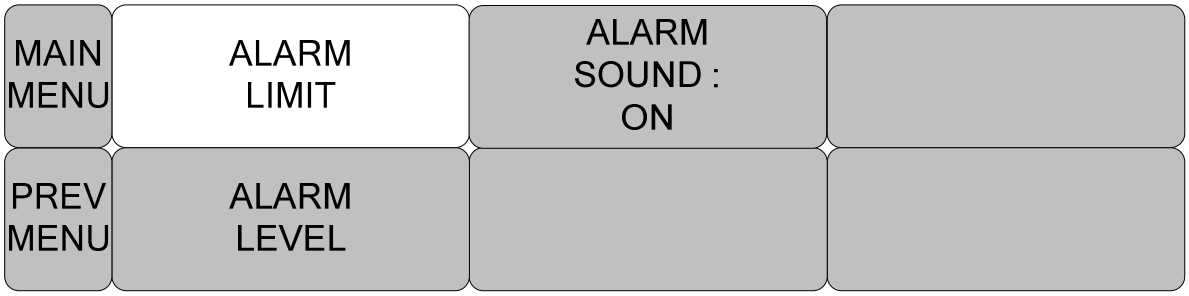




ALARM LIMIT

Setting numeric value is 0□ ~ 50.0□.

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 LEVEL

Set the order of priority in alarm.

MAIN MENU	ALARM LIMIT	ALARM SOUND	
PREV MENU	ALARM LEVEL		

ALARM LEVELS	
RETURN	ALARM LEVEL
TEMP PROBE OFF	MESSAGE MESSAGE

ALARM SOUND

The menu which decide activate of warning sign and message display when the respiration alarm is on.

MAIN MENU	ALARM LIMIT	ALARM SOUND : ON	
PREV MENU	ALARM LEVEL		
MAIN MENU	ALARM LIMIT	ALARM SOUND : OFF	
PREV MENU	ALARM LEVEL		

UNIT SELECT

Able to select unit with °C, °F.

MAIN MENU	ALARM		UNIT SELECT: °C
MAIN MENU	ALARM		UNIT SELECT: °F

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.

Warning

To measure the peripheral temperature, attach the probe to the ankle or palm.

If the patient sweats heavily or moves violently, fasten the pad with surgical tape.

NOTE

When the measuring site is exposed directly to air, the temperature may be lower than normal.

It take about 20 to 30 minutes to reach the equilibrium temperature after attaching the sensor.

10. PRINT

10.1 Print

Printer and Heat Sensitivity Paper

Function and Setup Menu

10.2 Paper Change

10.1 Print

Printer and Heat Sensitivity Paper

A printer used to print data onto thermal paper.

Size of the thermal paper roll: 58mm wide x 38mm in diameter any thermal paper of same size can be used for the printer.

Side View of Printer

Function and Setup Menu

MAIN MENU	PRINTER SPEED: 25mm/s		WAVE FORM1: ECG
PREV MENU	WAVE FORM3: SPO2	WAVE FORM2: RESP	

1. Press the PRINT Key for continuous printing.

2. Select Printing Speed 25, 50 mm/s.

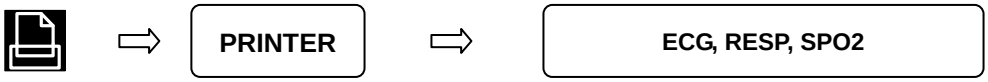
MAIN MENU	PRINTER SPEED: 25mm/s		WAVE FORM1: ECG
PREV MENU	WAVE FORM3: SPO2	WAVE FORM2: RESP	

MAIN MENU	PRINTER SPEED: 50mm/s		WAVE FORM1: ECG
PREV MENU	WAVE FORM3: SPO2	WAVE FORM2: RESP	

3. Set up ALARM PRINT in the MORE menu to activate ALARM during printing.

4. Data is printed in a selected wave form along with personal information of the patient.

   3 channels select 3 parameters to print.



MAIN MENU	PRINTER SPEED: 50mm/s		WAVE FORM1: ECG
PREV MENU	WAVE FORM3: SPO2	WAVE FORM2: RESP	

MAIN MENU	PRINTER SPEED: 50mm/s	WAVE FORM1: ECG	OFF > ECG SPO2 RESP
PREV MENU	WAVE FORM3: SPO2		

MAIN MENU	PRINTER SPEED: 50mm/s		WAVE FORM1: ECG
PREV MENU	WAVE FORM3: SPO2	WAVE FORM2: RESP	

MAIN MENU	PRINTER SPEED: 50mm/s	WAVE FORM2: RESP	OFF ECG SPO2 > RESP
PREV MENU	WAVE FORM3: SPO2		

MAIN MENU	PRINTER SPEED: 50mm/s		WAVE FORM1: ECG
PREV MENU	WAVE FORM3: SPO2	WAVE FORM2: RESP	

MAIN MENU	WAVE FORM3: SPO2	OFF ECG > SPO2 RESP	WAVE FORM1: ECG
PREV MENU			

If there is no print sheet, no paper icon of  appears.

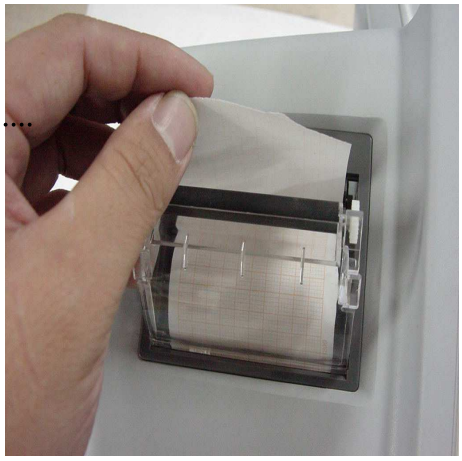
10.2 Paper Change

1

Open the window of the printer.

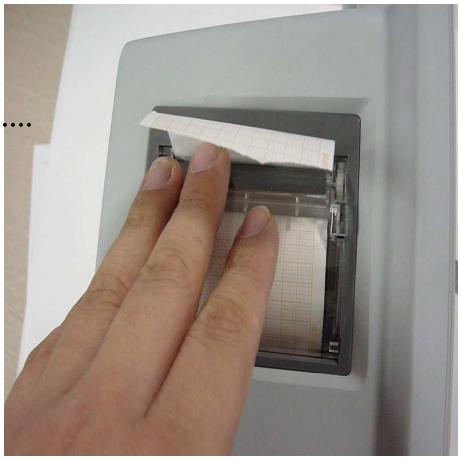
2

Insert the paper roll offered with the product into the printing unit. Place the roll in a proper way so that the printed paper can roll out upwards.



3

Press the printer window until it is properly shut. Inaccurate shutting may cause failure in printing.



11. MESSAGE LIST

Function	Message	Details
ECG	LEAD FAULT	Lead Cable is not properly connected.
SpO_2	PROBE OFF	Probe is not properly connected.
	CHECK PROBE	Patient's finger is off the probe.
	PULSE SEARCH	Detection by the monitor of a pulse has ceased.
	POOR SIGNAL	The SpO2 signal is too low.
	LOST PULSE	The quality of the signal is questionable.
	ARTIFACT	The signal is patient's motion artifact
RESP	LEAD FAULT	Lead Cable is not properly connected.
	APNEA	APNEA gives an alarm.
NIBP	INFLATION FAILURE CHECK CUFF	Cuff hose is not properly connected.
	OVER PRESSURE	Cuff pressure is putting on excessively.
	DEFLATION FAILURE CHECK CUFF	Cuff is bent, preventing deflation.
	OVER TIME PRESSURE	Measure time exceeds the preset Level.
	MEASUREMENT ERROR	Measure signal absent
TEMP	PROBE OFF	Probe is not properly connected.
ALARM	ALARM VOL.OFF	Alarm volume is off.
	SILENCED	Alarm key is pressed once
	ALARM PAUSE 2MIN	Alarm key is pressed twice
	ALL ALARM OFF	The all alarm is cleared, the alarm sounds and the lamp does not occur.
PRINT	No paper Icon	No paper in the printer
BATTERY	BATTERY LOW	The battery level is low, automatically power off within 5 minutes.

12. DEFAULT SETTING VALUE

1. Adult-ICU Mode

Alarm level

	High	Medium	Low	Message
ASYSTOLE	0			
VFIB/VTAC	0			
VTAC	0			
HR		0		
NIBP		0		
SpO_2			0	
SpO_2-Rate				0
RR				0
RR-Apnea				0
T(℃)				0

Parameter Limits

	Low	High
HR	50	150
NIBP-S	80	200
NIBP-M	40	140
NIBP-D	20	120
SpO_2	90	100
SpO_2-Rate	50	150
RR(RESP)	10	30
RR-Apnea	0	20
T(℃/℉)	30.0/86.0	42.0/107.6
ST	-10.0	10.0
PVC	0	20

Display

Patient Age	**Adult**
Color format	**Color**
Primary ECG	**II**
Arrhythmia	**Off**
Detect Pace	**Off**
Print Waveform2	**Off**
Print Waveform3	**Off**
Alarm Print	**On**
NIBP Auto	**Off**
NIBP Cuff Size	**ADT**
RR(RESP) Lead	**II**
Alarm Volume	**50%**
QRS Volume	**Off**
Pulse Volume	**Off**
ECG Lead Fault	**Message**
SpO_2 Probe Off	**Message**
Units for Height	**cm**
Units for Weight	**kg**
Temperature Units	**°C**
NIBP Limit Type	**Systolic**
ECG Filter	**Monitoring**

2. Neonate-ICU Mode

Alarm level

	High	Medium	Low	Message
ASYSTOLE	0			
VFIB/VTAC	0			
VTAC	0			
HR		0		
NIBP		0		
SpO_2			0	
SpO_2-Rate				0
RR				0
RR-Apnea				0
T(℃)				0

Parameter Alarm Limits

	Low	High
HR	90	200
NIBP-S	40	100
NIBP-M	30	70
NIBP-D	20	60
SpO_2	88	100
SpO_2-Rate	90	200
RR(RESP)	15	100
RR-Apnea	0	20
T(℃/℉)	30.0/86.0	42.0/107.6
ST	-10.0	10.0
PVC	0	20

Display

Patient Age	**0~2 years**
Color format	**Color**
Primary ECG	**II**
Arrhythmia	**Off**
Detect Pace	**Off**
Print Waveform2	**Off**
Print Waveform3	**Off**
Alarm Print	**On**
NIBP Auto	**Off**
NIBP Cuff Size	**NEO**
RR(RESP) Lead	**II**
Alarm Volume	**50%**
QRS Volume	**Off**
Pulse Volume	**Off**
ECG Lead Fault	**Message**
SpO_2 Probe Off	**Message**
Units for Height	**cm**
Units for Weight	**kg**
Temperature Units	**°C**
NIBP Limit Type	**Systolic**
ECG Filter	**Monitoring**

3. Pediatric-ICU Mode

Alarm level

	High	Medium	Low	Message
ASYSTOLE	0			
VFIB/VTAC	0			
VTAC	0			
HR		0		
NIBP		0		
SpO_2			0	
SpO_2-Rate				0
RR				0
RR-Apnea				0
T(℃)				0

Parameter Alarm Limits

	Low	High
HR	70	180
NIBP-S	60	160
NIBP-M	40	120
NIBP-D	30	100
SpO_2	90	100
SpO_2-Rate	70	180
RR(RESP)	10	50
RR-Apnea	0	20
T(℃/℉)	30.0/86.0	42.0/107.6
ST	-10.0	10.0
PVC	0	20

Display

Patient Age	**3~16years**
Color format	**Color**
Primary ECG	**II**
Arrhythmia	**Off**
Detect Pace	**Off**
Print Waveform2	**Off**
Print Waveform3	**Off**
Alarm Print	**On**
NIBP Auto	**Off**
NIBP Cuff Size	**PED**
RR(RESP) Lead	**II**
Alarm Volume	**50%**
QRS Volume	**Off**
Pulse Volume	**Off**
ECG Lead Fault	**Message**
SpO_2 Probe Off	**Message**
Units for Height	**cm**
Units for Weight	**kg**
Temperature Units	**℃**
NIBP Limit Type	**Systolic**
ECG Filter	**Monitoring**

SPOT MODE

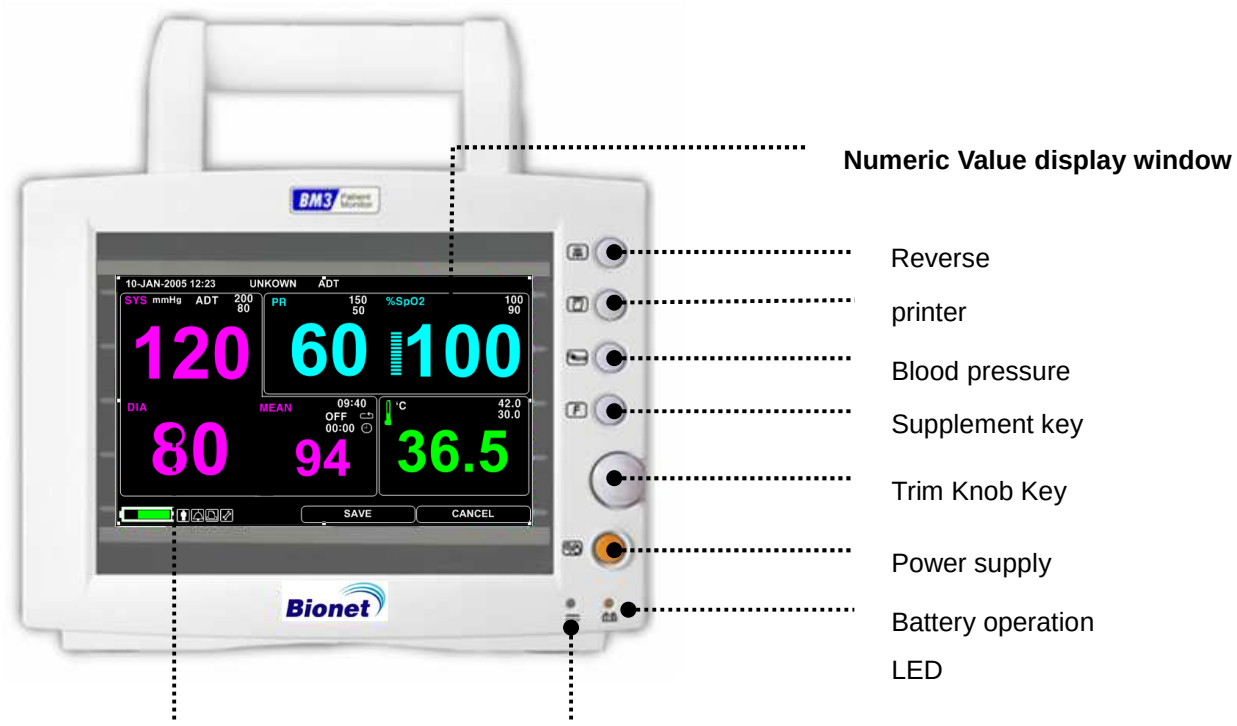
1. General Operation
2. Patient/Data Management
3. Save Record
4. Saved Data Management
5. Setup
6. NIBP
7. SpO2
8. Temperature
9. PRINT

1. General Operation

1.1 Function and key

The product has LCD screen and 5 functional keys and 1 trim knob.

Operating the BM3 Spot Monitor



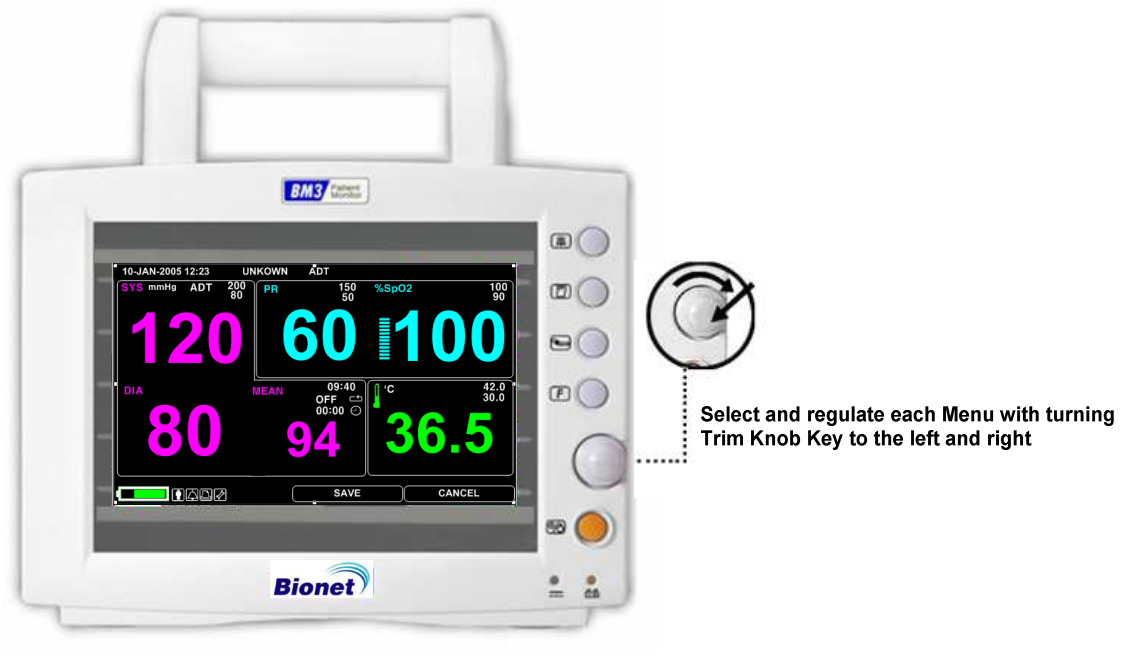
Operation Keys

1. Power：ON/OFF of the equipment
2. Supplement Key: Using home key to bring up the menu.
   Adjust view mode while out of menu/list.
3. Blood Pressure： Able to manage blood pressure measurement with manual operation.
4. Print：Print selected wave pattern in the menu. It prints continuously until press the key to stop.
5. Alarm ：Turn off the alarm when alarm rings.
   Press once, the alarm is off for 1 minute.
   Press twice, all alarm stops for 2 minutes.
   Press three times, all alarm off

Press four times, the alarm returns.

6. Trim Knob Key : Move cursor turning with Trim Knob Key to the left and to the right on each menus and press it to select.

Movement and Selection in Menu



1.2 Screen Generating Power Mode

There are 3 types of screen generating power mode.

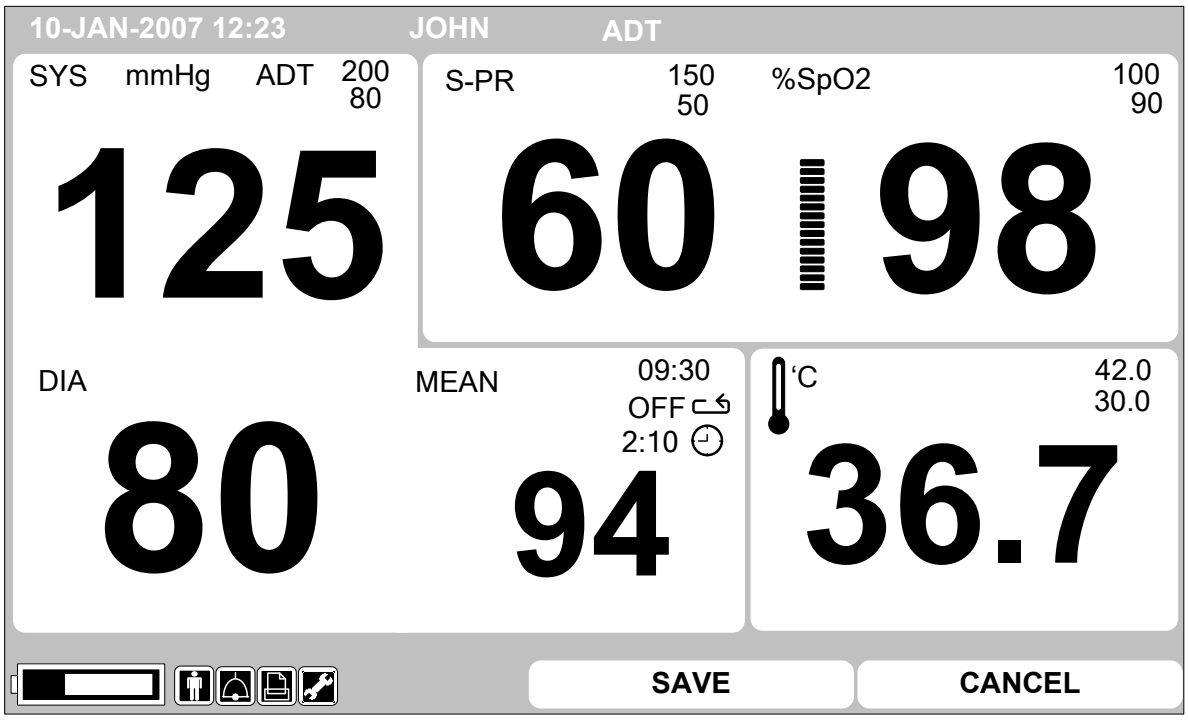
Select the screen generating mode icon or press supplement key to change the screen generating power.

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

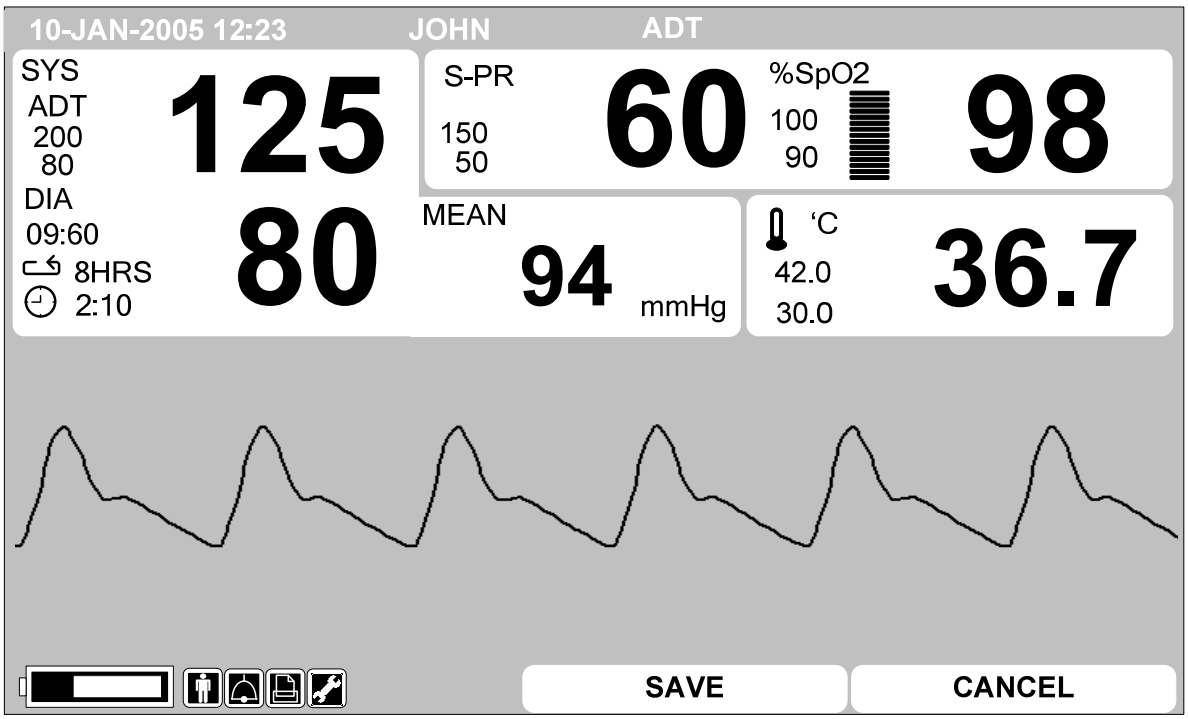
GRAPHIC VIEW (wave pattern generation mode): Generate parameter numeric value and SPO2 wave pattern together.

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

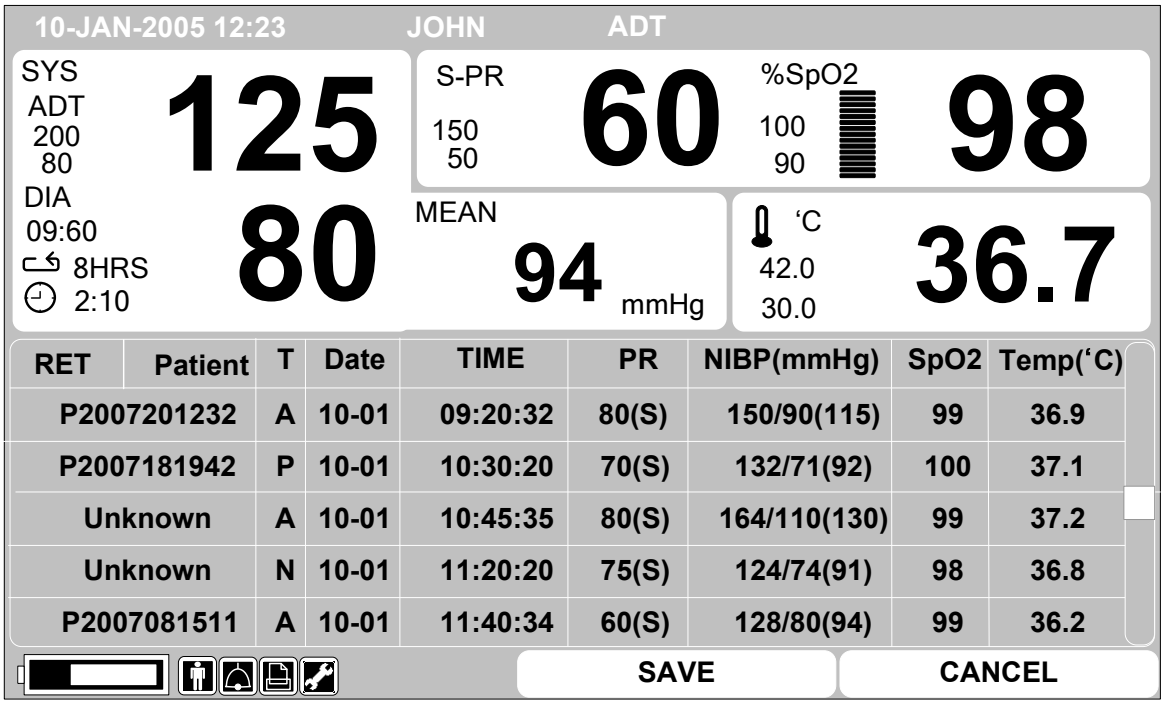
TEXT VIEW



GRAPHIC VIEW



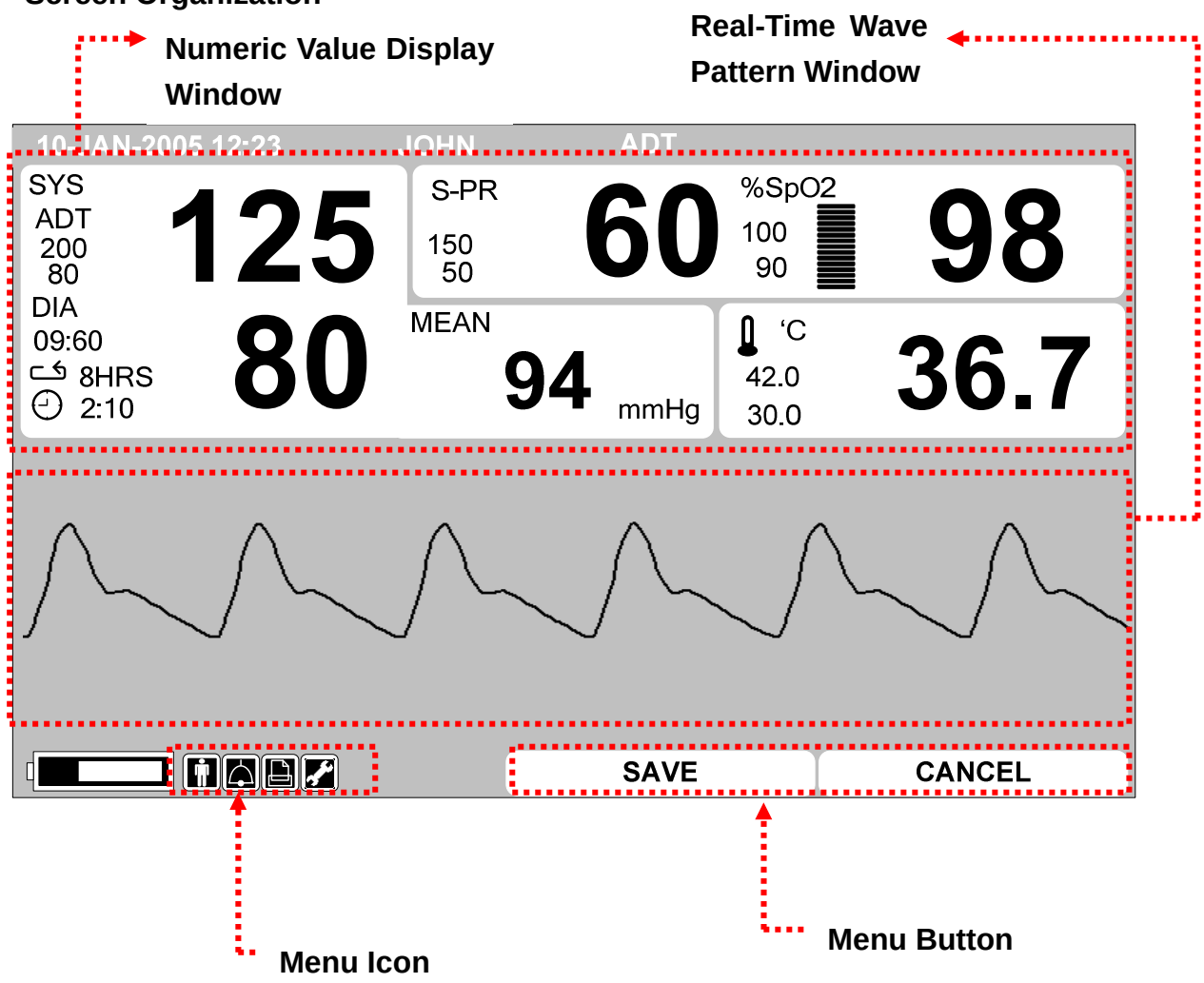
RECORD LIST VIEW



RET	Patient	T	Date	TIME	PR	NIBP(mmHg)	SpO2	Temp('C)
P2007201232		A	10-01	09:20:32	80(S)	150/90(115)	99	36.9
P2007181942		P	10-01	10:30:20	70(S)	132/71(92)	100	37.1
Unknown		A	10-01	10:45:35	80(S)	164/110(130)	99	37.2
Unknown		N	10-01	11:20:20	75(S)	124/74(91)	98	36.8
P2007081511		A	10-01	11:40:34	60(S)	128/80(94)	99	36.2

1.3 Standard Menu Operation

Screen Organization

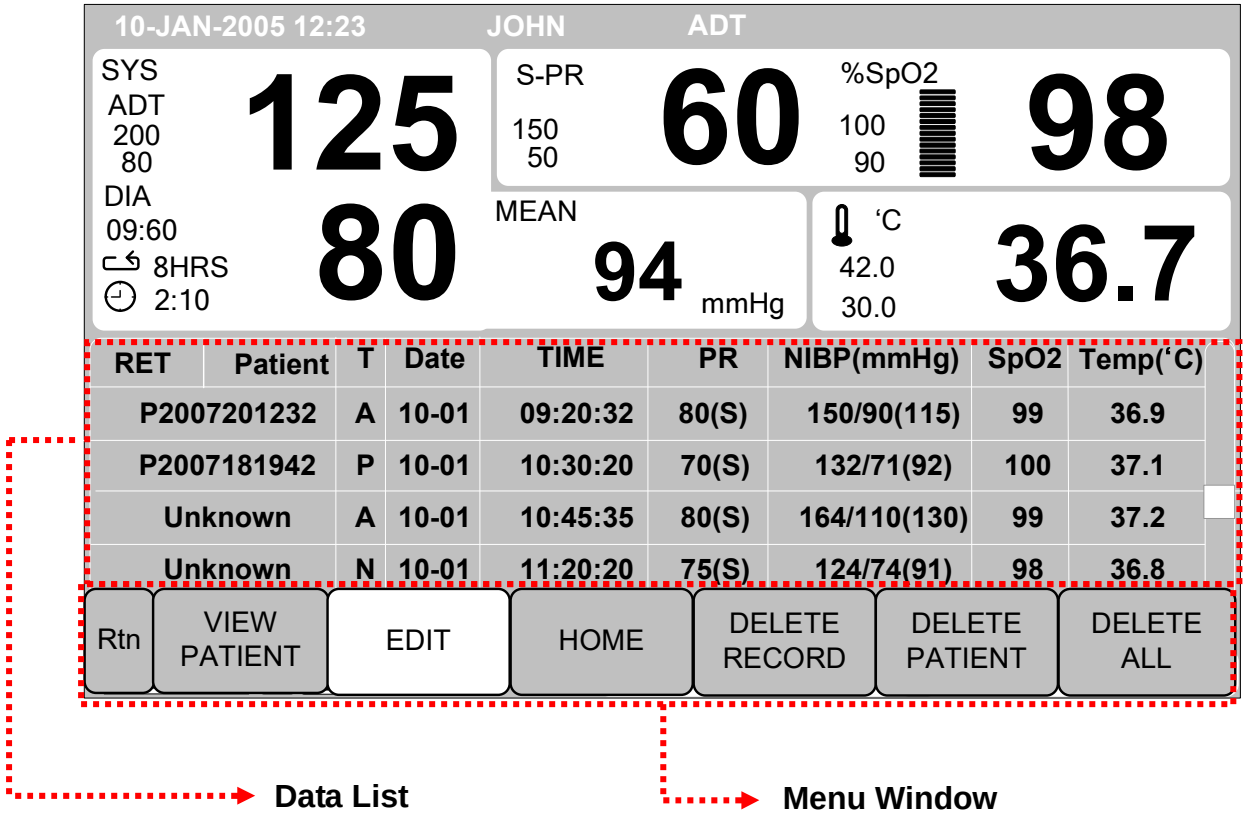


Real Time Wave Pattern Window： Print measured Wave Pattern Window

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.

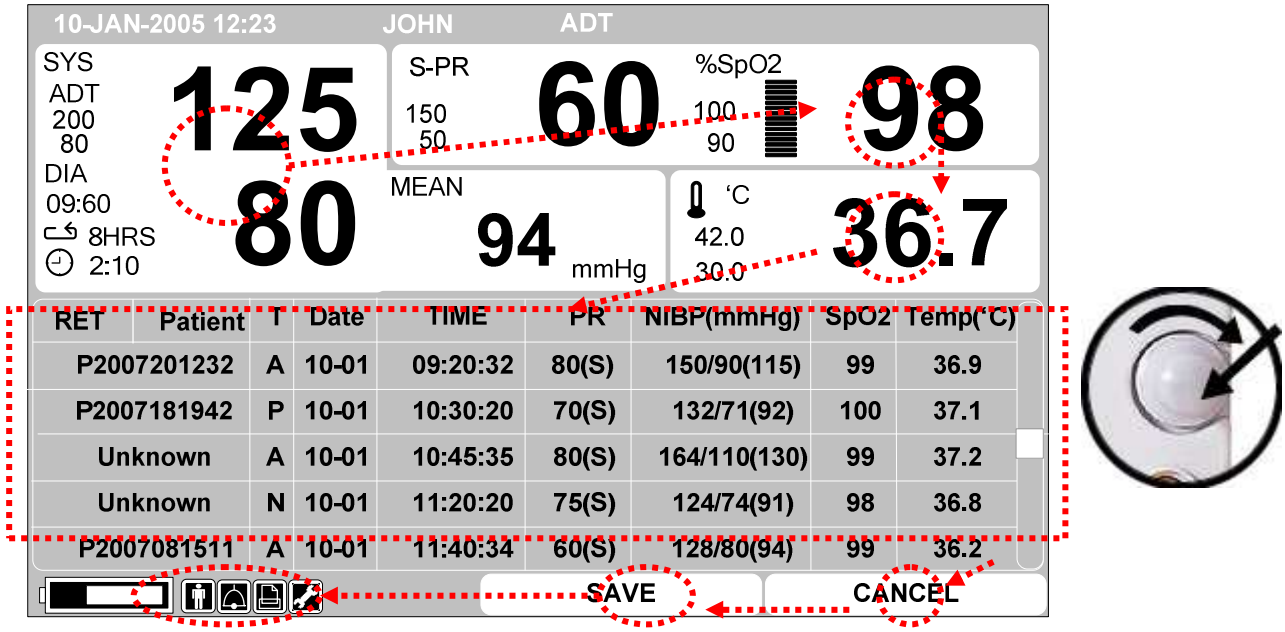
Menu Button: A button to save the data or delete.



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

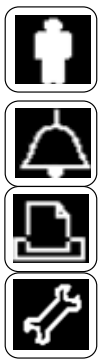
Data List: Display saved Data list.

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) → (SETUP) → (PRINT) → (ALARM) → (PATIENT) An inactivated window is jumped off. Data list mode does not appear in the Large Parameter mode and Graphic View Mode

Menu Icon Composition



Patient Icon: Patient register and delete.

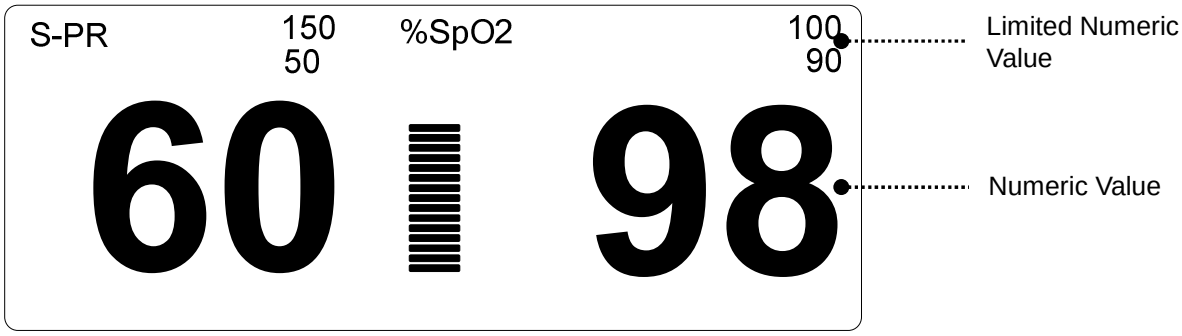
Alarm Icon: Setup alarm.

Printer Icon: Setup printer.

Setup Icon: Setup Standard Numeric Value.

Numeric Value Window

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



Select Menu Using by Trim Knob Key

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

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

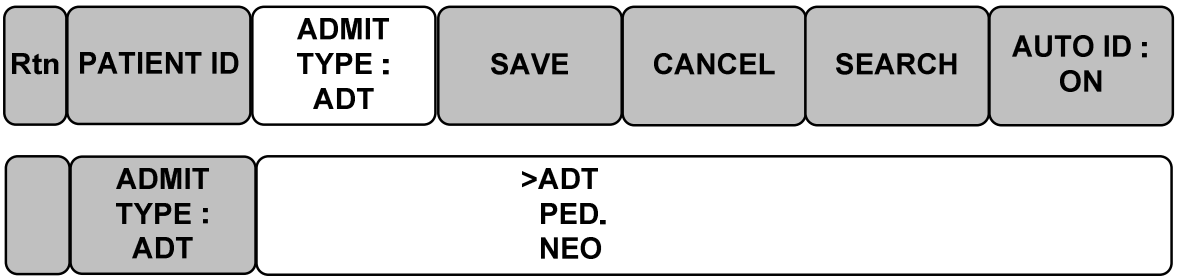
A selection is made by pressing the Trim Knob Key.

Select Arrow Item Menu

Move to the left：Turn Trim Knob Key to the left.

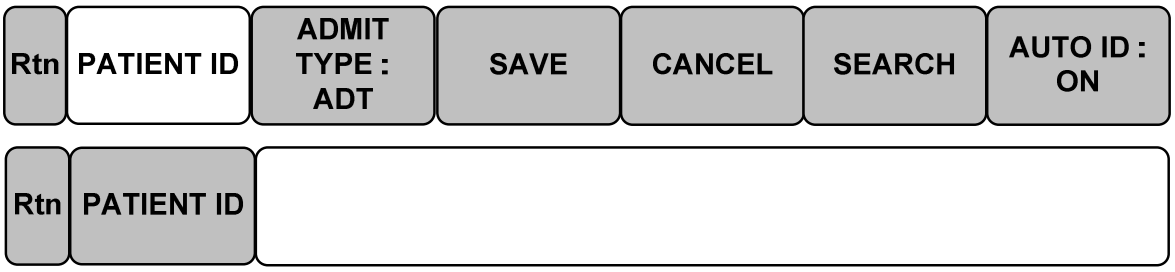
Move to the right： Turn Trim Knob Key to the right.

Selection is made by pressing the Trim Knob Key. Exit out of the menu after the selection.

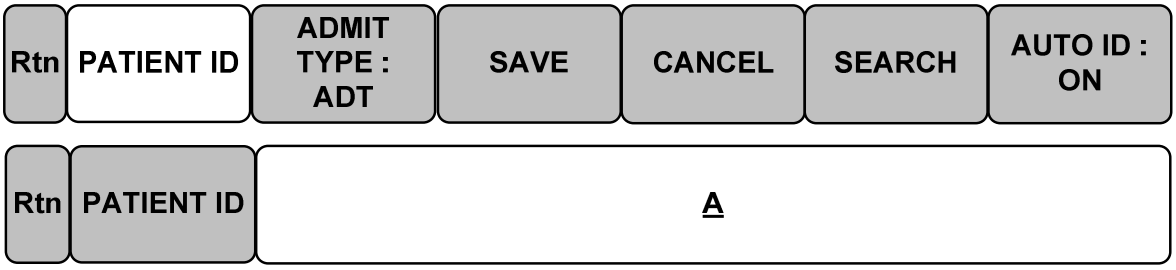


Letter Arrangement Menu

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 Trim Knob 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 Trim Knob Key is turned. Press the Trim Knob 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 Trim Knob 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 pressing Trim Knob Key. After completion, the screen comes back to the earlier picture.

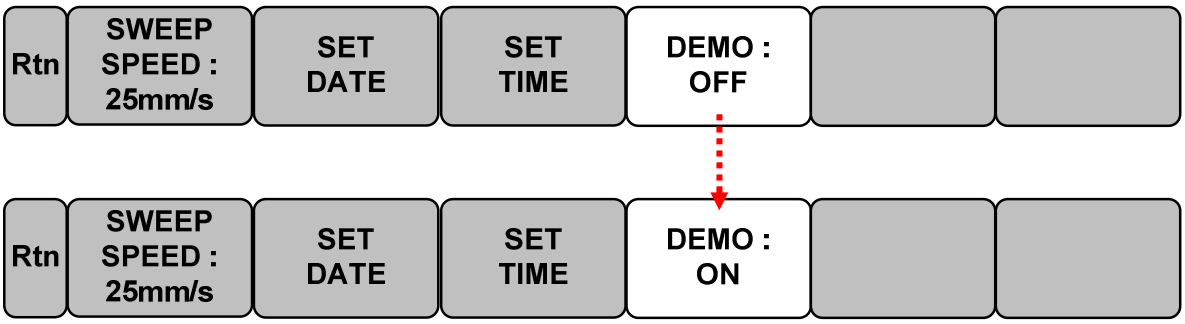
List selective menu

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

RET	Patient	T	Date	TIME	PR	NIBP(mmHg)	SpO2	Temp('C)
P2007201232		A	10-01	09:20:32	80(S)	150/90(115)	99	36.9
P2007081506		P	10-01	10:30:20	70(S)	132/71(92)	100	37.1
Unknown		A	10-01	10:45:35	80(S)	164/110(130)	99	37.2
Unknown		N	10-01	11:20:20	75(S)	124/74(91)	98	36.8
P2007081511		A	10-01	11:40:34	60(S)	128/80(94)	99	36.2

Operation Menu

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



2. PATIENT/DATA MANAGEMENT

2.1 Outline

2.2 Admit Type

2.3 Select Patient in Admit Information

2.4 Alarm Outline

2.5 Alarm Setup

2.6 Alarm Limit Setup

2.7 Alarm Print

2.8 Alarm Volume

2.9 Alarm Level

2.10 Nurse Call

2.11 Alarm Sound

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.

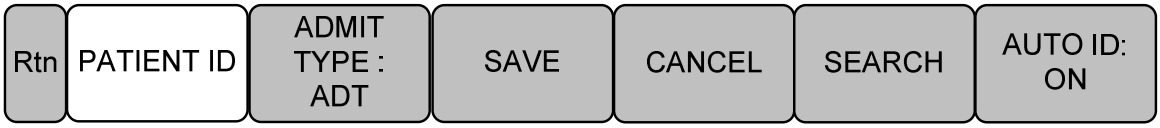
The screen initializes after once saved patient's record in Spot mode.

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

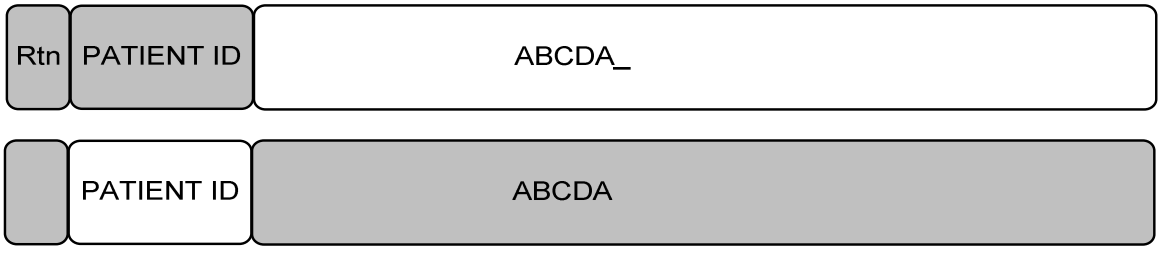
Without registration of patient, the patient's ID is "UNKNOWN" (When selected off in AUTO ID) or " 01 01 10 0000 " (DD/MM/YY 0000 ~ 4000 , When selected on in AUTO ID) and maintains previous numeric value in Type.

2.2 Admit Type

Select patient icon in Menu icon



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

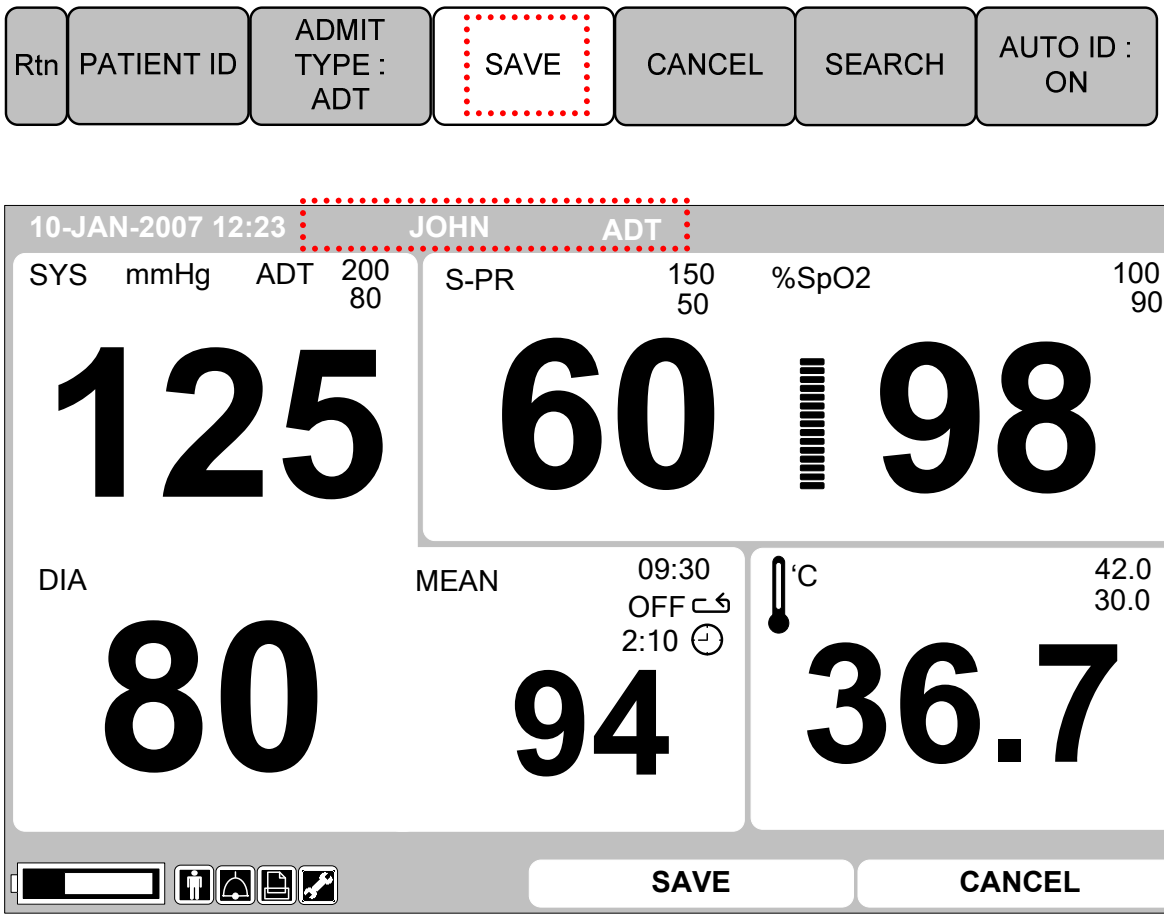


Select TYPE of menu in the menu window and register type of patient.

Select save menu and complete patient registration.

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

Select CANCEL button to cancel registration.



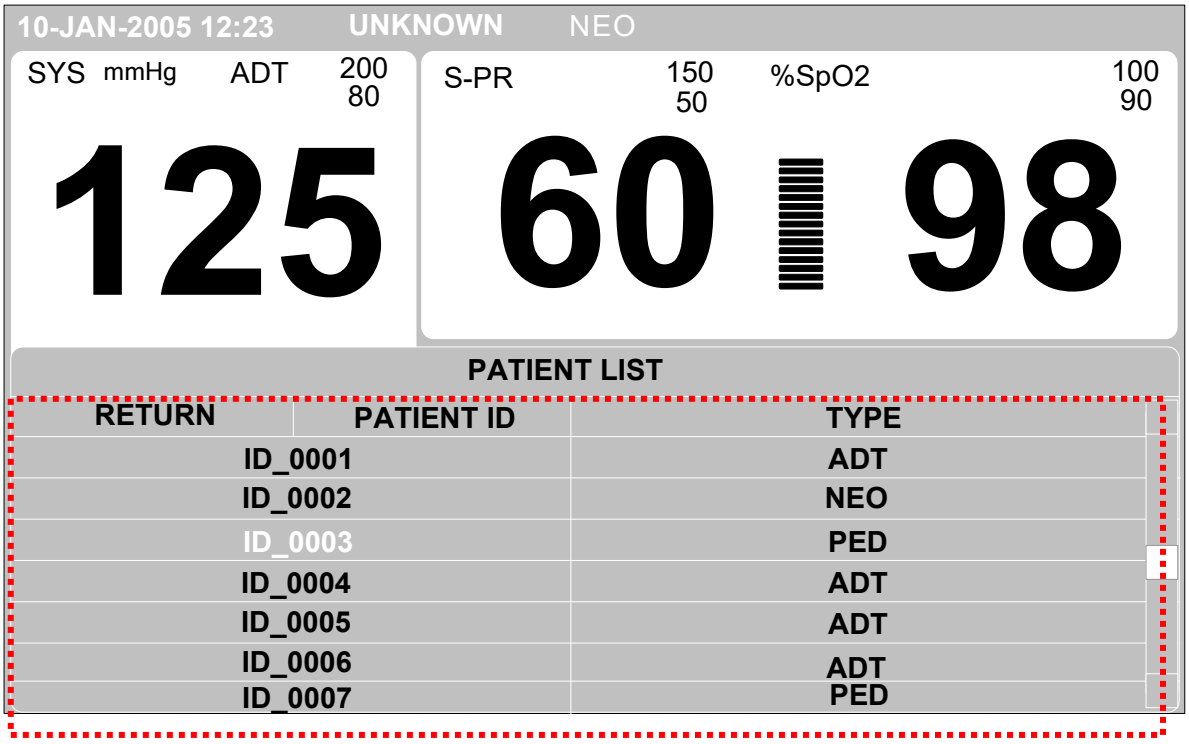
2.3 Select Patient in Admit Information

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 Trim Knob button then register.

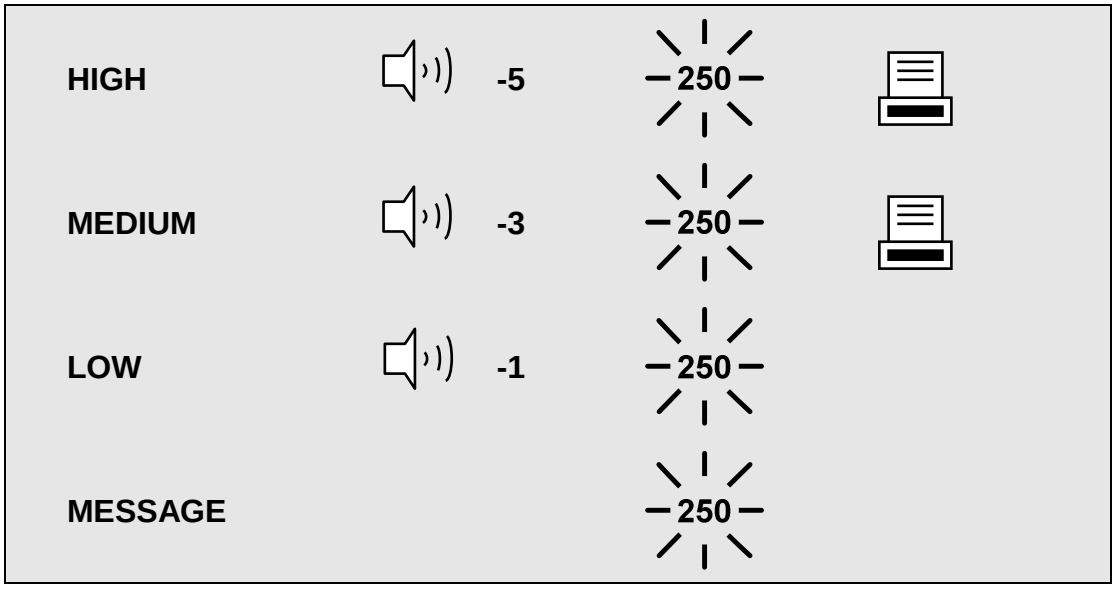
Select RETURN menu at the left top of the list to move to the top menu.

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

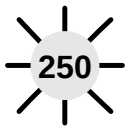
2.4 Alarm Outline

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

The patient's alarm sounds when the diagnostic functions (ASYSTOLE, VTAC/VFIB, and VTAC) are detected. Each alarm sound differs in order in order and volume according to the levels of HIGH, MEDIUM, LOW and MESSAGE.



Display alarm sound and the number of ringing sound



Text flashes

Alarm lamp flashes

Print Wave Pattern

Product Status Alarm

The machine gives alarm sounds for its system with a related message flashing.

2.5 Alarm Setup

Select alarm icon in menu icon.

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

ALARM PRINT：with an ON/OFF setup, the related information is printed out whenever an alarm is given.

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

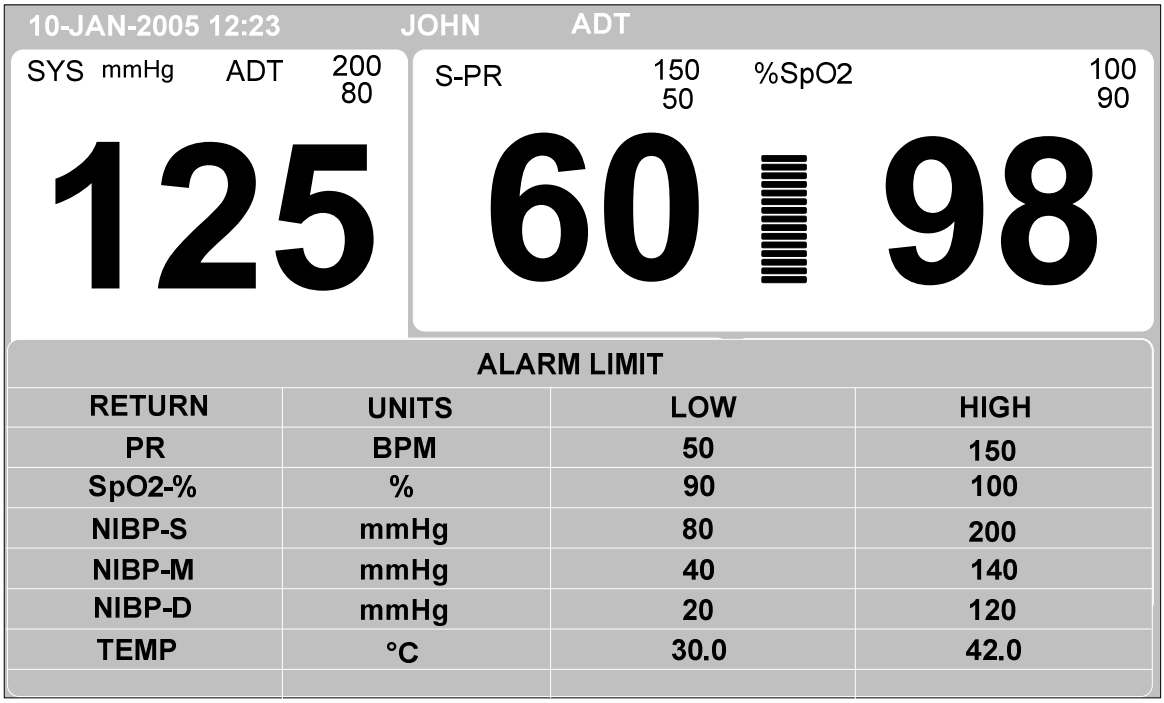
ALARM LEVEL：Priority of each parameter alarm can be set up.

NURSE CALL： Set the feature of the NURSE CALL.

ALARM SOUND ： Set the ON/OFF feature of the ALARM SOUND.

2.6 Alarm Limit

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



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	°C	30.0	42.0

2.7 Alarm Print

With an ON/OFF setup, the related information is printed out whenever an alarm is given.

Rtn	ALARM LIMIT	ALARM PRINT: ON	ALARM VOLUME: OFF	ALARM LEVEL	NURSE CALL	ALARM SOUND

2.8 Alarm Volume

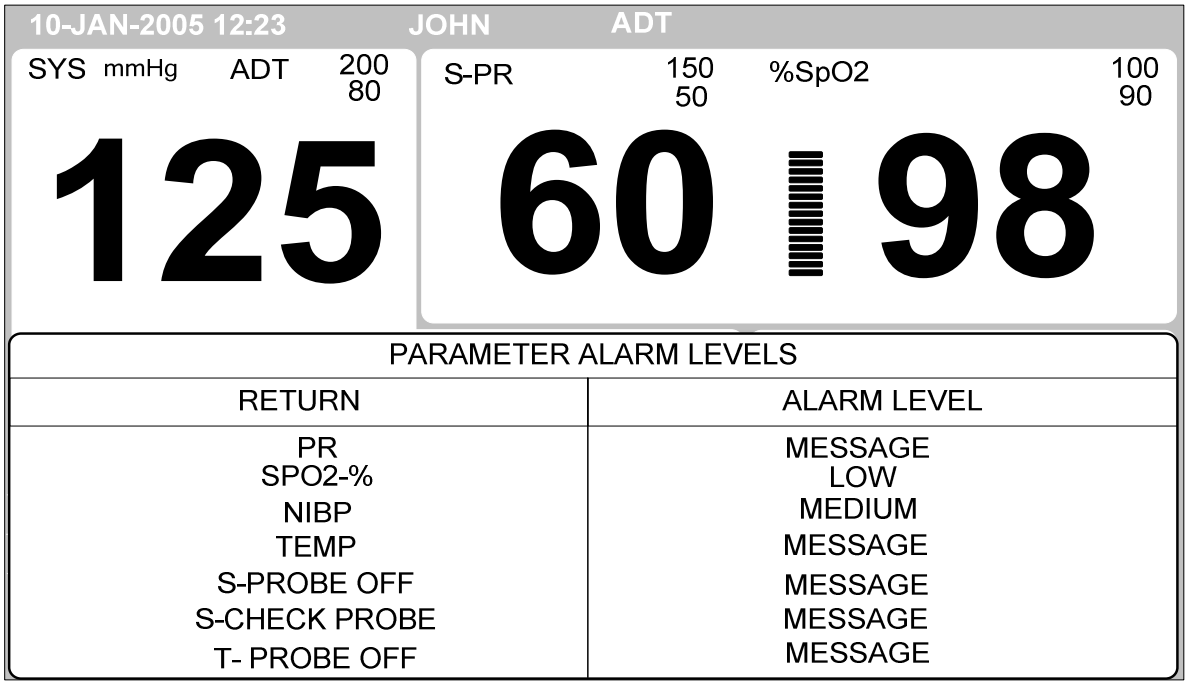
The volume of each alarm can be adjusted in 10 step.

Rtn	ALARM LIMIT	ALARM PRINT: ON	ALARM VOLUME: OFF	ALARM LEVEL	NURSE CALL	ALARM SOUND

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

2.9 Alarm Level

Priority of each parameter alarm can be set up.



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

2.10 Nurse Call

Set the feature of the NURSE CALL.

NURSE CALL SETUP	
RETURN	CONTENTS
NURSE CALL NORMAL MODE CALL MODE	OFF NORMAL OPEN ONE TIME

1. NURSE CALL : ON/OFF
   - The nurse call function is enable or disable.
2. NORMAL MODE
   - NORMAL OPEN : Select this option when the hospital's call system is set to NORMAL OPEN.
   - NORMAL CLOSE : Select this option when the hospital's call system is set to NORMAL CLOSE.
3. CALL MODE
   - ONE TIME : When ONE TIME is selected. a nurse call signal is a pulse signal lasting 3s. When multiple alarms occur simultaneously, only one pulse signal will be output..
   - CYCLING : When CYCLING is selected, the duration of a nurse call signal is the same with the alarm, namely, from the time that the alarm occurs to the time it disappears. On and off repeatedly at intervals of 1 second.
   - CONTINUE : When CONTINUE is selected, the duration of a nurse call signal is the same with the alarm, namely, from the time that the alarm occurs to the time it disappears. However, lasts only one minute, then stops.

2.11 Alarm Sound

Set the ON/OFF feature of the ALARM SOUND.

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

3. SAVE RECORD

3.1 Outline

3.2 Adjust to Record Save Mode

3.3 Measure with Monitor Mode

3.4 Measure with Manual Mode

3.5 Save

3.6 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 SAVE Mode

Select setup icon in icon menu.

When SAVE MODE menu selected in setup menu widow, whenever press Trim Knob Key mode switches to AUTO and MANUAL in turn.

3.3 Measure with Monitor Mode

Measure after setup mode to AUTO

It saves a measured data in 60 seconds.

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

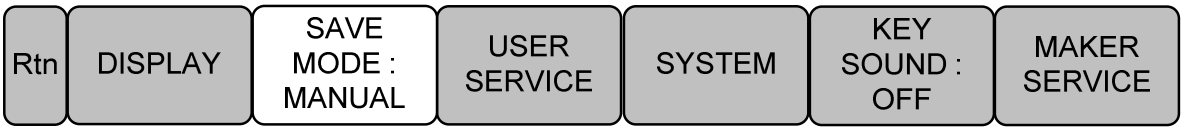
Not be able to delete measured Parameter data once save it in the machine completely Maintain ID and TYPE after complete saving.

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 MANUAL 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.

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.

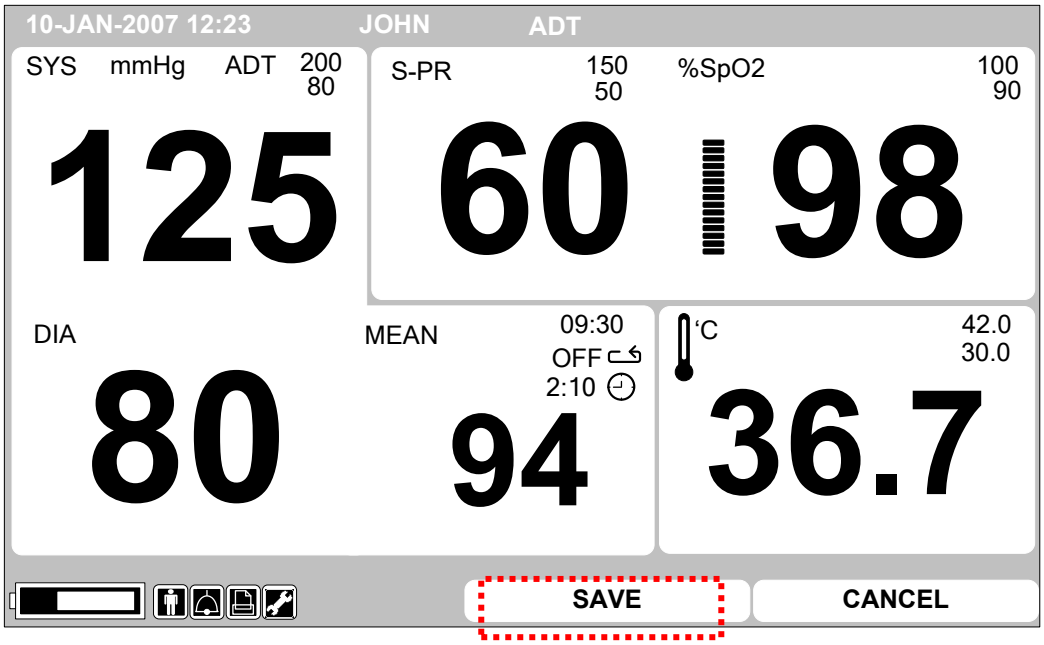
After saving, the patient ID initializes as UNKNOWN.

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 AUTO or MANUAL mode.

Select save button in the menu button.

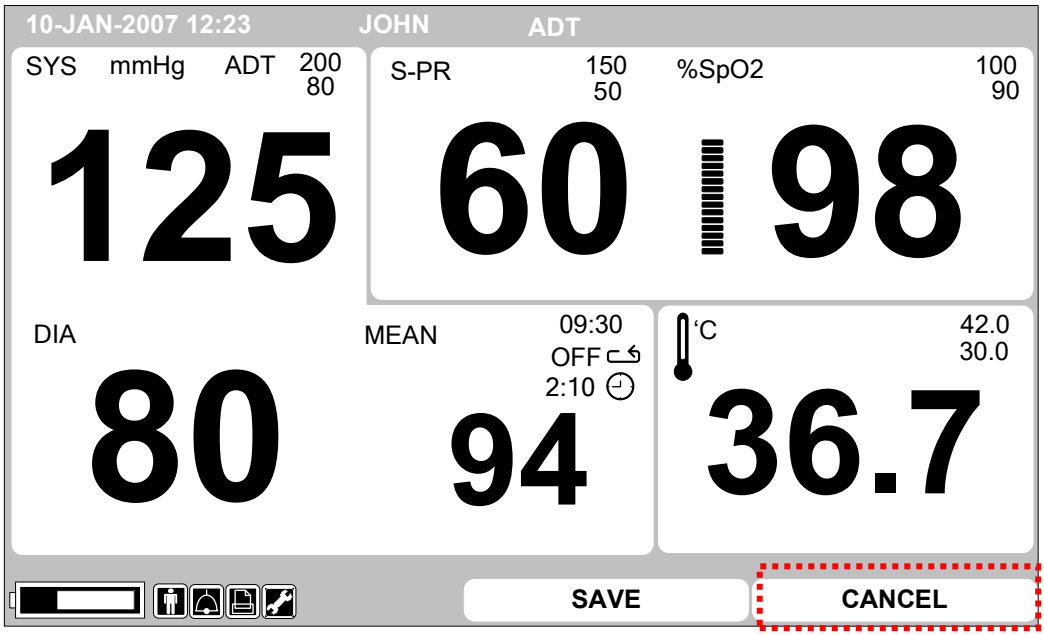


3.6 Exit from Saving Mode

It is used for exiting status of monitoring in monitor 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

4.2 Exit from Record List

4.3 View Specified Patients Record List

4.4 View All Patients Record List

4.5 Adjust Record

4.6 Delete a Record

4.7 Delete a Patients Record

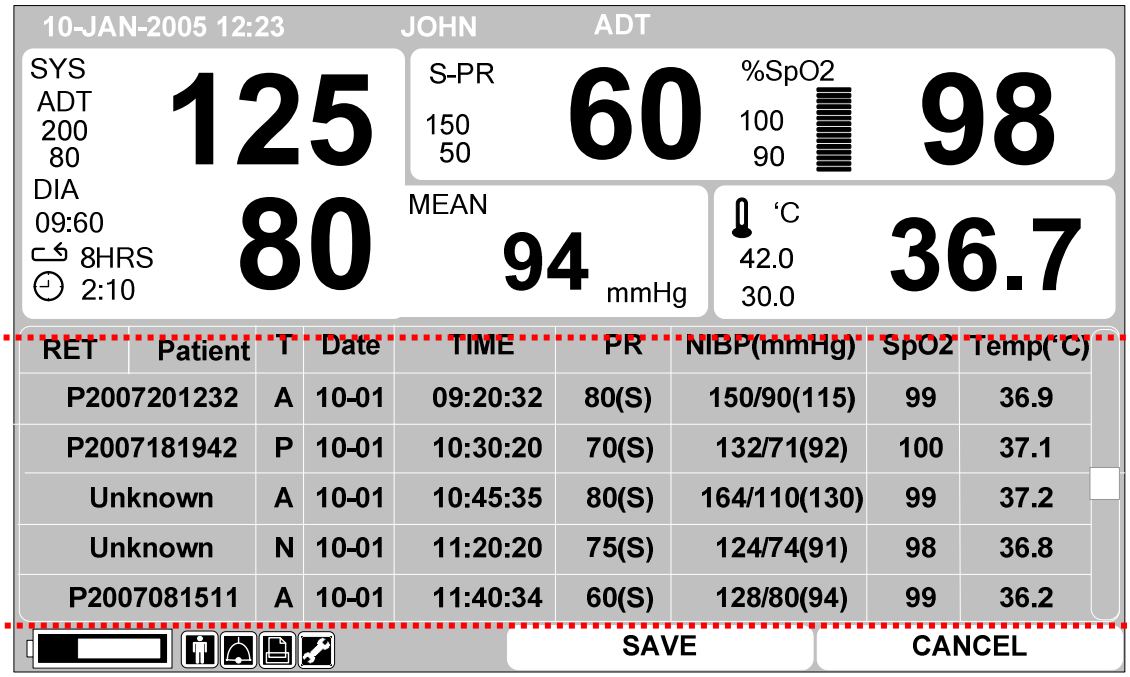
4.8 Delete All Patients Record

4.1 Record List View

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

Turn Trim Knob button in inside of the list then move to records.

Move to patient's record then press Trim Knob button to adjust or delete.

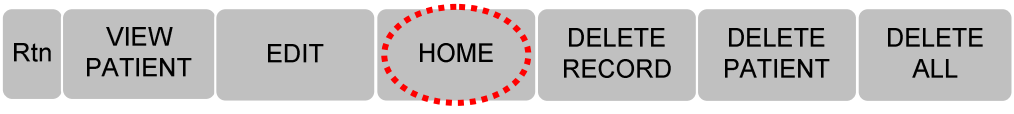


< Record List View >

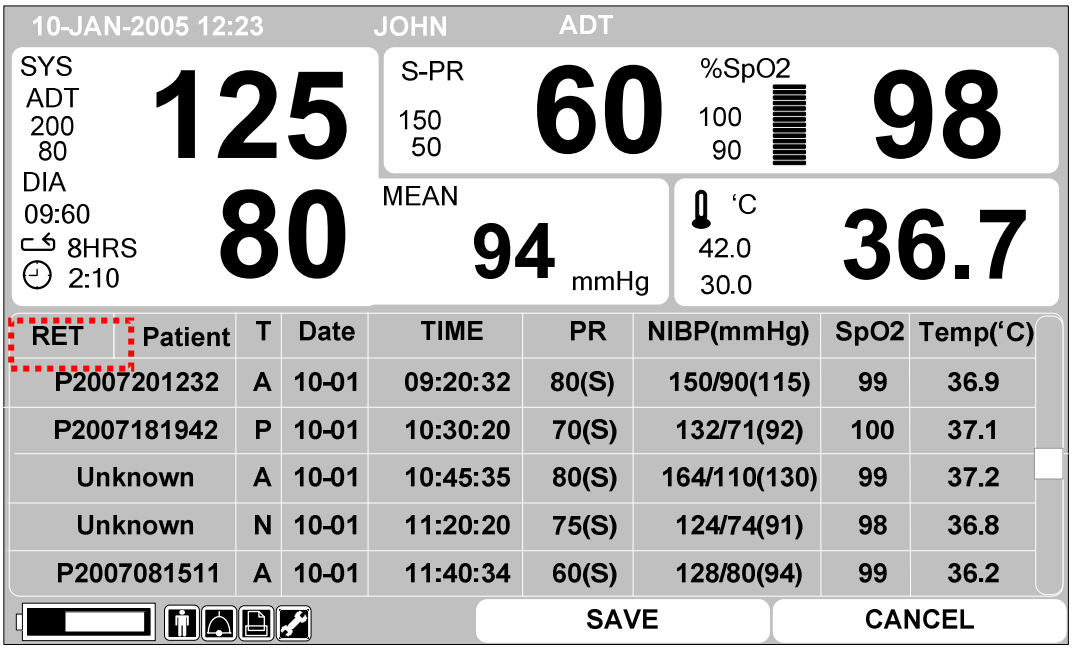
4.2 Exit from Record List

There are 4 ways to exit from Record List.

1. Press Home menu in the Menu.

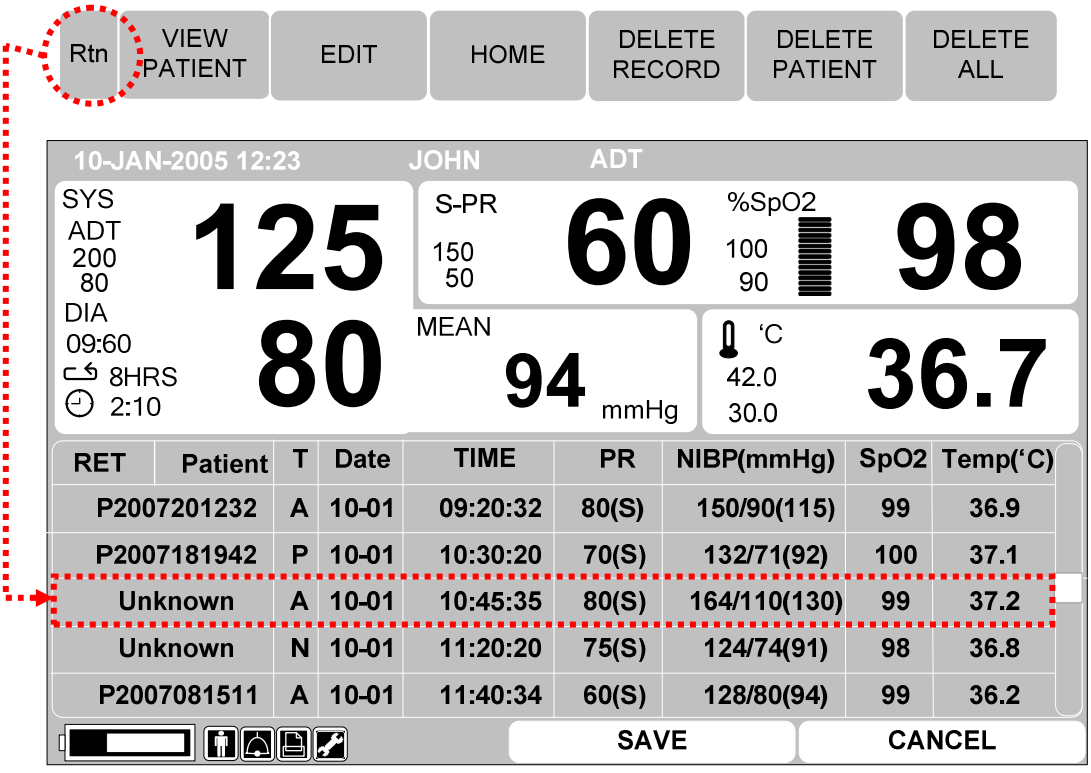


2. Press return menu at the top of the record list window.



3. Press Rtn in the Menu.

   Then it will return to Record List.



4. Exit Menu simply by pressing the Supplement Key.

4.3 View Specified Patients Record List

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

Move to a patient's record by turning Trim Knob button.

RET	Patient	T	Date	TIME	PR	NIBP(mmHg)	SpO2	Temp('C)
P2007201232		A	10-01	09:20:32	80(S)	150/90(115)	99	36.9
P2007081506		P	10-01	10:30:20	70(S)	132/71(92)	100	37.1
Unknown		A	10-01	10:45:35	80(S)	164/110(130)	99	37.2
Unknown		N	10-01	11:20:20	75(S)	124/74(91)	98	36.8
P2007081511		A	10-01	11:40:34	60(S)	128/80(94)	99	36.2

Press Trim Knob 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.

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

Select View All menu in Menu window.

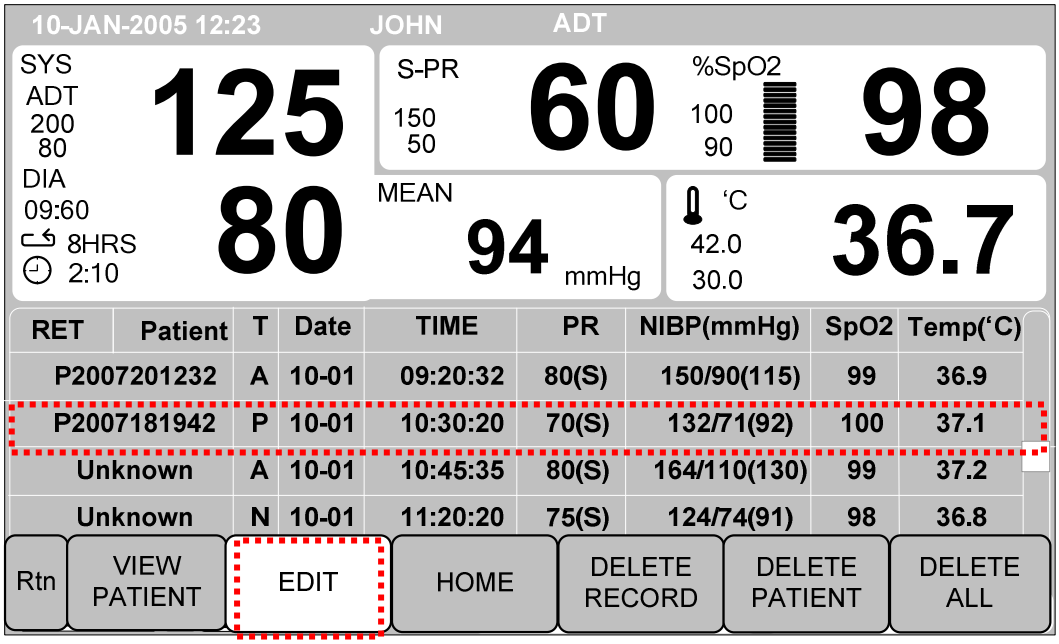
RET	Patient	T	Date	TIME	PR	NIBP(mmHg)	SpO2	Temp('C)
P2007201232		A	10-01	09:20:32	80(S)	150/90(115)	99	36.9
P2007081506		P	10-01	10:30:20	70(S)	132/71(92)	100	37.1
Unknown		A	10-01	10:45:35	80(S)	164/110(130)	99	37.2
Unknown		N	10-01	11:20:20	75(S)	124/74(91)	98	36.8
P2007081511		A	10-01	11:40:34	60(S)	128/80(94)	99	36.2

4.5 Adjust Record

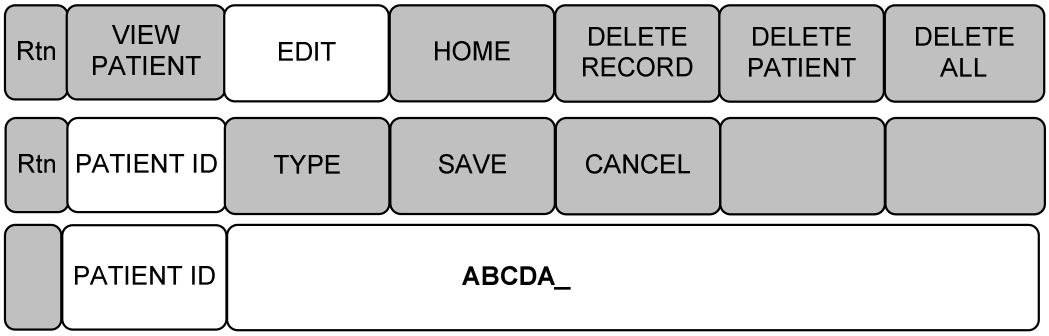
Move to Record List to adjust the record.

Move to the Record where you want to adjust by turning Trim Knob Key.

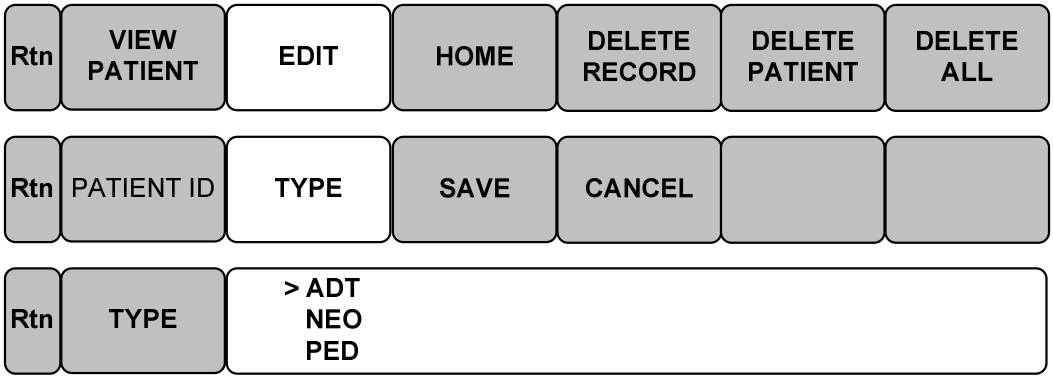
Select Edit menu in the list. It is able to adjust the patient's ID and type.



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

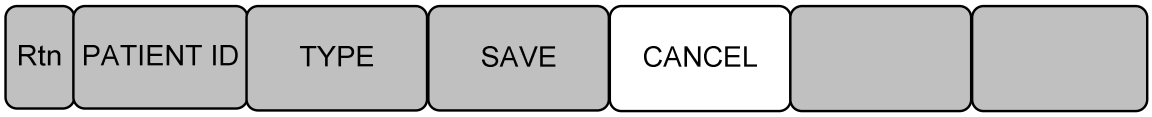


2)Adjust patient's type. Select Type menu and Adjust



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

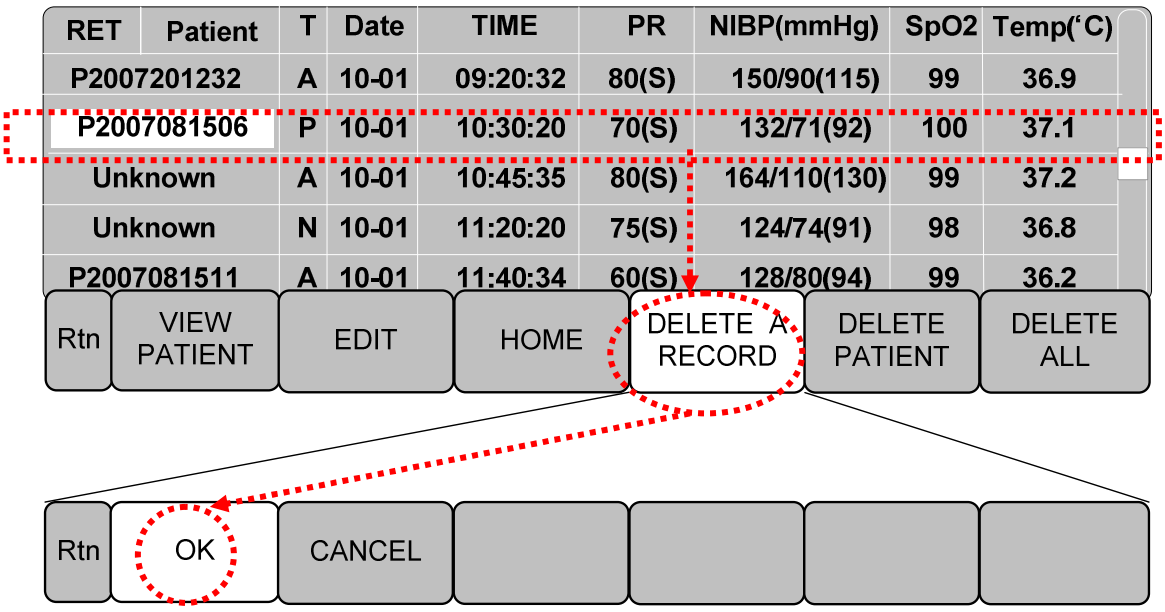


4.6 Delete a Record

Move to the Record List.

Move to the Record where you want to adjust by turning Trim Knob Key.

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



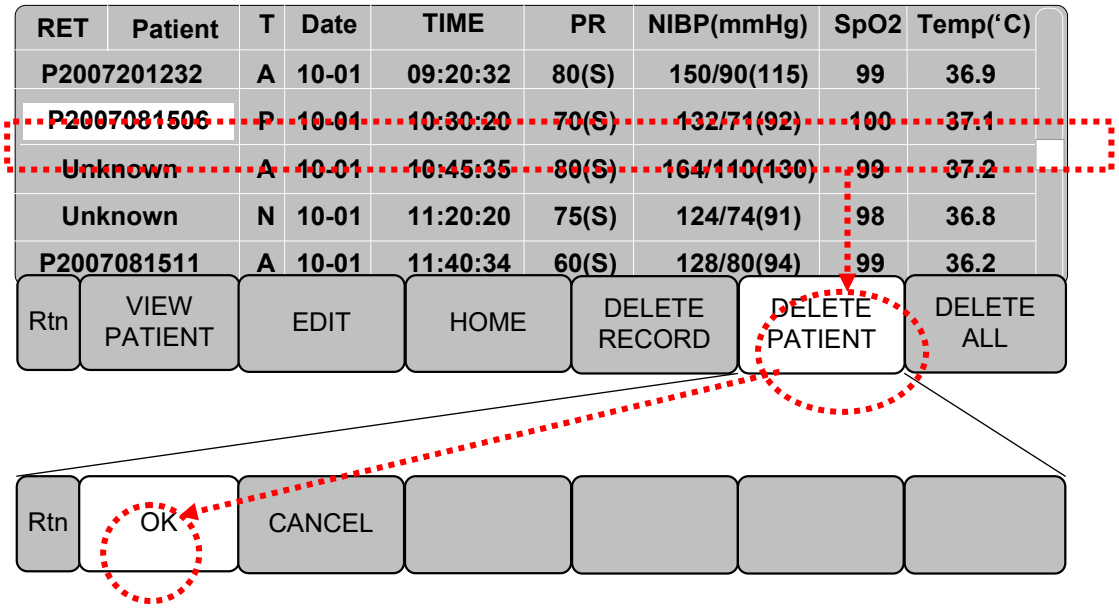
4.7 Delete a Patients Record

Move to record list in order to delete the record.

Move to the Record where you want to adjust by turning Trim Knob Key.

Press Trim Knob 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.

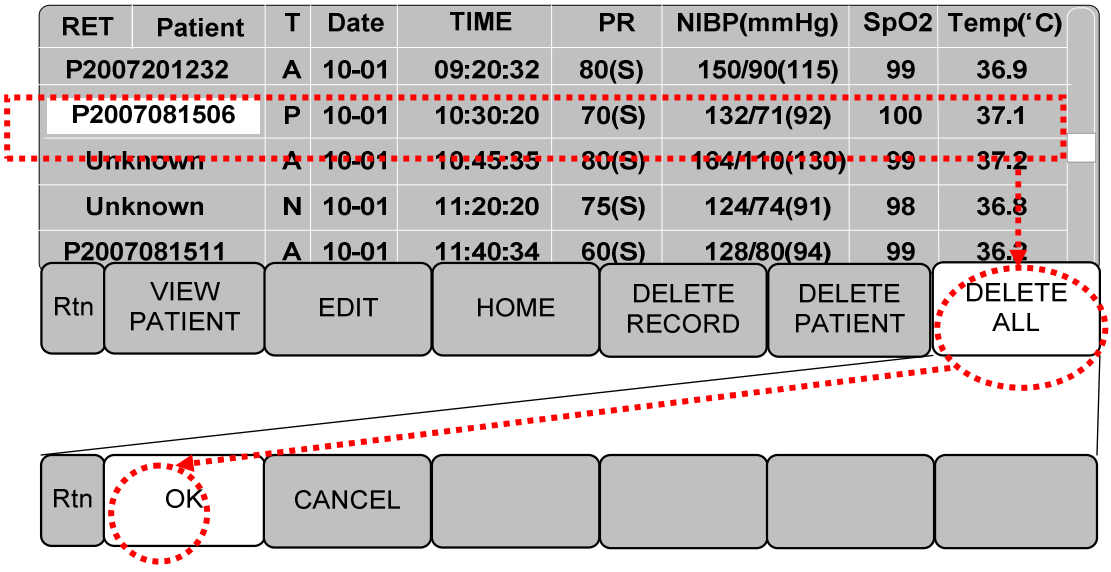


4.8 Delete All Patients Record

Enter the record list to delete all the record.

Select Trim Knob 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

5.2 DISPLAY

5.3 SAVE MODE

5.4 USER SERVICE

5.5 SYSTEM

5.6 KEY SOUND

5.7 MAKER SERVICE

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 (AUTO , MANUAL)

USER SERVICE: To setup information of equipment

SYSTEM: To set up connection to external computer

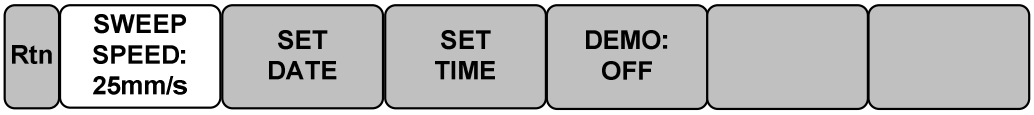
KEY SOUND: Set up ON/OFF of Key sound.

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

5.2. DISPLAY

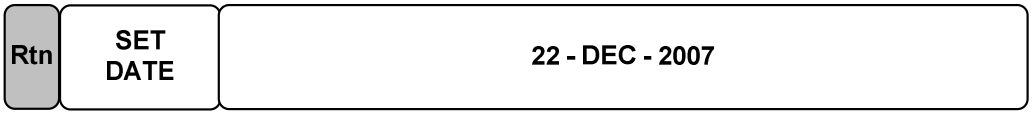
1. SWEEP SPEED

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



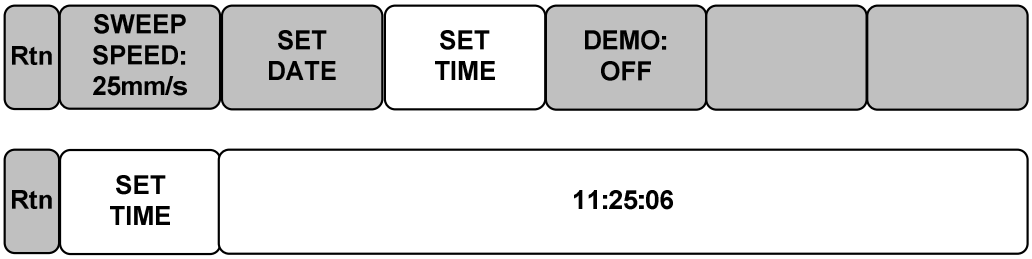
2. SET DATE

   Setup and adjust the date.



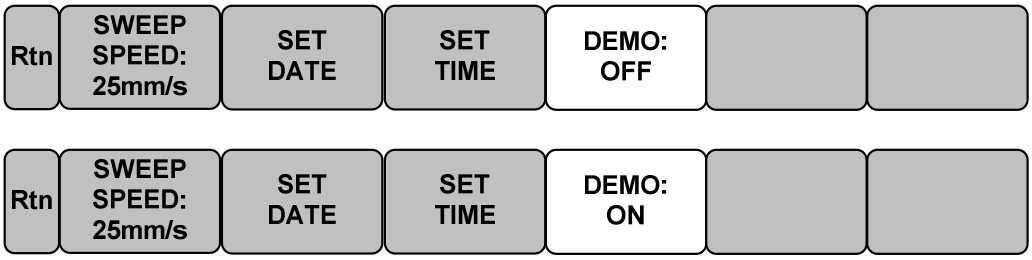
3. SET TIME

Setup and adjust the time.



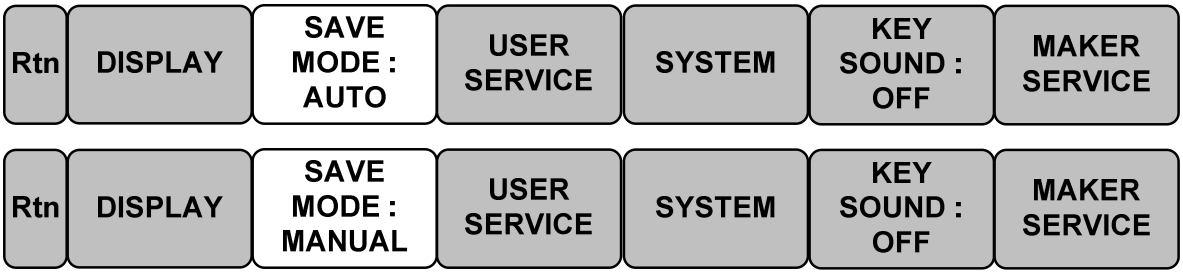
4. DEMO

Setup the movement to demo/action mode.



5.3 SAVE MODE

Set up menu for record saving mode.



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

MANUAL mode is initializing ID whenever saving is activated.

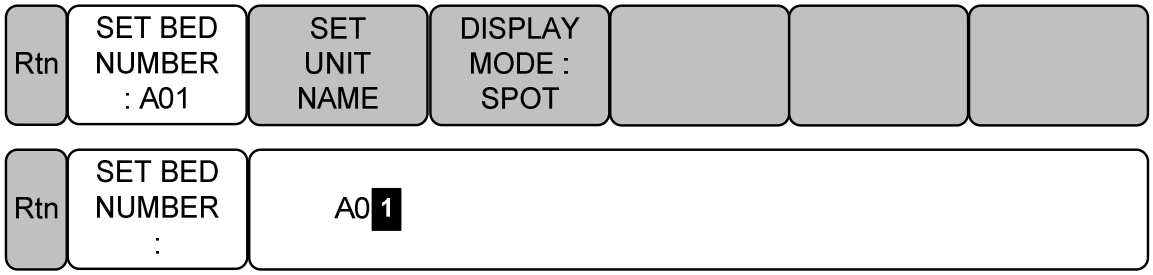
5.4 USER SERVICE

Setup for information of the equipment

1. BED NUMBER

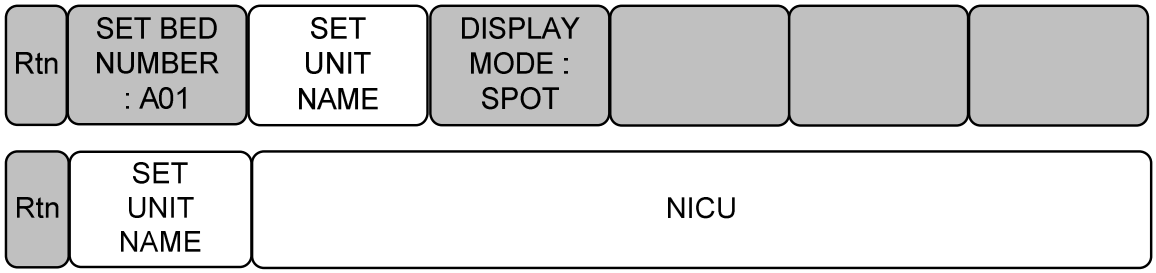
Setup the number for the bed which connected to the equipment.

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



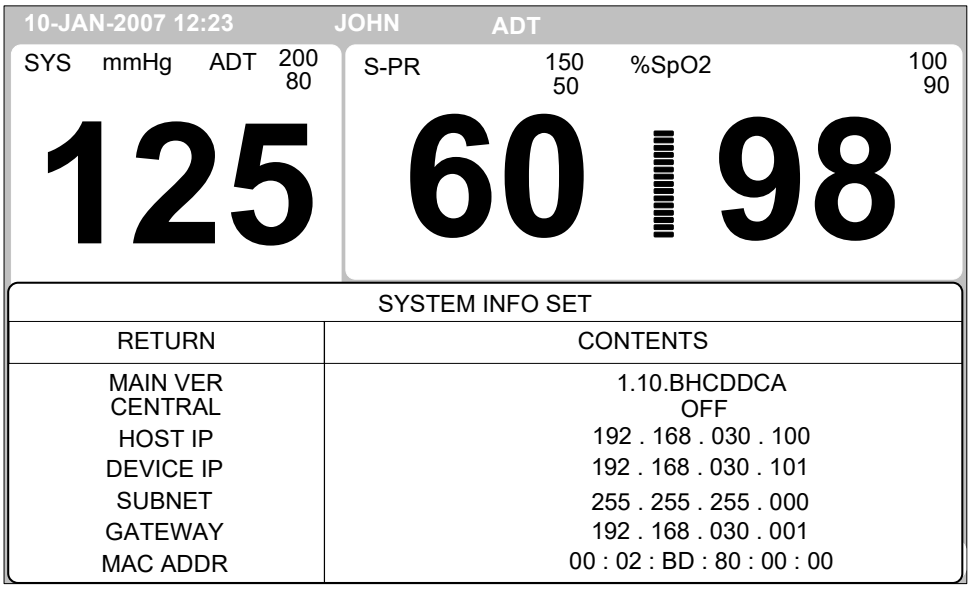
2. UNIT NAME

Set up UNIT name for connected hospital with equipment.



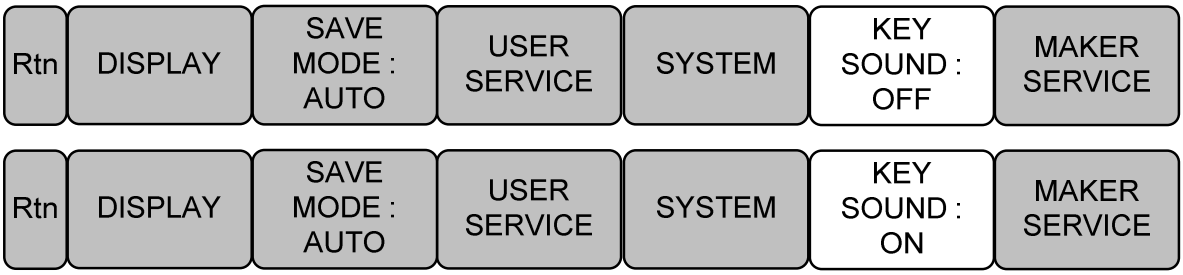
5.5 SYSTEM

Setup for connect to outside computer.



5.6 KEY SOUND

Setup ON/OFF of key sound.



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 Setup

ALARM LIMIT

CUFF SIZE

NIBP STAT

INFLASTION SET

UNIT SELECT

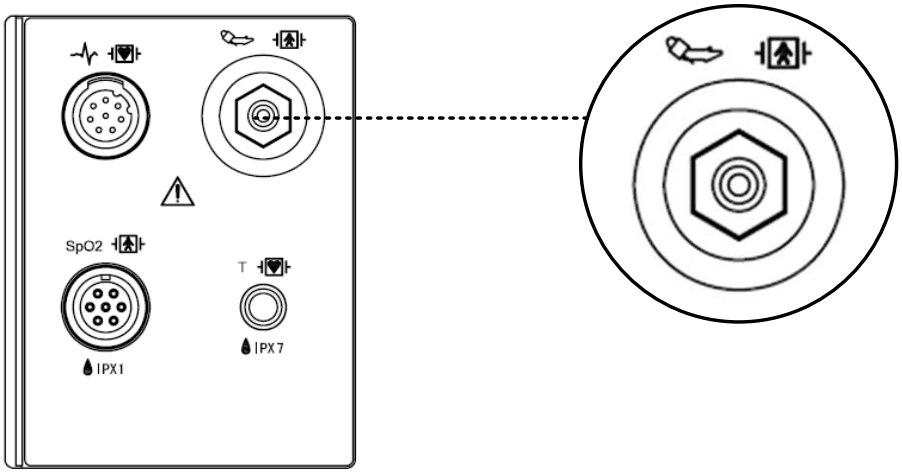
INTERVAL

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

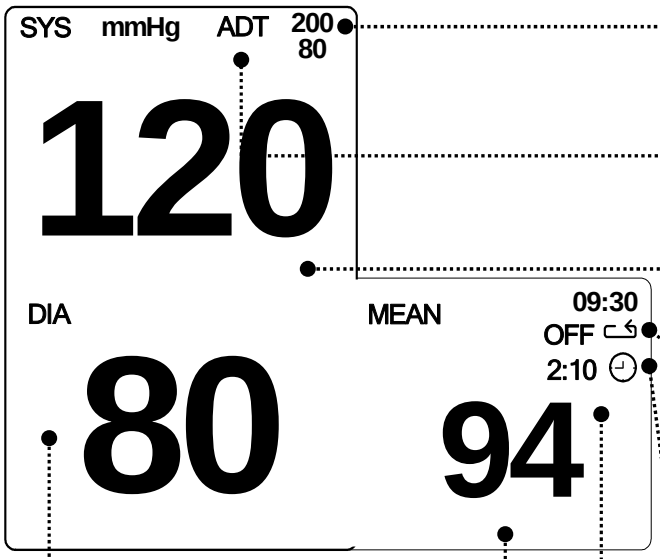


ADULT NIBP CUFF

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.

6.2 NIBP Data Window

Measurement group Type: display type of measurement group



alarm limit numeric value：display alarm setting range of blood pressure.

Cuff Type：Indicates Cuff size(Adult).

systolic： the maximum blood pressure

Measurement time Indicates the completion time of measuring

Interval Time: Indicates Interval time when measures the blood pressure periodically

Next measure predicts time: Display remaining time till the next measurement.

diastolic： Display the lowest numeric value of blood pressure

mean blood pressure： average blood pressure

6.3 NIBP Setup

ALARM LIMIT：A menu to setup alarm range

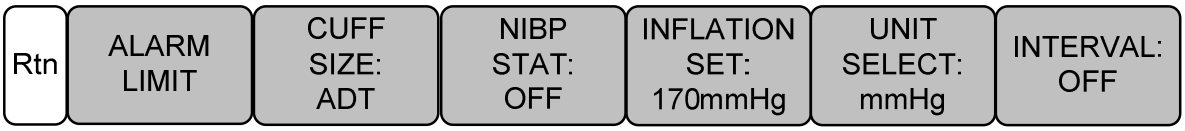
CUFF SIZE： A menu to select Cuff size

STAT : Start 5 minutes of continuous, sequential NIBP measurements.

INFLATION: A menu to setup INFLATION

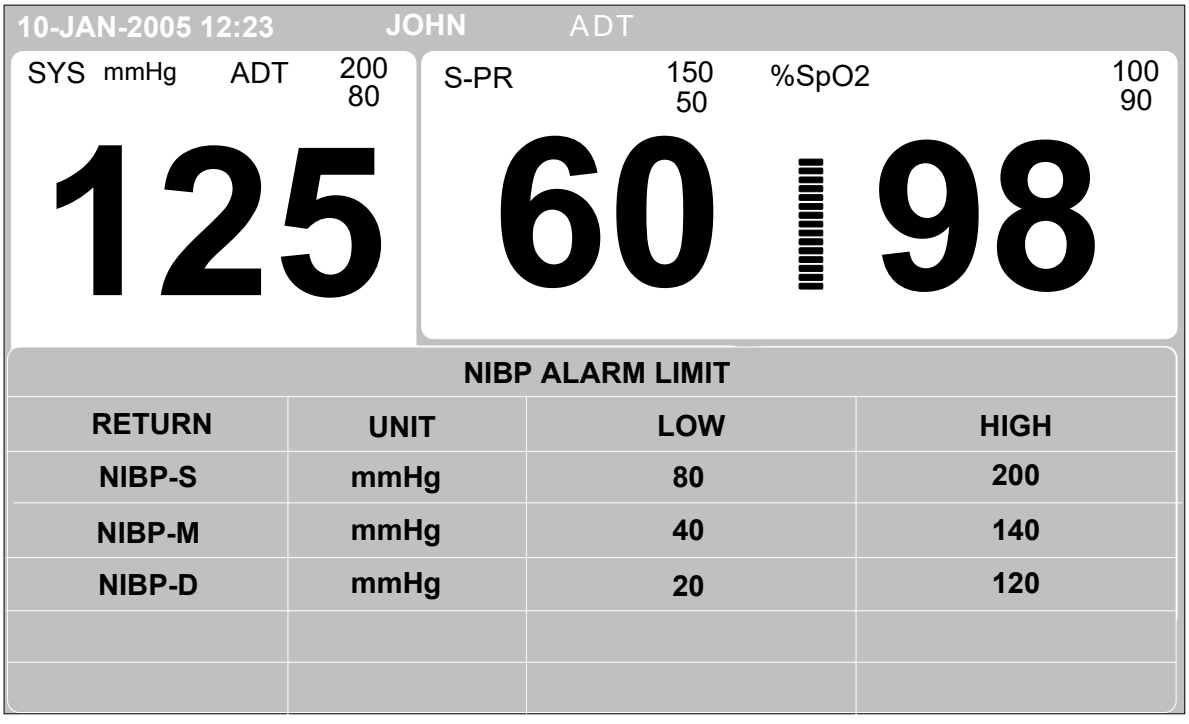
UNIT: A menu to setup blood pressure unit

INTERVAL ：A menu to setup interval for blood pressure measurement



ALARM LIMIT

Numeric value of Systolic, Diastolic, and mean pressure is 10 ~ 350mmHg.



NIBP ALARM LIMIT

RETURN	UNIT	LOW	HIGH
NIBP-S	mmHg	80	200
NIBP-M	mmHg	40	140
NIBP-D	mmHg	20	120

CUFF SIZE

It is able to choose adult, baby, and children's cuff.

Rtn	ALARM LIMIT	CUFF SIZE: ADT	NIBP STAT: OFF	INFLATION SET: 170mmHg	UNIT SELECT: mmHg	INTERVAL: OFF

Rtn	CUFF SIZE: ADT	> ADT PED NEO

NIBP STAT

Start 5 minutes of continuous, sequential NIBP measurements.

Rtn	ALARM LIMIT	CUFF SIZE: ADT	NIBP STAT: OFF	INFLATION SET: 170mmHg	UNIT SELECT: mmHg	INTERVAL: OFF

INFLATION SET

The function for setup of pressure at the beginning

Set numeric value is 80, 100, 120, 140, 160, 180, 200, 220, and 240.

Rtn	ALARM LIMIT	CUFF SIZE: ADT	NIBP STAT: OFF	INFLATION SET: 170mmHg	UNIT SELECT: mmHg	INTERVAL: OFF

Rtn	ALARM LIMIT	CUFF SIZE: ADT	NIBP STAT: OFF	INFLATION SET: **170mmHg**	UNIT SELECT: mmHg	INTERVAL: OFF

UNIT SELECT

The function is to setup blood pressure measurement display unit.

Set unit is mmHg, kPa

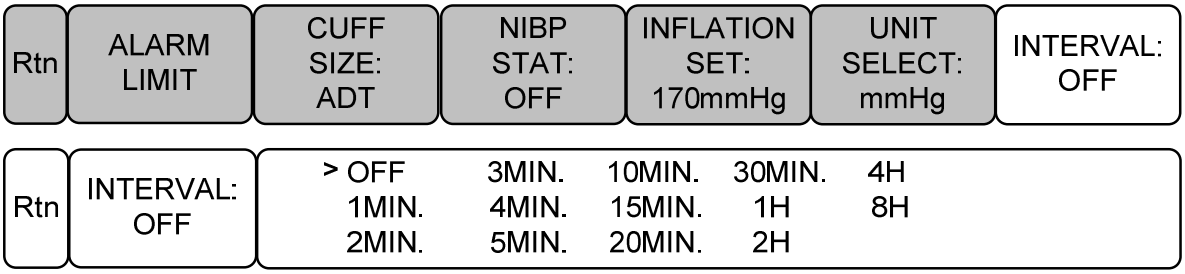
Rtn	ALARM LIMIT	CUFF SIZE: ADT	NIBP STAT: OFF	INFLATION SET: 170mmHg	UNIT SELECT: mmHg	INTERVAL: OFF

Rtn	ALARM LIMIT	CUFF SIZE: ADT	NIBP STAT: OFF	INFLATION: 170mmHg	UNIT SELECT: kPa	INTERVAL: OFF

INTERVAL

The function is to setup the interval to measure blood pressure automatically

Set numeric value is1min, 2, 3, 4, 5, 10, 15, 20, 30, 1hour, 2, 4, and 8.



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.

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.
PULSE TOO 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
  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 Setup

ALARM LIMIT

SWEEP SPEED

RATE VOLUME

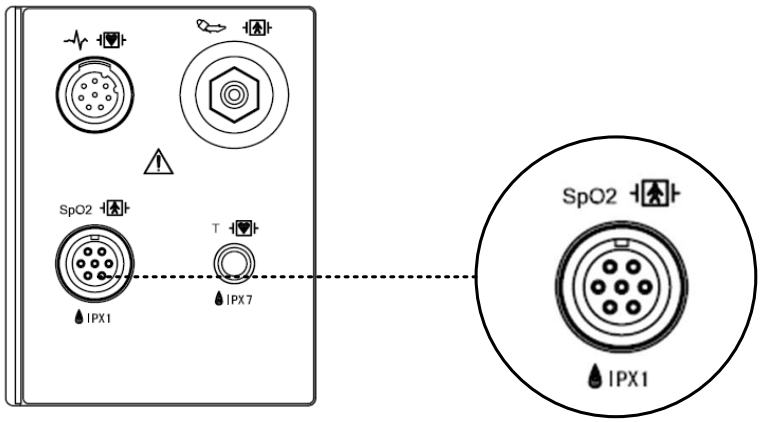
ALARM LEVEL

7.1 Outline

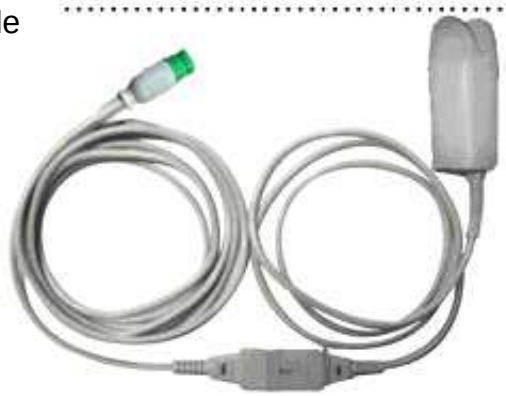
SPO2 monitoring is a noninvasive technique used to measure the amount of oxygenated hemoglobin and pulse rate by measuring the absorption of selected wavelengths of light. The light generated in the probe passes through the tissue and is converted into an electrical signal by the photodetector in the 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

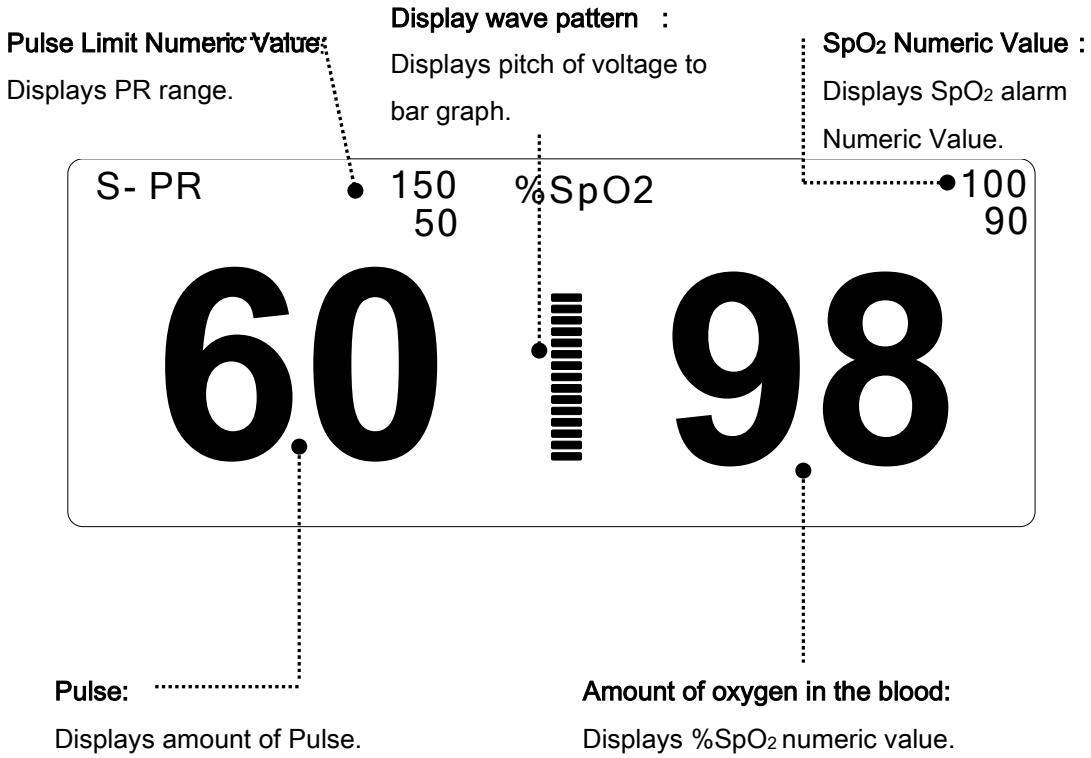


SpO_2 Measuring Cable



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 Setup

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.

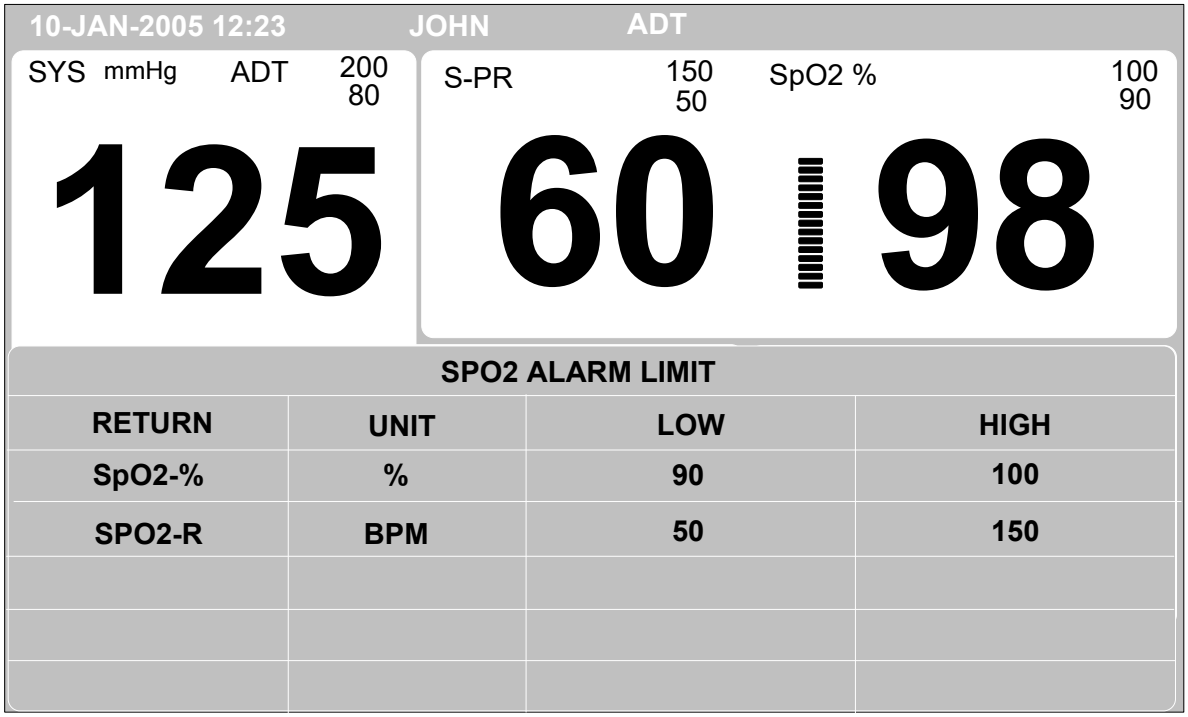
ALARM LEVEL： A menu to set SpO2 ALARM LEVEL.

Rtn	ALARM LIMIT	SWEEP SPEED: 6.25mm/s	RATE VOLUME: OFF	ALARM LEVEL		

ALARM LIMIT

ALAMRM Numeric Value of %SpO_2 is 40 ~ 100.

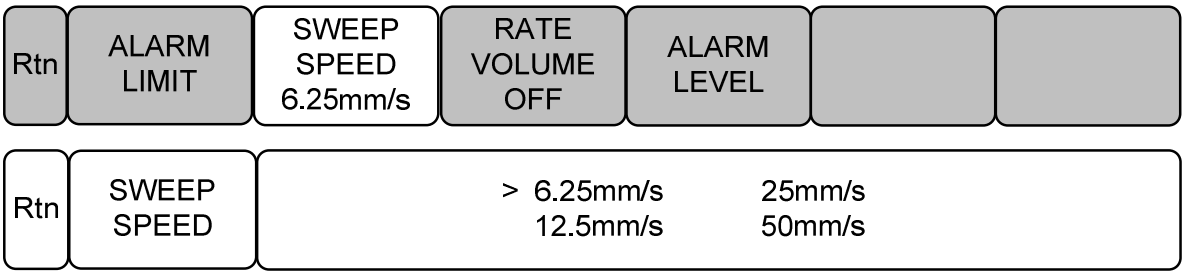
Pulse numeric Value of SpO_2 is 20 ~ 300BPM.



SWEEP SPEED

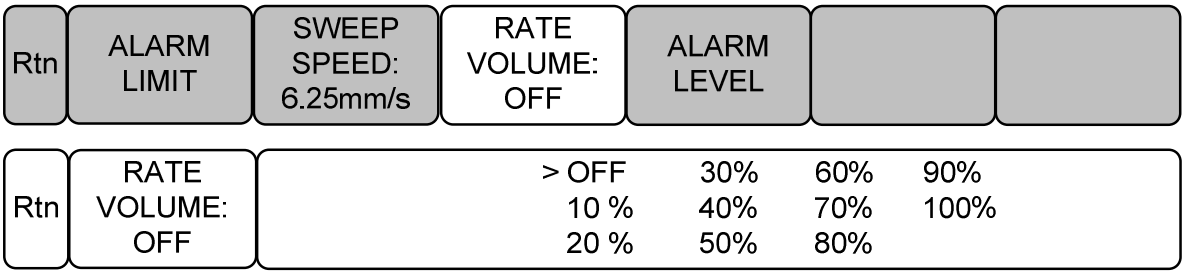
Adjust WAVE DISPLAY speed setup as below.

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



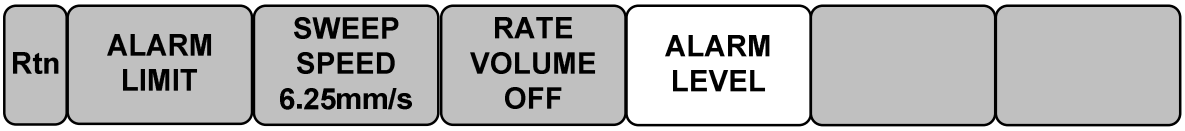
RATE VOLUME

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



ALARM LEVEL

Set the order of priority in each alarm.



PARAMETER ALARM LEVELS	
RETURN	ALARM LEVEL
PR	MEDIUM
SPO2-%	LOW
PROBE OFF	MESSAGE
CHECK PROBE	MESSAGE
LOST PULSE	LOW
POOR SIGNAL	LOW
ARTIFACT	LOW

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" 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 Setup

ALARM LIMIT

UNIT SELECT

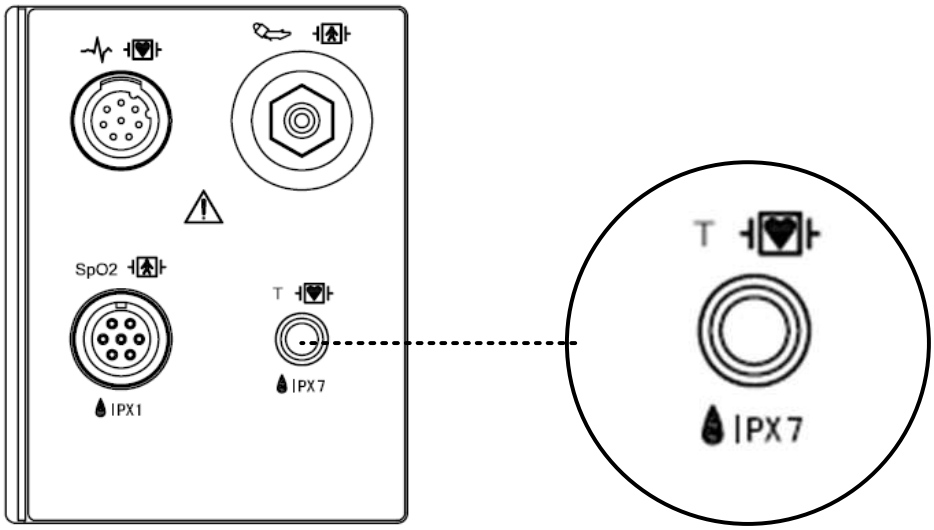
PROBE SITE

8.1 Outline

Adjust electric signal procedure in change of resistance ingredient followed by temperature change then it shows numeric value through signal procedure.

Temperature Connector and Measuring Cable

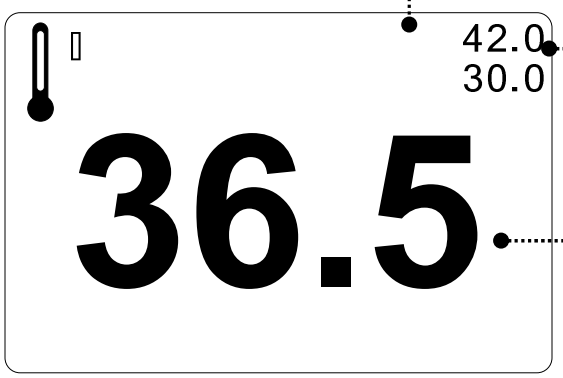
Temperature Connector



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



Temperature Unit: Displays Temperature Unit.

Alarm limit on the least low temperature :
Indicates temperature limits

Temperature numeric value:
Displays temperature numeric value..

Note
For an accuracy measurement for human body, it takes 3 minute interval to measure.

8.3 Temperature Setup

ALARM LIMIT： Sets up temperature limit.

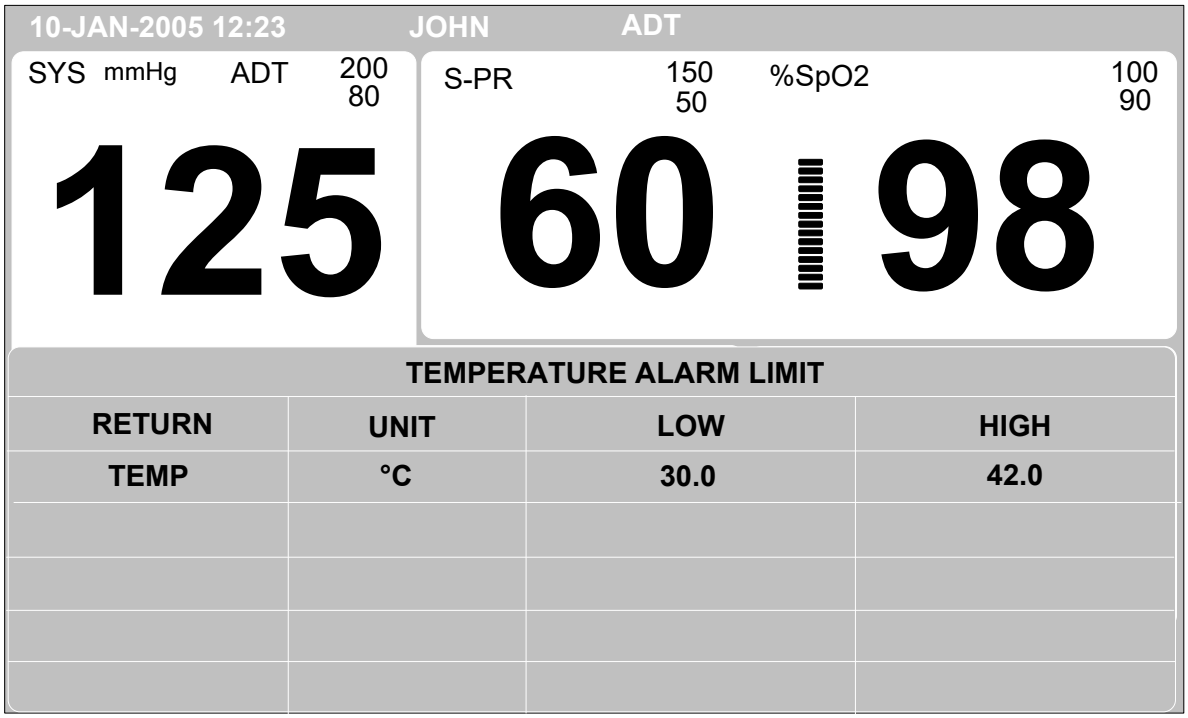
UNIT: Sets up temperature measurement unit.

PROBE SITE: Displays temperature measurement region.

Rtn	ALARM LIMIT		PROBE SITE: ORAL	UNIT SELECT: °C		

ALARM LIMIT

Numeric value is 0□ ~ 50.0□.



UNIT SELECT

It is able to select °C and °F unit.

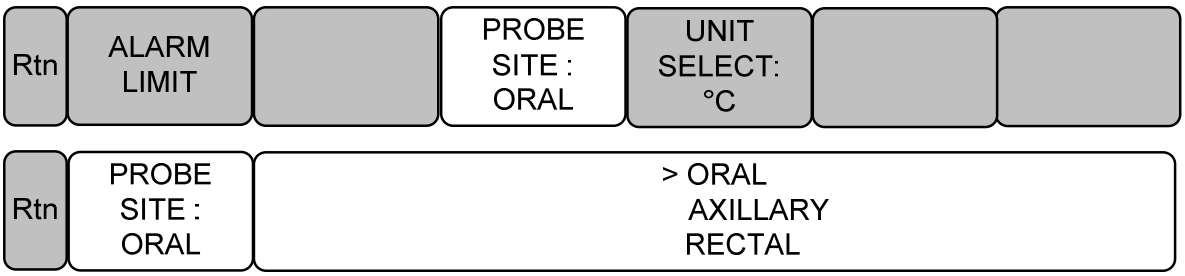
Rtn	ALARM LIMIT		PROBE SITE : ORAL	UNIT SELECT: °C		

Rtn	ALARM LIMIT		PROBE SITE : ORAL	UNIT SELECT: °F		

PROBE SITE (Measurement Position)

Set up to display temperature measurement region.

Measurement regions are ORAL, AUXILLARY, and RECTAL.



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.

- LEAD FAULT: Probe is not properly connected. Check the probe.

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

Warning

To measure the peripheral temperature, attach the probe to the ankle or palm.

If the patient sweats heavily or moves violently, fasten the pad with surgical tape.

NOTE

When the measuring site is exposed directly to air, the temperature may be lower than normal.

It take about 20 to 30 minutes to reach the equilibrium temperature after attaching the sensor.

9. PRINT

9.1 Print

Print and Heat Sensitivity Paper

Function and Setup Menu

9.2 Paper Change

9.1 Print

Print and Heat Sensitivity Paper

A printer used to print data onto thermal paper, this product is offered as an option,

Size of the thermal paper roll: width 58mm x diameter 38 mm papers can be used.

Any thermal paper of same size can be used for the printer.

Side view of printer

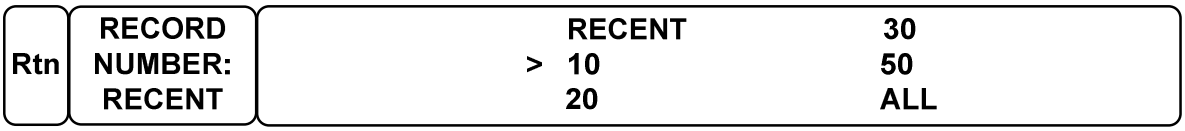
Function and Setup Menu

1. Able to ON/OFF the PRINT Key in constant printing.

2. Able to Set up the print speed to 25, 50 mm/s.

3. RECORD NUMBER

Able to setup print from top RECORD to RECORD NUMBER numeric value in current list while activate PRINT in RECORD LIST window.



4. WAVE TIME

When printing in WAVEFORM VIEW

Able to setup print from current time till WAVE TIME while activate PRINT in the WAVEFORM VIEW.

Rtn	PRINT SPEED: 25mm/S	RECORD NUMBER: RECENT	WAVE TIME: 20			

Rtn	PRINT SPEED: 25mm/S	RECORD NUMBER: RECENT	WAVE TIME: CONTINUE			

5. Set up ALARM PRINT in additional menu, and then print automatically when alarm occurs.

Rtn	ALARM LIMIT	ALARM PRINT: OFF	ALARM VOLUME: 50%	ALARM LEVEL	NURSE CALL: OFF	ALARM SOUND

Rtn	ALARM LIMIT	ALARM PRINT: ON	ALARM VOLUME: 50%	ALARM LEVEL	NURSE CALL: OFF	ALARM SOUND

If there is no print sheet, no paper icon of  appears.

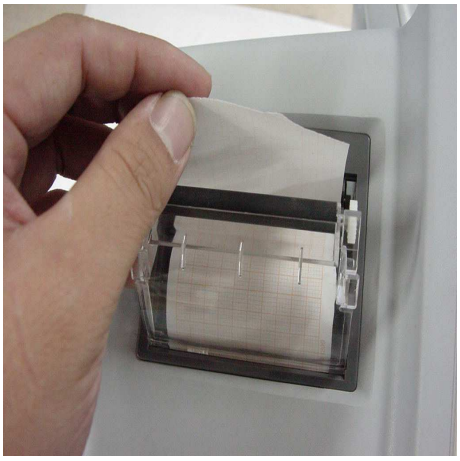
9.2 Paper Change

1

Open the window of the printer.

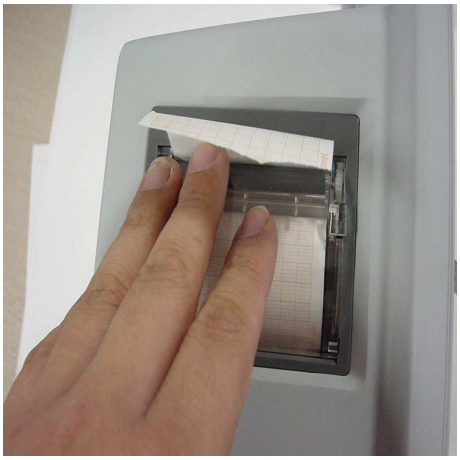
2

Insert the paper roll offered with the product into the printing unit. Place the roll in a proper way so that the printed paper can roll out upwards.



3

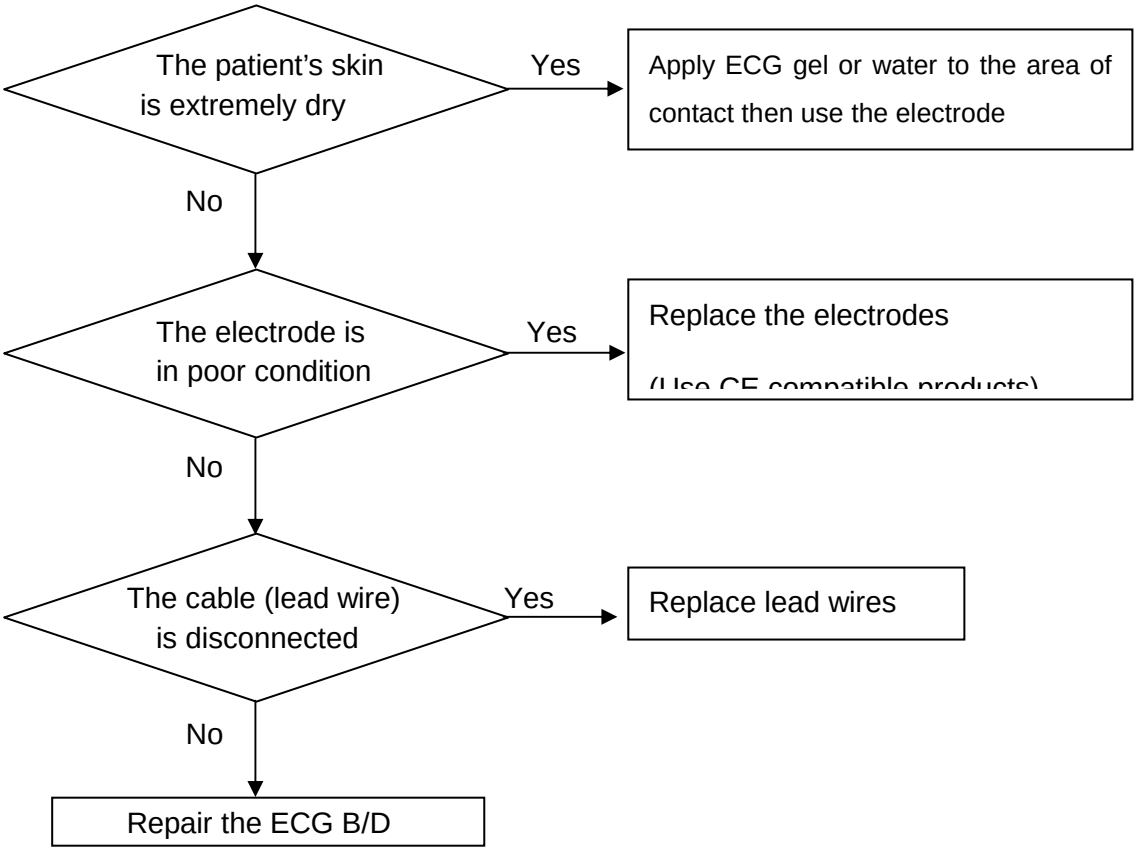
Press the printer window until it is properly shut. Inaccurate shutting may cause failure in printing.



10. TROUBLE SHOOTING

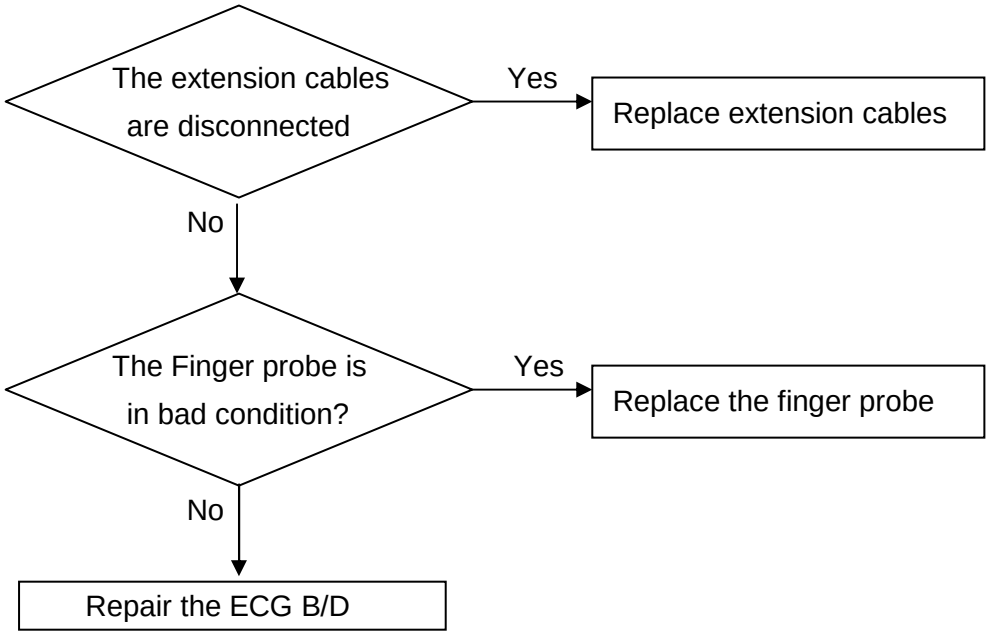
1. Noise in ECG

- Gel is dry
- Electrodes does not stick well to skin

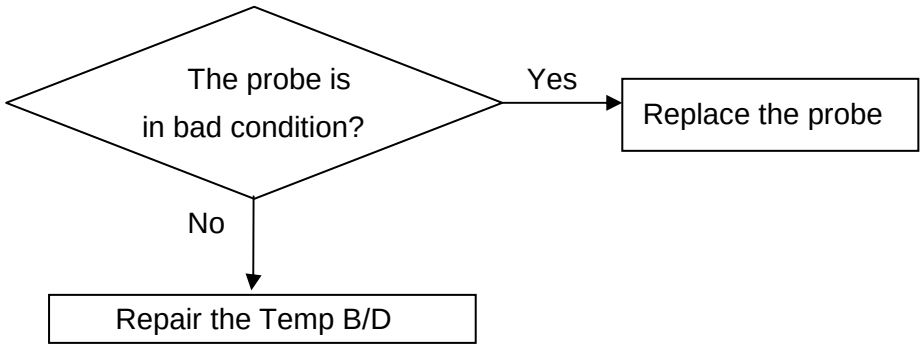


2. SpO_2 malfunction

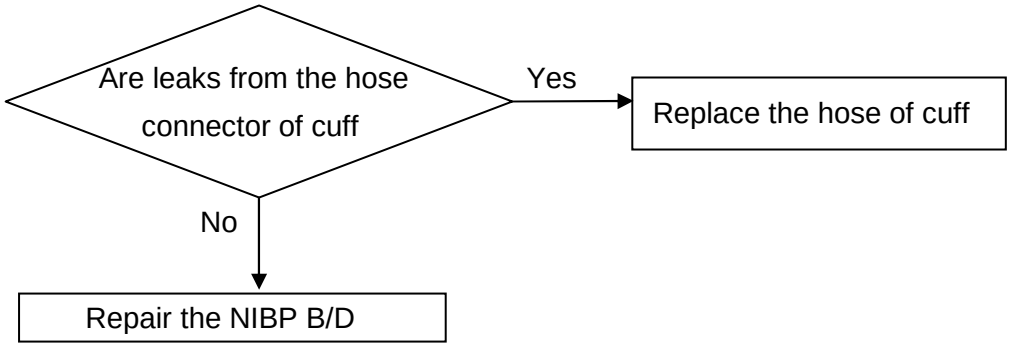
Connectors of the equipments are in bad condition?



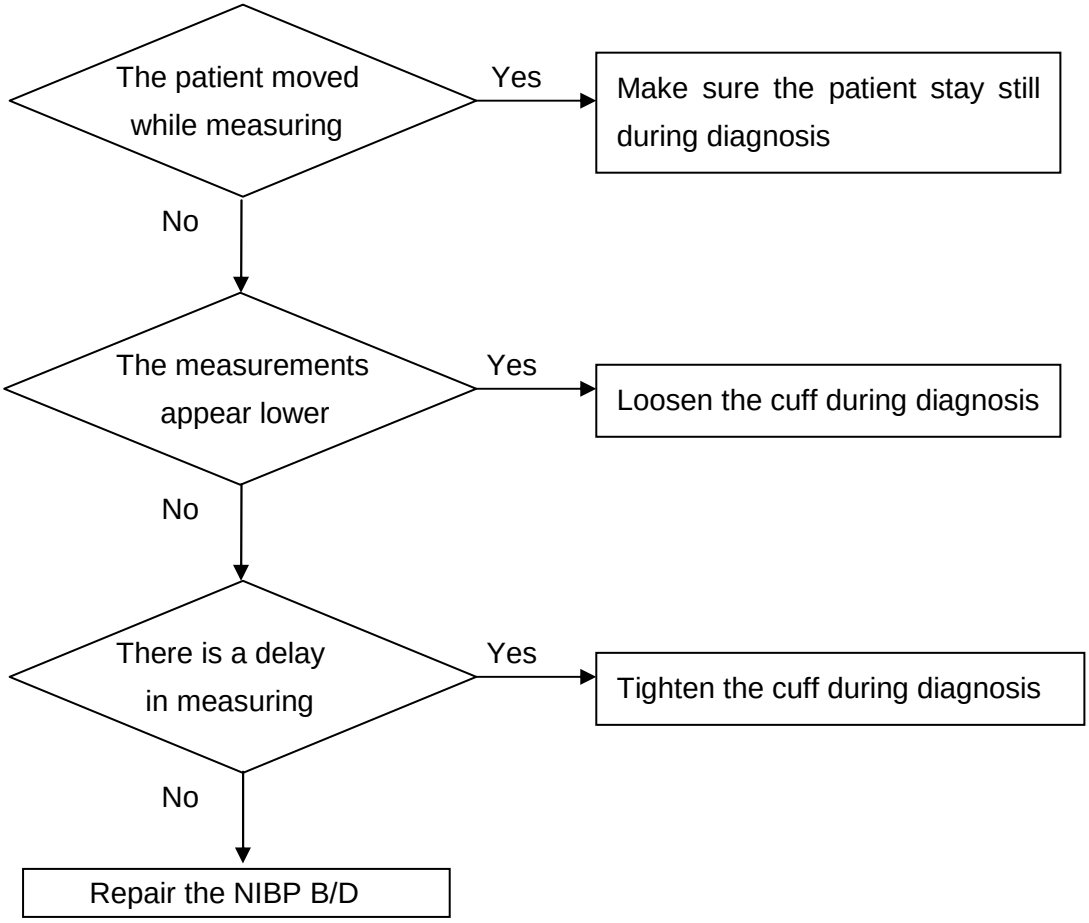
3. Temp malfunction



4. NIBP malfunction

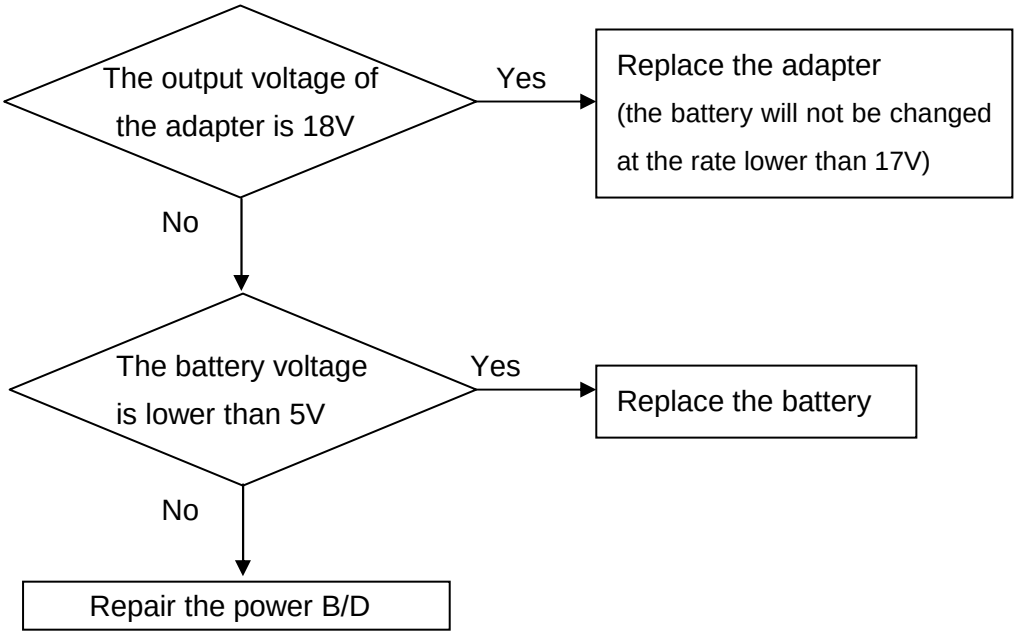


5. Abnormality in NIBP measurements

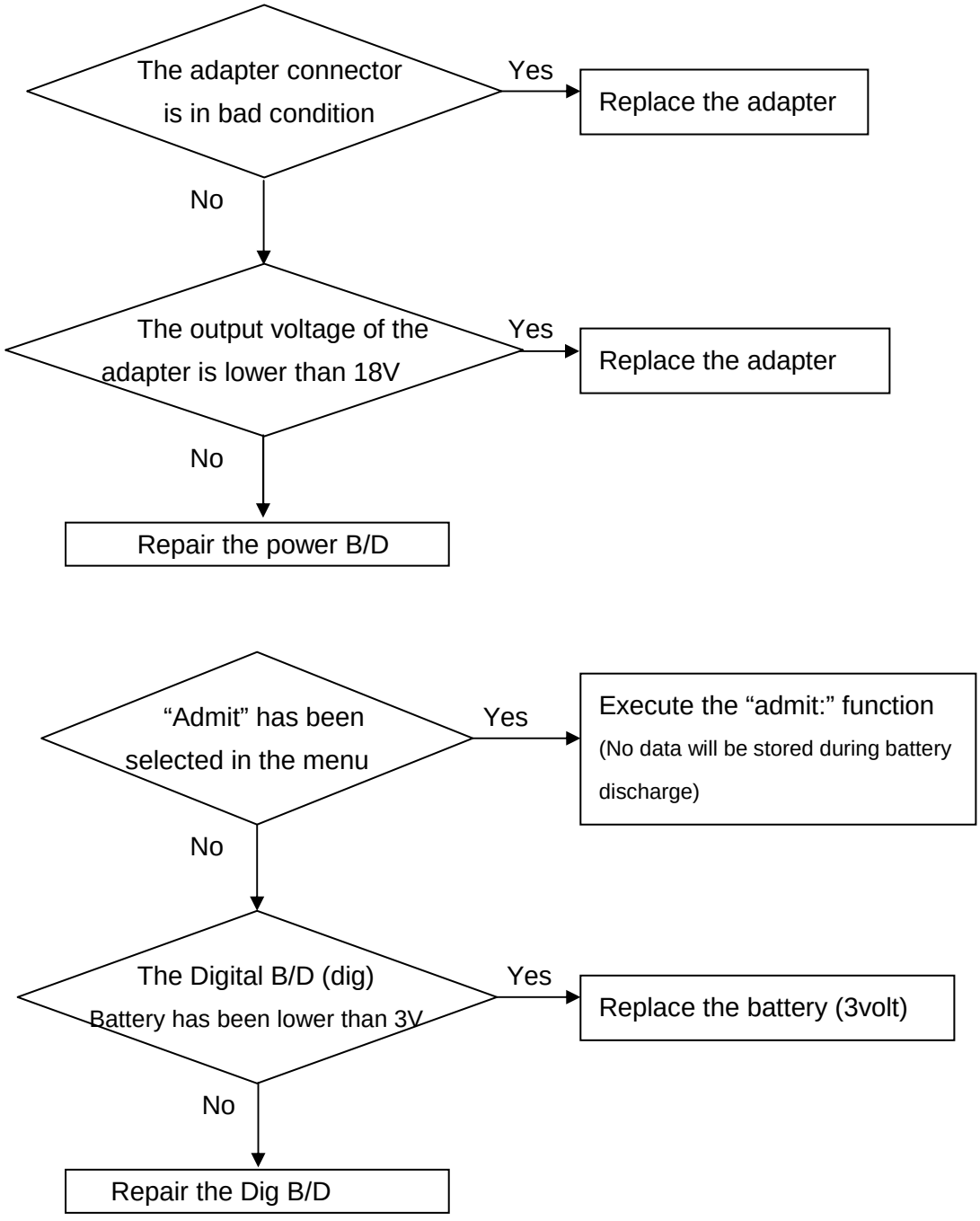


6. Failure in battery recharge

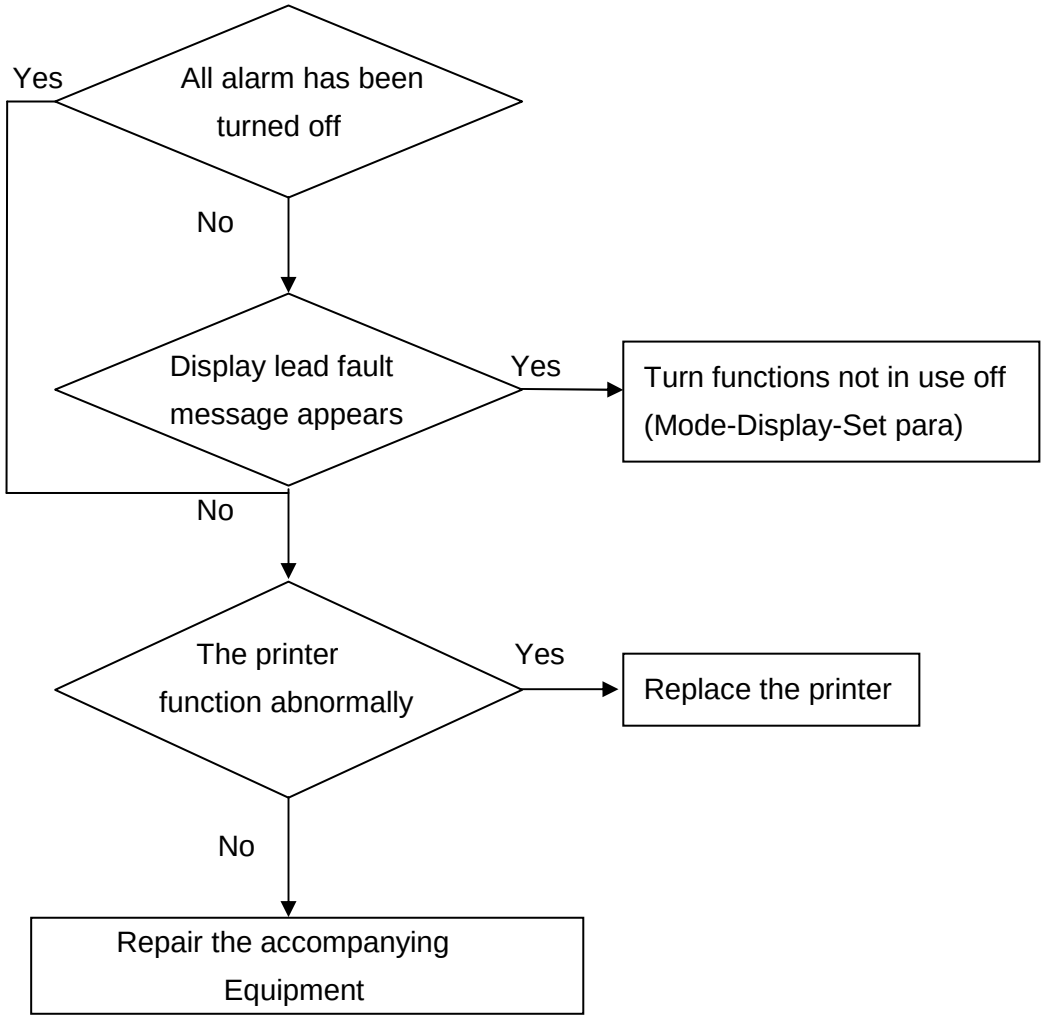
(the battery does not fully recharge in 6 hours or more)



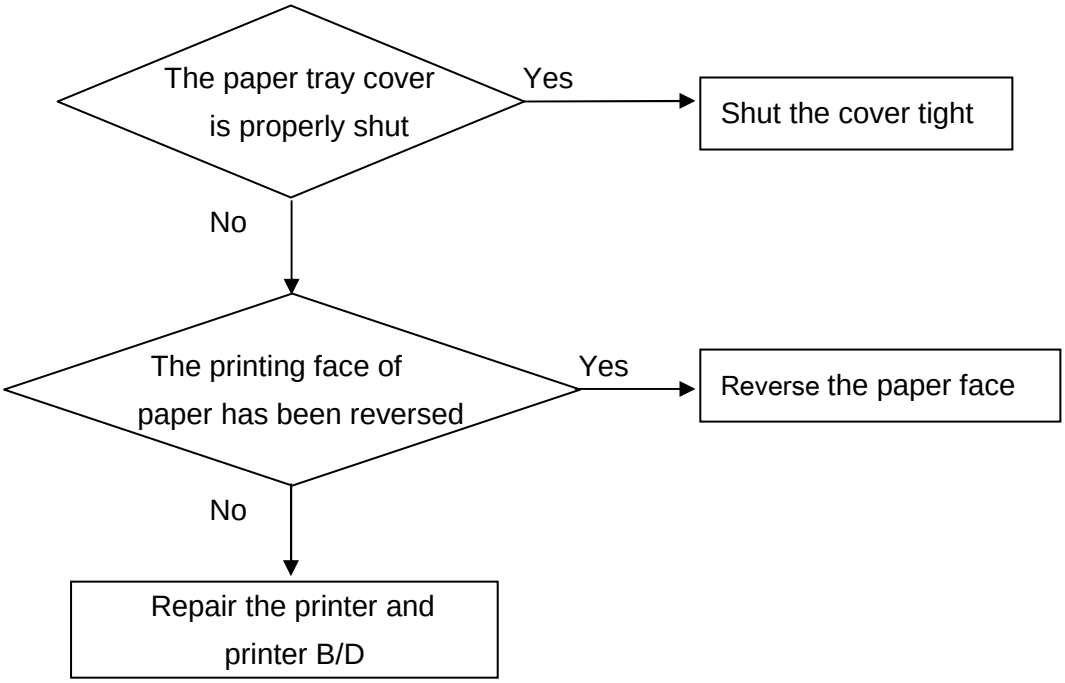
7. Power failure



8. Periodic noises



9. Print failure



SPECIFICATION

Ease of use

Indication for use

Intended use

Customization

Special Features

Monitor Environmental Specifications

Power adaptor

Monitor Performance Specifications

Graphical and Tabular Trends

SpO2 Performance Specifications

Respirations Performance Specifications

NIBP Performance Specifications

ECG Performance Specifications

Temperature Unit Performance Specifications

Accessories included

OPTION

Ease of use

· Battery operation

· Attached printer

· Table and graphic trend

· Nellcor SpO_2 sensor compatible (OxiMax sensor exclusion)

Intended use

- The monitors are intended to be used for monitoring and recording of, and to generate alarms for, multiple physiological parameters of adults, pediatrics, and neonates.
- The monitors are intended for use by trained healthcare professionals in a hospital environment.
- The BM3 monitors are additionally intended for use in transport situations within hospital environments.
- The monitors are only for use on one patient at a time. They are not intended for home use. Not therapeutic devices.
- The monitors are for prescription use only.
- The BM3 Patient Monior is not intended for use during MRI.
- The BM3 Patient Monior monitors and displays ECG (including arrhythmia and ST segment analysis), heart/pulse rate, oscillometric non-invasive blood pressure(systolic, diastolic and mean arterial pressure), end-tidal carbon dioxide, respiration rate, temperature with a electronic thermometer for continual monitoring Esophageal/Nasopharyngeal/Tympanic/Rectal/Bladder/Axillary/Skin/Airway/Room/Myocardial/ Core/Surface temperature, and functional oxygen saturation (SpO_2) and pulse rate via continuous monitoring, including monitoring during conditions of clinical patient motion or low perfusion.
- The ECG measurement is intended to be used for diagnostic recording of rhythm and detailed morphology of complex cardiac complexes.
- ST segment monitoring is intended for use with adult patients only and is not clinically validated for use with neonatal and pediatric patients.
- The gas measurement is restricted to neonatal patients only.

Indication for use

Monitoring, recording and/or alarming of patients including with arrhythmias in ICU, Post-OP and others. The target populations are adult, pediatric and neonate with the exception of:

· Arrhythmia detection and ST segment analysis, for which the target populations are adult and pediatric only.

Additional Function

· LAN Connection

Monitor Environmental Specifications

· Operating Temperature : 10°C to 40°C (50°F to 104°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) 1.2A

· Adapter 18 V, 2.8 A (BPM050S18F02)

Monitor Performance Specifications

· Screen : 7" TFT LCD (800×480)

· Indicators

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

· Interfaces

- Generating power for LAN, Wireless LAN : 5.0V max 0.9A

· Battery

- Li-ion battery
- Battery status display

- Operating time：1.5hours(with fully charged Battery)

· Thermal Printer：internal printer

- Speed：25, 50 mm/sec
- Paper width：58 mm

Graphical and Tabular Trends

· Table Trend

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

· Graphical Trend

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

ECG capacity

· Lead :	3,5
· Heart rate range :	30 to 300 bpm (accuracy : ±3 bpm)
· Bandwidth(monitoring mode) :	0.5 Hz to 40 Hz
· Display Sweep Speed :	2 5mm / sec
· ECG size (Sensitivity) :	0.5, 1, 2, 4 mV/cm
· Lead-off Detection with display indicator	
· Pace maker Detection Mode	
· Differential Input Impedance :	> 5 MΩ
· Common Mode Rejection Ratio :	> 90 dB at 50 or 60 Hz
· DC Input Range :	±5 mV
· Defibrillator Discharge :	< 4s
· Defibrillation Artifact Recovery Time :	< 8s

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 905nm, 2-2.4mW (typical)

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

Respiration Performance Specifications

· Range : 5 to 120 breaths/min

· Accuracy : ±3 breaths/min

· Display Sweep Speeds : 25mm/sec

NIBP capacity

· Technique : Oscillometric

· Measurement mode:

- Manual : Single Measurement
- STAT : Start 5 minutes of continuous
- Auto : automatic Intervals of 1MIN., 2, 3, 4, 5, 10, 15, 20, 30, 1Hour, 2, 4, 8

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

· Measurement Range:

- Systolic : ADULT 40 – 260mmHg
  PEDIATRIC 40 – 230mmHg
  NEONATE 40 – 130mmHg
- MAP(Mean Aterial Pressure) : ADULT 26 – 220mmHg
  PEDIATRIC 26 – 183mmHg
  NEONATE 26 – 110mmHg
- Diastolic : ADULT 20 – 200mmHg
  PEDIATRIC 20 – 160mmHg
  NEONATE 20 – 100mmHg
- Pulse Rate : ADULT 30 – 220BPM
  PEDIATRIC 30 – 220BPM
  NEONATE 30 – 220BPM

Temperature Unit Performance Specifications

· Range : 0°C to 50°C (32°F to 122°F)

· Accuracy : 25°C to 50°C ± 0.1°C, 0°C to 24°C±0.2°C

· Sensor : YSI 400 Series compatibility

Accessories Included:

· 3Lead patient cable 1 EA

· Electrodes 10 EA

· NIBP extension hose, 3m long 1 EA

· Adult cuff, 25-35 Cm 1 EA

· SpO_2 extension cable 2m 1 EA

· Reusable Adult SpO2 Probe 1 EA

· DC adapter, 18VDC, 2.8A (BPM050S18F02 Made in Bridge Power Co., Ltd.) 1 EA

Option

· Temperature sensor (skin)

· 5 lead patient cable

· Thermal printer (58mm) and Thermal paper roll

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
ARRYTHM	arrhythmia
ASYS	asystole
Auto, AUTO	automatic
AUX	Auxiliary
aVF	left foot augmented lead
aVL	left arm augmented lead
aVR	right arm augmented lead
	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

ECG	electrocardiograph
EMC	electromagnetic compatibility
EMI	electromagnetic interference
ESU	electrosurgical cautery unit

F

F	Fahrenheit

G

g	gram

H

HR	heart rate, hour
Hz	hertz

I

ICU	intensive care unit
Inc	incorporated

K

kg, KG	kilogram
kPa	kilopascal

L

L	liter, left
LA	left arm, left atrial
LBS	pounds
LCD	liquid crystal display
LED	light emitting diode
LL	left leg

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

O

OR	operating room

P

PED	pediatric
PVC	premature ventricular complex

Q

QRS	interval of ventricular depolarization

R

RA	right arm, right atrial
RESP	respiration
RL	right leg
RR	respiration rate

S

S	systolic
sec	second
SpO2	arterial oxygen saturation from pulse oximetry
SYNC, Sync	synchronization
SYS	systolic

T

Temp, TEMP	temperature

U

V

V	precordial lead
V	volt
V-Fib, VFIB	ventricular fibrillation
VTAC	ventricular tachycardia

W

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	**BM3**
Approval Number	
Approval Date	
Serial Number	
Warranty Period	**1 year from date of purchase(Two years in Europe)**
Date of Purchase	
Customer Section	**Hospital Name :** **Address :** **Name :** **Phone :**
Sales Agency	
Manufacturer	

* Thank you for purchasing BM3.

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

GIMA warranty conditions

Congratulations for purchasing a GIMA product.

This product meets high qualitative standards both as regards the material and the production.

The warranty is valid for 12 months from the date of supply of GIMA.

During the period of validity of the warranty, GIMA will repair and/or replace free of charge all the defected parts due to production reasons. Labor costs and personnel traveling expenses and packaging not included.

All components subject to wear are not included in the warranty.

The repair or replacement performed during the warranty period shall not extend the warranty.

The warranty is void in the following cases: repairs performed by unauthorized personnel or with non-original spare parts, defects caused by negligence or incorrect use.

GIMA cannot be held responsible for malfunctioning on electronic devices or software due to outside agents such as: voltage changes, electro-magnetic fields, radio interferences, etc. The warranty is void if the above regulations are not observed and if the serial code (if available) has been removed, cancelled or changed.

The defected products must be returned only to the dealer the product was purchased from. Products sent to GIMA will be rejected.

Disposal

Disposal: The product must not be disposed of along with other domestic waste. The users must dispose of this equipment by bringing it to a specific recycling point for electric and electronic equipment.

For further information on recycling points contact the local authorities, the local recycling center or the shop where the product was purchased. If the equipment is not disposed of correctly, fines or penalties may be applied in accordance with the national legislation and regulations.

CE 0123

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