BM1

User's Manual

Patient Monitor

Rev. 2.2

2021.05.04

BM1 Vital-Sign Monitor

Warning

To ensure proper use of this medical equipment, you must read and comply with this user manual.

BM1 User Manual

Before using Bionet devices, read all the manuals that are provided with your device carefully. Patient monitoring equipment, however sophisticated, should never be used as a substitute for the human care, attention, and critical judgement that only trained health care professionals can provide.

CE 0123

Document No: BN-OP-BM1

Table of Contents

BM1 User Manual

Intended Use

The BM1 monitor is for patient vital-sign monitoring. The instrument generates visual and audible alarms, when the configured limits and time are exceeded, or when various physiological parameters are monitored.

NOTE
All hardware and screenshots in this user guide are for illustration purposes only. Actual products or screens may vary slightly.

General Description

The BM1 monitor can monitor the following:

- Non-Invasive blood pressure
- Temperature
- SpO2
- Pulse Rate
- Apnea (option)
- EtCO2 (option)
- FiCO2 (option)

This equipment is designed to be used in an environment where a health care professional can determine when to use the equipment for its intended purpose, based on an expert assessment of the patient's medical condition, including physicians, nurses.

Patient Classification

BM1 monitors are designed for use by adults, pediatrics and neonates.

Functional Safety

The essential performance of the patient monitor is to provide the clinician with meaningful parameter values and to sound an alarm when the established parameter value is exceeded or the function that provides the value is not working properly. We assessed the risks associated with the use of these monitors in light of these essential performance features and mitigated the risk of lowering the residual risk to a level that could be used without compromise as long as the product maintained its regular lifecycle maintenance and service recommendations.

Warning, Caution, Note

The following terms are defined in the User Guide to emphasize the agreement as follows: The user must follow all warnings and precautions.

The specifications and functions shown in this manual are subject to change without prior notice.

WARNING
"Warning" A warning contains important information regarding possible danger to you or the patient that is present during normal operation of the equipment.

CAUTION
"Caution" A caution provides information or instructions that must be followed to ensure proper operation and performance of the equipment.

NOTE
"Note" A note presents information that helps you operate the equipment or connected devices.

Define Groups

The defined groups for this product are users, service personnel, and experts.
Defined groups should read the user manual before using the product and be trained in the use, installation, reprocessing, maintenance and repair of the product.
This product can only be used, installed, reprocessed, maintained and repaired by a defined group.

User

Users use the product for their intended use.

Service Personnel

Service personnel are responsible for the maintenance of the product.

They must be trained in the maintenance of the medical device, install, reprocess and maintain the product.

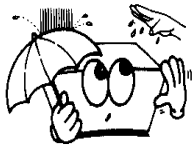
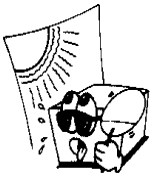
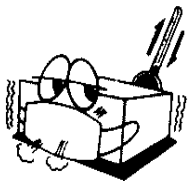
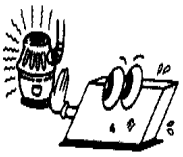
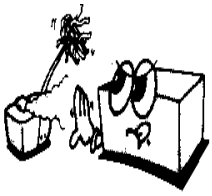
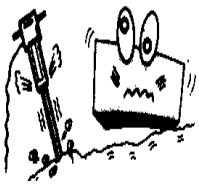
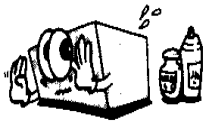
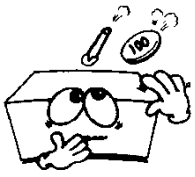
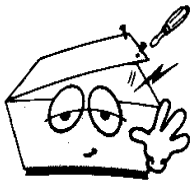
Expert

The expert repairs the product or performs complex maintenance tasks.

The expert have the knowledge and experience to perform complex maintenance tasks on the product.

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.		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.

Electromagnetic Compatibility

The monitor has been designed and tested for compliance with current regulatory standards as to its capacity to limit electromagnetic emissions(EMI), and also as to its ability to block the effects of EMI from external sources.

The monitor complies with the following standards pertaining to EMI emissions and susceptibility : EN60601-1-2, CISPR 11 Class A.

To reduce possible problems caused by electromagnetic interference, we recommend the following.

- Use only Bionet approved accessories.
- Ensure that other products used in areas where patient monitoring and life support is used comply to accepted emissions standards (CISPR 11, Class A).
- Try to maximize the distance between electro medical devices. High-power equipment related to electrical simulators, electrosurgical instruments and radiators (X-ray machines) as well as evoked potential devices may cause monitor interference.
- Strictly limit exposure and access to portable radio frequency sources (e.g. cellular phones and radio transmitters). Be aware that portable phones may periodically transmit even when in standby mode.
- Maintain good cable management. Do not route cables over electrical equipment. Do not intertwine cables.
- Ensure all electrical maintenance is performed by qualified personnel.

CAUTION
Infectious devices and parts must be sanitized and cleaned before disposal.

1. Basic

Basic Overview

This Vital-sign monitor is for adult, pediatric, and neonatal monitoring. It can be used as an independent device or connected to EMR network. Use of the monitor is limited to one patient at a time.

The following optional software features are available:

- Connecting EMR server.
- Wireless network connection

Electric Safety Precautions

CAUTION
Please check the following before using the product. 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. (Manufacturer : BRIDGEPOWER, Model: JMW128, Rated Voltage: DC15V/2.0A) 3. Be sure that the entire connection cable of the system is properly and firmly fixed. 4. Be sure that the equipment is completely grounded. (If not, 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.

CAUTION

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 BM1 both independent circuit and stable grounding are essentially required. In the event that the same power source is shared with other electronic equipment, it can also produce inaccurate output.

NOTE

BM1 is classified as follows :

- BM1 classifies as Class II, BF & CF concerning electric shock. It is not proper to operate this Equipment around combustible anesthetic or dissolvent.
- Noise level is A class regarding IEC/EN 60601-1 and the Subject of noise is A level concerning IEC/EN60601-1-2.

WARNING

Do not touch the patient while using the defibrillator. The user may be at risk.

When using the defibrillator, be careful about safety and use only the supplied 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.

Equipment Connection

CAUTION
Doctors and patients in hospitals are exposed to the risk of uncontrollable currents. This current is caused by a potential difference between the equipment and a conductive object that can be contacted. Use auxiliary equipment to meet this requirement in accordance with EN60601-1; 2011.

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.

Product Configuration

1.	Main Body of BM1 Monitor	1 EA
2.	NIBP Extended Hose	1 EA
3.	Reusable Adult NIBP Cuff	1 EA
4.	SpO2 extension cable	1 EA
5.	Reusable Adult SpO2 Probe	1 EA
6.	DC Adaptor	1 EA
7.	User Manual	1 EA
8.	Rechargeable Battery	1 EA

Option Product

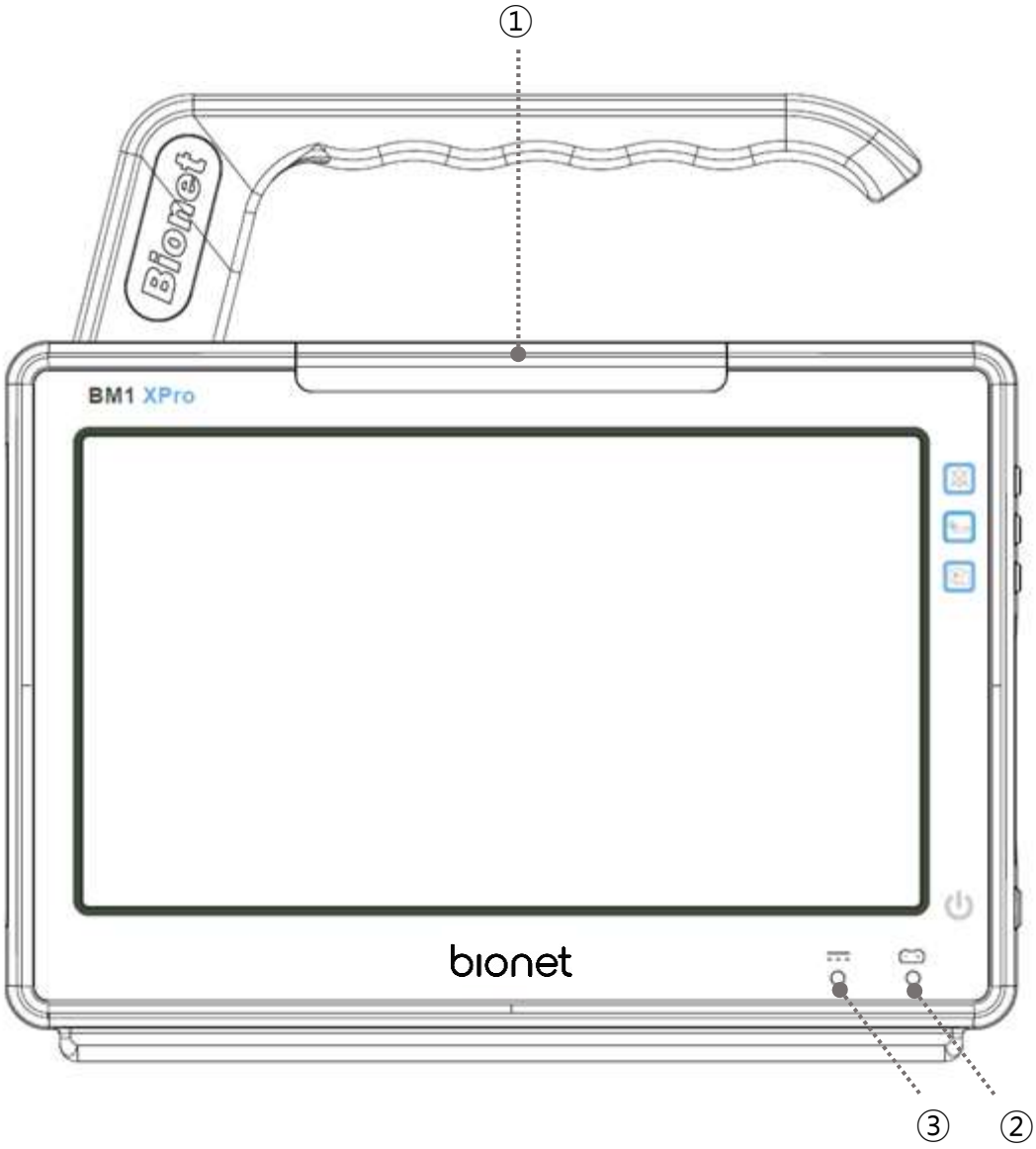
1. Temperature (IR Thermometer, FS-300)
2. Sidestream EtCO2 Module (Respironics)
3. Mainstream EtCO2 Module (Respironics)
4. Sidestream EtCO2 airway adapter sampling kit
5. Mainstream EtCO2 airway adapter
6. Barcode Reader (USB)
7. Cart and Cradle

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.

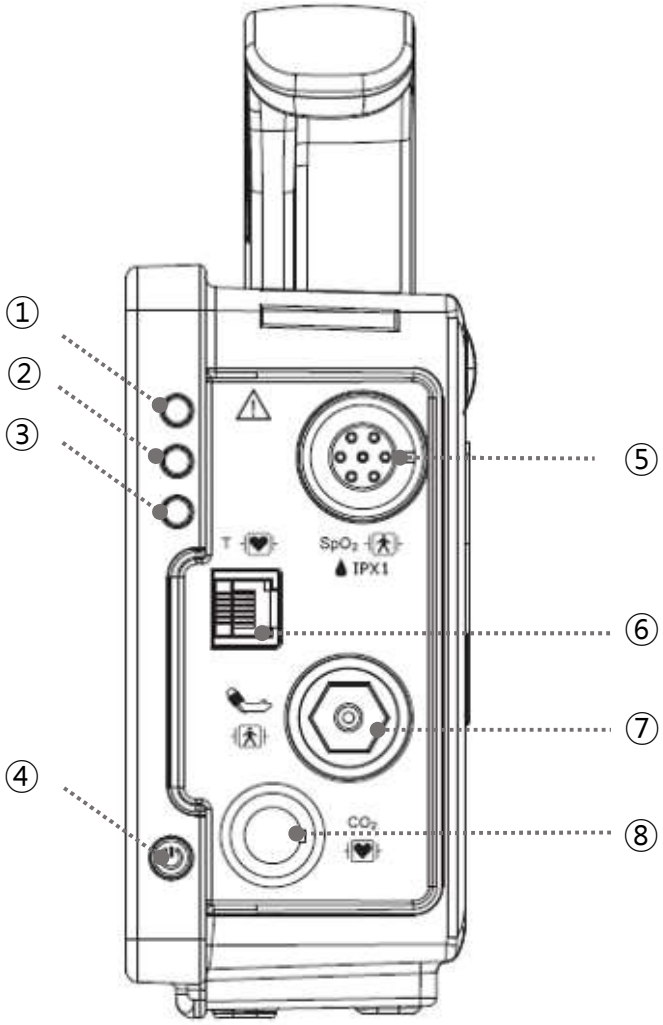
Basic Unit

Front View



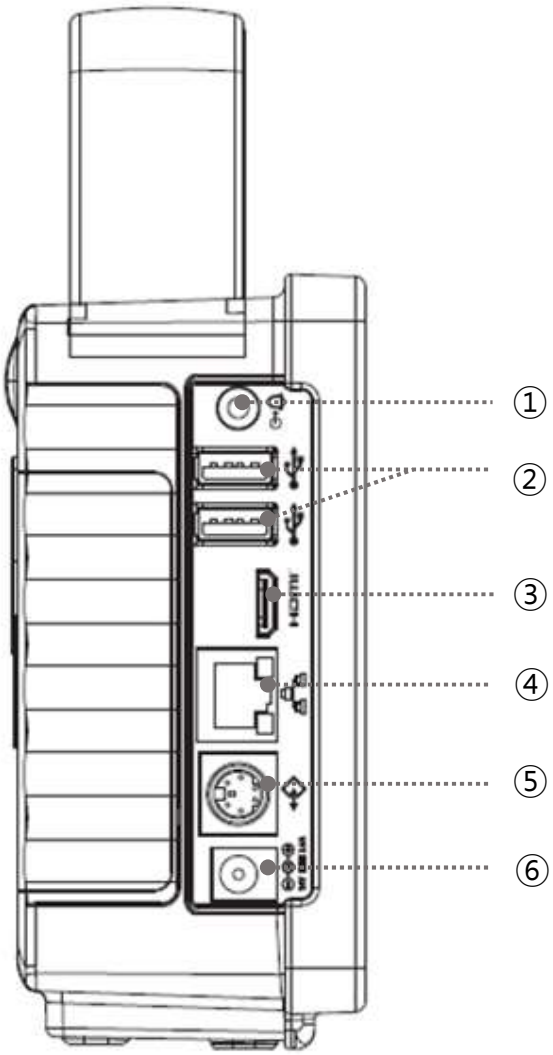
①	Alarm lamp
②	Battery operation indicator
③	AC status indicator

Right Side View



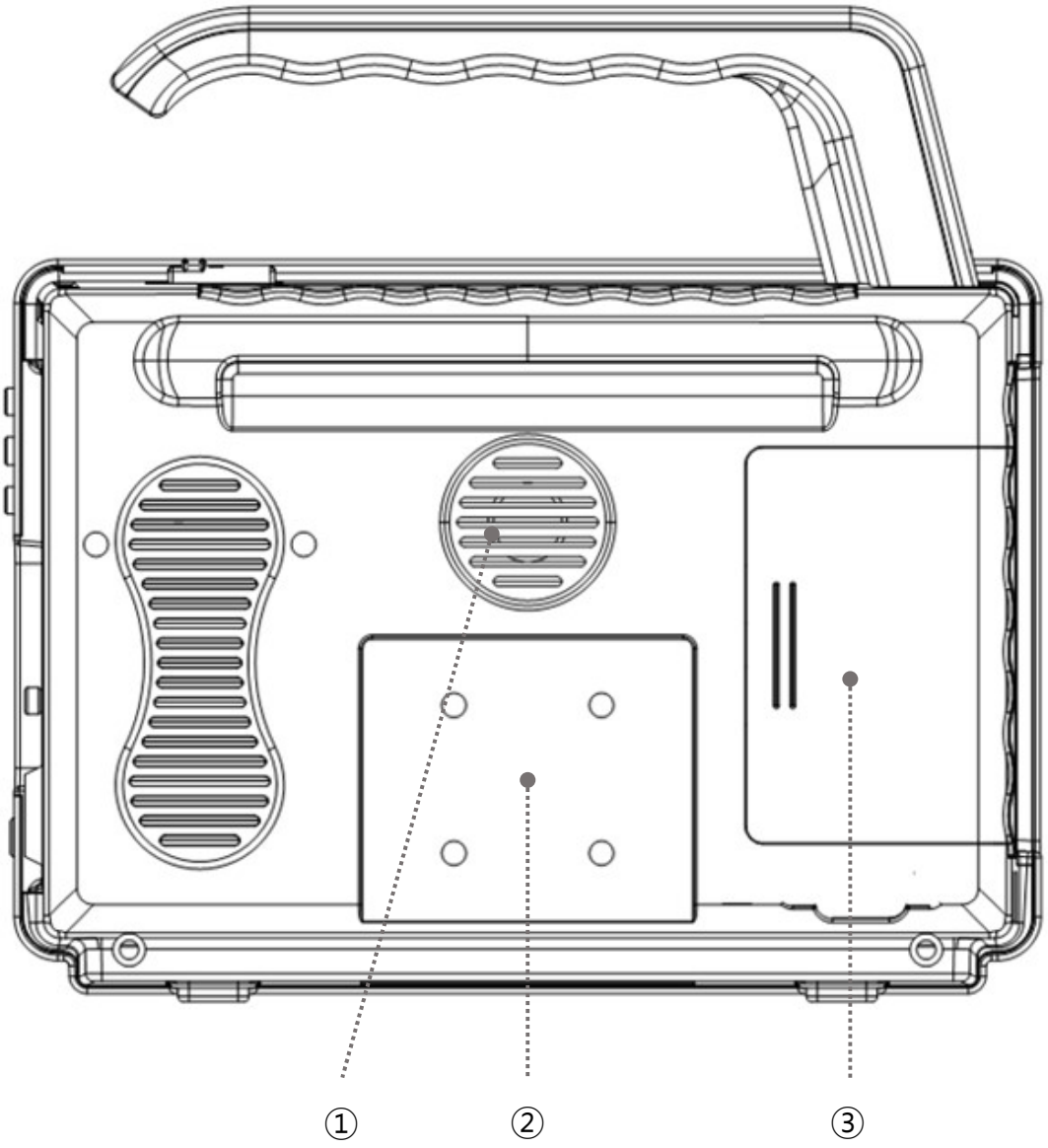
①	Alarm control key
②	Blood-pressure measurement key
③	Operation mode/ home key
④	Power ON/OFF Key
⑤	SpO2 connector
⑥	Infra-Temperature connector
⑦	Blood pressure cuff hose connector
⑧	EtCO2 connector

Left Side View



①	Nurse-call connector
②	USB port (USB 2.0 5Vdc / Max. 500mA / 2EA)
③	HDMI mini Output port
④	Ethernet port
⑤	Service Port
⑥	DC adaptor jack

Back Side View



①	Speaker Hole
②	IV Pole Mount
③	Battery Cover

NOTE
USB Compatible ● The BM1 is compatible with external USB memory drives up to 64GB. ● We recommend brands products listed in the manual.(Sandisk, PNY, Transcend, Samsung) ● When using a product with high power consumption, such as an external hard drive, be sure to use the provided adapter for suitable power supply. (Cannot be used alone as a power supply) ● You should save the data of connected device before connecting the additional device. ● It may not be supported some devices that required high power.

NOTE
The HDMI output of this device is 800x480 @50Hz. The screen may not be displayed depending on the monitor specifications, so check in advance.

Barcode Scanners

Normally barcode scanners are compatible with all products. However, because of inconsistencies in barcode scanner manufacturer's implementation of input methods, you need to verify the scanner is supported by Bionet.

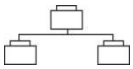
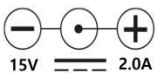
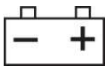
- Input methods supported by Bionet : International standards, USB

Products below are tested and confirmed by Bionet.

No	Manufacturer	Product name	Product image
1	Symbol	LS-2208	
2	ZEBEX	Z-3110	
3	Honeywell	MS5145	
4	Honeywell	1900GHD-1 (QR code)	

CAUTION
You must read the user manual of the barcode scanner to get complete information about it. The initialization codes for various products would be included. You must run the initialization after verifying the input type. Do not use multi-language input with barcode scanner.(except alphanumeric character)

Device Markings

	Caution : Consult Accompanying Documents		Consult instructions for use. This symbol advises the reader to consult the operating instructions for information needed for the proper use of the device.
	TYPE CF Applied Part		TYPE BF Applied Part
	Drip proof protection to IPX1		SpO2 Connect Port
	IR Temperature Connect Port		NIBP Connect Port
	EtCO2 Connect Port		Nurse call
	USB port		HDMI mini Output port
	LAN port		Auxiliary Port
	DC Input Port		Alarm Control Key
	Blood-pressure Measurement Key		Operation Mode/ Home Key
	Power ON /OFF		DC Input Indicator
	Battery Operation indicator		Address of Manufacturer
	Safety Sign : To signify that the instruction manual must be read. Reading the instruction manual before starting work or before operating equipment.		WEEE(Waste Electrical and Electronic Equipment)
	European Medical Device Directive 93/42/EEC		

Power

The BM1 monitor uses a DC adapter (100-240 VAC / 15VDC 2.0A). In the event of a power outage or cable shortage, the monitor automatically switches to battery power to continue patient monitoring without data loss.

The built-in battery is intended for back-up use only during power-off.

DC Adaptor information

- Manufacture: BRIDGEPOWER CORP.
- Model name: JMW128
- Input Power: 100V~240V 1.2A
- Output Power: 15V, 2.0A

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.

CAUTION
This equipment must be connected to a protective earth grounded power supply. Using non-standard products other than the adapters supplied by us may cause signal distortion or noise. Be sure to use a genuine adapter that is supplied by our company and is insulated.

Battery Power

DC adapter, it uses battery power when power failure and portable use.

The battery is attached to the bottom of the equipment and the additional extended battery is connected to the left side.

Operation

1. Battery Power LED is lighted on when the equipment is in use.
2. Battery is automatically charged when the equipment is connected to DC adaptor. (Charging is displayed at the top right of the screen.)
3. The charging status of the battery is displayed on the screen in a green box with 5 levels. (5% -> 25% -> 50% -> 75% -> 100%)
4. When all batteries are discharged, the battery image is displayed in red.
5. When the battery is disconnected from the device and the battery is faulty, an 'X' appears inside the shape of the battery.
6. The monitor automatically turns off when the battery is depleted.

The table below describes the function of the battery charging bar graph at the top of the screen.

Battery charge/discharge display		
Display	**Charging remain time**	**Description**
	Your battery is fully charging	Not applicable
	Your battery is fully charged	Not applicable
	Your battery is 75% charged	Not applicable
	Your battery is charged at 50%	If possible, connect it to the AC adapter.

	Your battery is charged at 25%	Immediately connect the monitor to the AC adapter.
	The internal battery is very low. (The power will turn off about 2min)	Immediately connect the monitor to the AC adapter.
	There is no built-in battery.	Connect the battery.

CAUTION
The battery charge display is accurate only when the battery is operating normally.

NOTE
If no AC power is applied, the battery charge display will take up to 15 seconds to reflect the actual capacity of the internal battery.

Battery Information:

- 3BL335-BIO-S (10.8V / 3250mAh, Li-ion) or

  031PpTC3(3ICR19/65) (10.8V / 2150mAh, Li-ion)
- Battery charging time: More than 6 hours
- Battery usage time: Max 4 hours (3BL335-BIO-S, NiBP every 15 minutes, when using SpO2)

NOTE
Lithium-ion batteries are rechargeable batteries that contain lithium-ion cells. Each battery contains an electrical level measurement circuit and a safety protection circuit.

WARNING
Older or defective batteries will have significantly reduced capacity or operating time.

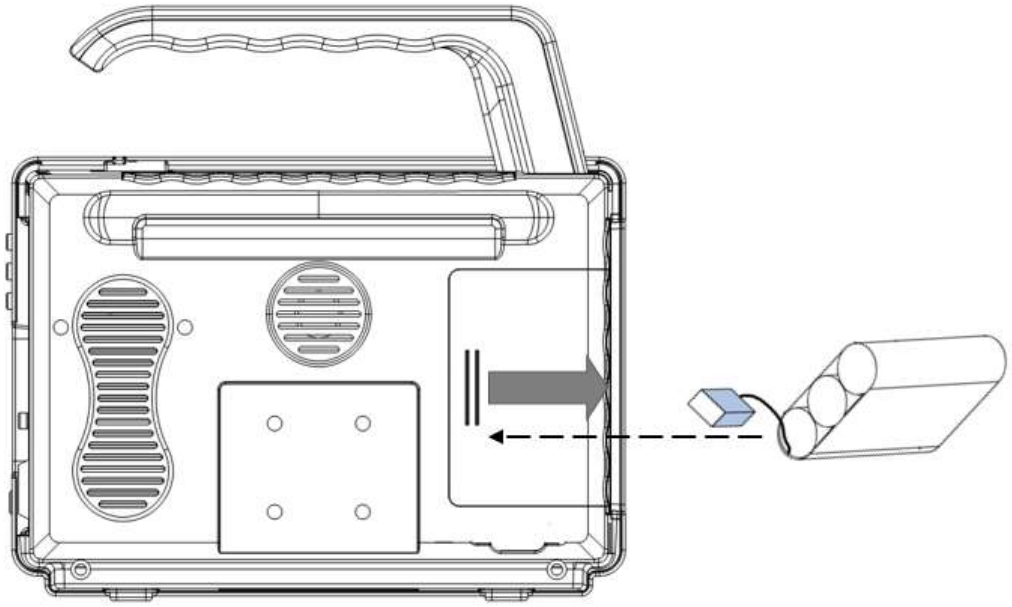
NOTE
To maximize battery performance for transport, keep the monitor connected until you are ready to transport the patient. Reconnect the monitor immediately after transport. Bionet recommends replacing the lithium ion battery after 24 months of use. Battery life depends on usage. If battery life continues, battery life will decrease and frequency of replacement will increase. To prevent pre-discharge, recharge after the battery is discharged.

WARNING
Be careful of the polarity when replacing the battery. We strongly recommend that you use the battery supplied by Bionet. Using unauthorized batteries may damage the equipment.

NOTE
Charging is not possible at low power. (below 12V) When replacing the battery, be sure to remove the DC adapter and replace it.

How to Replace the Battery

Please assemble and replace as shown below.



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.

Getting Started

Starting the Monitor

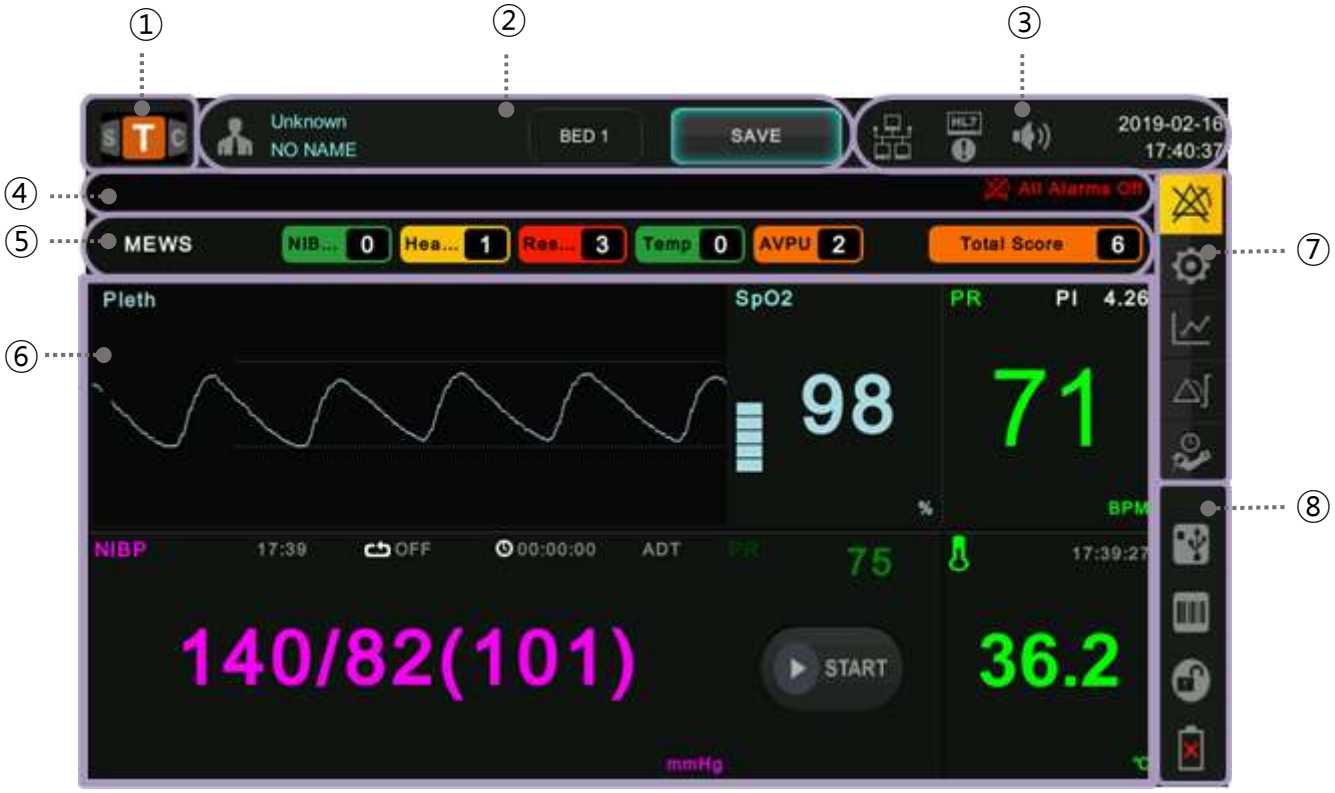
Press the power key at the bottom right side of the monitor front panel. The power light on the monitor lights up, the alarm bar lights up, the power is turned on, the screen lights up, the main screen is displayed after running the self-test.

Stopping the Monitor

Press and hold the power key for 3 seconds. The screen goes off.

Main Screen Setup

After the monitor is turned on, the main screen is displayed.



①	Operating Mode window
②	Patient window
③	Indicator icons
④	Alarm status window
⑤	EWS window (Triage mode only)
⑥	Parameter box displays (Waveform & Numeric window)
⑦	Keys window
⑧	Device status information

Operating Mode window

You can change the operating mode by clicking the Operation Mode window and entering the user password. BM1 supports three operation modes.

Continuous mode: It is used for short term patient monitoring.

Spot mode: It is used to collect the patient's vital sign during the round.

Triage mode: It collects patient vital sign information and determines the priority of patient treatment.

Patient Window

The patient information is displayed in the upper corner of the screen.

There is a save button to save the study data in the spot and triage modes.

Indicator Icons

Displays the time, network and device management status.

Alarm Status Window

The message appears at the top of the screen except for technical alarms.

EWS Window

EWS is provided in Triage mode.

It can help you to quickly determine the degree of illness of a patient.

Parameter Box Displays (Waveform & Numeric Window)

The parameter box displays values, alarm limits and icons for the selected parameter. You can set the parameters and their associated waveforms so that they are easy to distinguish.

The character color according to the measurement time of TEMP or NIBP.

- The measured value is displayed in the set color.

Function Key

On the right side of the monitor's front panel, the touch screen icon allows you to perform frequently-used functions.

Button	Description
	This is an alarm mode key, so it enables the current alarm mode one of Normal / Audio Paused/ Alarm Paused modes.
	Displays the setup menu.
	Displays trend menu.
	Displays the alarm setting menu.

	Displays the automatic blood pressure measurement interval setting menu.

Device Status Information

Displays the connection status of USB, Barcode Reader, screen lock and battery status.

Fixed Key

The fixed keys on the front panel of the monitor allow you to perform commonly performed functions.

Fixed key	Description
	Short press : Holds all alarms or cancels the hold at a preset time. Long press : It enables the current alarm mode one of 'Alarm off' or 'Audio off' modes.
	Start or end non-invasive blood pressure (NIBP) measurements.
	Return to the main screen or switch the operating mode.

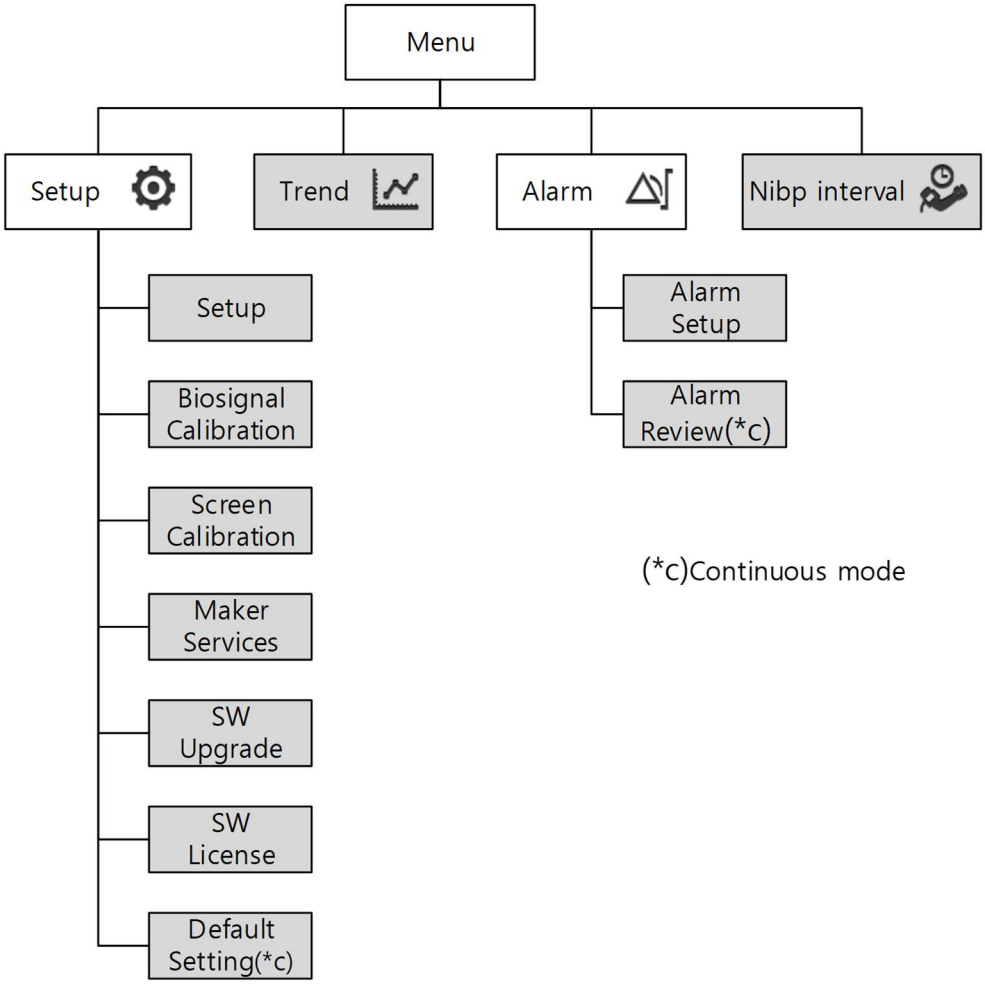
2. Setup

Setup Overview

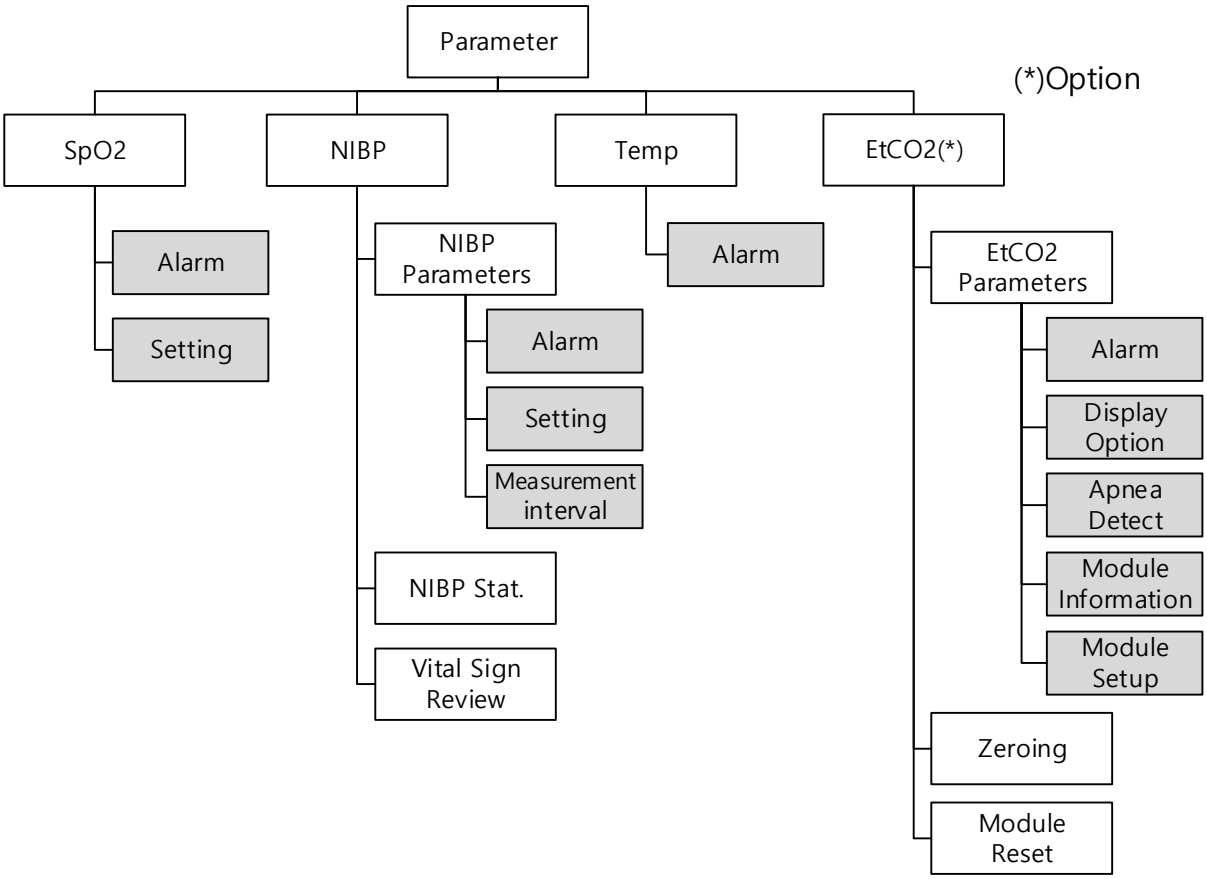
This chapter describes how to configure your monitor.

Monitor Configuration

Setup Menu tree



Parameter Menu Tree



Main Menu Settings

The Setup menu allows the user to access submenus, display screens, and perform specific monitor setup functions.

1. To display the Settings menu, click the Setup icon to open the submenu.
2. Click the desired setting to access the submenu that performs the desired function or goes one step further down.
3. Click x button at the bottom of the submenu list to return to the previous menu or screen.

Main Menu

	Main Menu	Sub Menu
	**A. SETUP**	**A-1.** PARAMETER SETUP
		A-2. USER SERVICES
		A-3. INFORMATION
		A-4. NETWORK INFORMATION
		A-5. HL7
	B. BIOSIGNAL CALIBRATION	
	C. SCREEN CALIBRATION	
	D. MAKER SERVICE	
	E. SW UPGRADE	
	F. SW LICENSE	
	G. DEFAULT SETTING (*c)	

(*c)Continuous mode only

MENU	Description	Available settings
A. SETUP		
A-1. PARAMETER SETUP		
A-1-1. MONITORINGS & COLORS	Parameter selection and color setting used for measurement on the monitor menu: SPO2, NIBP, TEMP, ETCO2(*c)	PARAMETER enable ON/OFF PARAMETER COLOR setup
A-1-2. UNITS	Unit setting menu used for monitor measurement	
A-1-2-1. WEIGHT	Weight unit	Kg Lbs
A-1-2-2. HEIGHT	Height unit	Cm Inch
A-1-2-3. BLOOD PRESSURE	blood pressure measurement unit	mmHg kPa

A-1-2-4. TEMPERATURE	Temperature measurement unit	℃ ℉
A-1-2-5. GAS PRESSURE UNIT	Gas measurement unit	mmHg kPa vol%
A-1-3. SWEEP SPEED	SpO2, EtCO2(*c) waveform sweep speed	6.25 mm/s 12.5 mm/s 25.0 mm/s 50.0 mm/s
A-2. USER SERVICES	User configuration menu	
A-2-1. UNIT NAME	Setting Monitor Environment Group	GENERAL ICU NICU OR CCU USER DEFINE
A-2-2. DATE DISPLAY	Set date format	YYYY-MM-DD MM-DD-YYYY DD-MM-YYYY
A-2-3. SCREEN BRIGHTNESS	Set screen brightness	10~100%
A-2-4. KEY Sound	Set Key activation	ON / OFF, 0 ~ 100%
A-2-5. BED No.(*c)	Set bed number	1~300
A-2-6. AUTO SAVE (*s,t)	Depending on the setting, send HL7 or save information.	
A-2-6-1. NIBP TRIGGER (*s,t)	Auto save when NIBP is measured	ON / OFF
A-2-6-2. TEMP TRIGGER (*s,t)	Auto save when Temp is measured	ON / OFF
A-2-7. DEMO	Set Demo	ON / OFF
A-2-8. SETUP USER PASSWORD	Change user password.	
A-3. INFORMATION		
A-3-1. SYSTEM INFORMATION		
A-3-1-1. MAIN VERSION	Display main S/W version	
A-3-1-2. LICENSE	Main software license display	
A-3-1-3. NIBP VERSION	Blood pressure module software	

	version display	
A-3-1-4. LANGUAGE	Set language	English, Korean French, Bulgarian Polish, German Chinese, Portuguese, Hungarian, Czech, Romanian, Italian, Turkish, Spanish, Russian, Greek, Japanese
A-3-2. HOSPITAL INFORMATION	Set Hospital information	
A-3-2-1. NAME	Hospital Name	
A-3-2-2. ADDRESS 1	Address information 1	
A-3-2-3. ADDRESS 2	Address information 2	
A-3-2-4. POSTAL CODE	Set postal Code	
A-3-2-5. DOCTOR NAME	Set doctor name	
A-4. NETWORK INFORMATION	Network information and setup	
A-4-1. WIRELESS	Wireless setup	ON/OFF
A-4-2. AP SEARCH		
A-4-3. SSID	Display the connected SSID	
A-4-4. DHCP	Auto IP allocation setting menu	ON/OFF
A-4-5. DEVICE IP	IP setting menu	XXX.XXX.XXX.XXX
A-4-6. SUBNET MASK	SUBNET MASK setting menu	XXX.XXX.XXX.XXX
A-4-7. GATEWAY IP	GATEWAY setting menu	XXX.XXX.XXX.XXX
A-4-8. NETWORK INTERFACE	Mac address information	
A-5. HL7	HL7 Network message settings	
A-5-1. COM	Enable HL7 connection	ON/OFF
A-5-2. IP	Remote PC IP address setup	XXX.XXX.XXX.XXX
A-5-3. PORT	Remote PC PORT address	XXXXX
A-5-4. PERIOD	Transmission cycle settings menu(*c)	10sec, 30sec, 1,3,5,10,15,30min, 1hour, 6hours
A-5-5. NAK	NAK Transmission menu setup	ON/OFF

A-5-6. QUERY	Enable patient info import via HL7 query	ON/OFF
A-5-7. CENTRAL	CENTRAL NETWORK setting menu	
A-5-7-1. PROTOCOL VERSION	Display network protocol version	X.X.X
A-5-7-2. CENTRAL COMM	Remote communication function activation menu	ON/OFF
A-5-7-3. CENTRAL IP	Remote server IP address setting menu	XXX.XXX.XXX.XXX
A-5-8. EDIT HL7 LABEL	Parameter label edit menu	
A-5-8-1. PARAMETER LABELS	SpO2 - %, SpO2 – PR, SpO2 – PI, NIBP – S, NIBP – D, NIBP – M, NIBP – PR, ETCO2 - ETCO2, ETCO2 - FICO2, ETCO2 – AWRR, TEMP-1	
A-5-8-2. UNIT LABELS	Percent, mmHG, kPa, BPM, RPM, Cesius, Fahrenheit	
A-5-8-3. ALARM LEVEL LABELS	Message Alarm, Low Alarm, Medium Alarm, High Alarm	
A-5-8-4. PATIENT QUERY	Query Name, Query Tag, User Parameter	
B. BIOSIGNAL CALIBRATION	Manufacturer menu, not user menu. Set calibration menu	
C. SCREEN CALIBRATION	Perform touch screen calibration point input.	
D. MAKER SERVICES	Manufacturer menu, not user menu.	
E. SW UPGRADE	Manufacturer menu, not user menu. Software Upgrade menu	
F. SW LICENSE	Manufacturer menu, not user menu.	
G. DEFAULT SETTING	Parameter setting is initialized to the value set by the manufacturer.	

(*c)Continuous mode only, (*s,t)Spot & Triage mode only

Parameter Color

Parameter	Basic color
Selectable colors : Green, Magenta, Blue, White, Scarlet, Orange, Pink, Light Blue, Yellow, Sky Blue, Coral, Purple, Pale Green, Pale Yellow.	
SpO2	Light Blue
NIBP	Magenta
TEMP	Green
EtCO2	Yellow

3. Network

Network Overview

When you connect the monitor to the network, you can access patient information from EMR server.

In continuous mode, you can use BM Central. BM Central connects the monitors to the central station and each device to provide various monitoring functions. For more information of BM Central Station, please refer to the BM Central Station User Guide.

With the Remote Control feature in BM Central, you can perform the following tasks on a patient monitor that can be remotely controlled from a central station.

- Start recording
- Modify alarm limit
- Alarm Mute
- Print the current monitor screen using a laser printer through network
- Enter, edit and view patient data

Network Connection

In a network, data can be exchanged over wired or wireless technology. All data interfaces (e.g. RS-232, LAN, USB interface) described in the standard and convention can be network. This device can exchange information with other devices through the network during operation and supports the following functions.

- Display waveform and parameter data
- Alarm signal
- Device setup and transmission of patient data

Connecting this device to an integrated network with other devices, or subsequent changes to that network, can be a new risk to patients, users, and third parties. These risks must be identified, analyzed and evaluated before the device is connected to the network or the network is changed, and appropriate action must be taken.

Subsequent changes to the network example:

- Network configuration change
- Removing a device from the network
- Adding new devices to the network
- Upgrading or updating devices connected to the network

WARNING
Recommendations for wireless connections • BM1 has a change in the number of equipment connections depending on wireless AP (Access Point) performance. • When using a general AP, it is recommended to connect 8 units to the same network. • It is recommended to use the AP exclusively for monitoring equipment. • Due to the nature of wireless, connectivity may not be good depending on the environment.

NOTE

Supported USB Wifi Dongle

BM1 supports the following USB Wifi dongle.

TP-Link

Model	USB VID:PID	Chipset
TP-LINK T2U plus	2357:0120	Realtek 8821a
TP-LINK T2U nano	2357:011e, 2357:0122	Realtek 8821a
TP-LINK T2U v3	2357:011f	Realtek 8821a
Other 8821A-enabled products	0bda:0811, 0bda:0821, 0bda:8822, 0bda:a811	Realtek 8821a
TP-LINK T2UHP	2357:010b	MediaTek 7650u
TP-LINK T2U	148f:761a	Ralink 7610u
TP-LINK T2UH	148f:761a	Ralink 7610u
TP-LINK T2U v2	0e8d:7650	MediaTek 7650u

ipTime

Model	USB VID:PID	Chipset
Other products using 7650u / 7610u such as ipTime A1000	148f:7610, 0e8d:7610	MediaTek 7650u / 7610u
ipTime N150UA TP-Link TL-WN727N v4	148f:7601	Ralink 7601U
ipTime N150UA / N150U	148f:3070	Realtek 3070
ipTime N150UA	148f:5370	Realtek 5370
ipTime N100mini (N300U / Ncubic)	0bda:8176	Realtek 8188CU/8192CU
TP-Link TL725N v2	0bda:8179	Realtek 8188EUS

In addition to this, USB Wifi dongle using chipset below can be used.

Chipset
MediaTek 7650u / 7610u
Ralink 7601U
Realtek 3070
Realtek 5370
Realtek 8188CU/8192CU
Realtek 8188EUS
Realtek 8821a
MediaTek 7650u
Ralink 7610u

NOTE
It may take up to 5 seconds for the Wifi dongle to connect to the device and be recognized. At this time, please be careful as USB may not work when detached.

IT Network Connection

No one other than service personnel can connect this device to the network. Please consult with the hospital IT staff in advance.

Please refer to the following document to proceed with the installation.

- Documents attached to this device
- Network interface manual
- BM Central User Documentation

It is recommended to comply with IEC 80001-1(Risk management of IT networks connected to medical devices).

LAN Network

LAN networks are usually configured through star topology. Individual devices can be combined into groups via a layer –n-switch. Other data traffic is separated by separate VLAN networks. Configure your device's network settings according to this user manual and network specifications.

LAN connection specifications are described in the following standard specifications.

- Wired network: IEEE 802.3
- Wireless network: IEEE 802.11 (a, b, g, n)

In addition, it is necessary to establish a network system that detects and defends against denial-of-service attacks by installing dedicated DDos defense system.

If the device is used as a layer-2-switch or layer-3-switch, the port settings must be configured on the network switch. The Bionet equipment must be configured to make network settings compatible with the operating organization's.

The device exchanges data with other medical devices over the LAN network. The network supports the following transport and protocols:

- TCP/IP
- BROADCAST

VLAN Network

If data is exchanged within a single network, an independent VLAN network for clinical information systems must be established. At least one of the following independent VLAN networks must be established.

- Network for medical devices in hospitals
- Network for portable patient monitors

When Using an Inappropriate Network

If your network does not meet the requirements, the following dangerous situations can occur.

The following situations may occur with this unit.

- If the distributed alarm system is not safe:
  - The alarm will not be delivered.
  - The alarm or data is delayed.
  - An error alarm appears.
- If the network connection is interrupted:
  - The alarm will not be delivered.
  - Reactivates with the alarm off or the alarm sound off.
- If you do not have firewall and antivirus software:
  - Your data is not protected.
  - The device settings are changed.
  - The device raises an error alarm or does not generate an alarm.
  - Data is sent incomplete, to the wrong device, or not at all.
  - Patient data is blocked, falsified, or corrupted.
  - The time stamp of the data is inaccurate.
- Overloading this unit due to very high network loading (e.g. denial of service attacks) can cause interface deactivation. The interface can only be used again after the device is restarted. Rarely, booting may be slow or repeated reboots may occur.

4. Patient

Patient Overview

The Patient menu allows you to enter and edit a patient's personal data (Type, ID, Name, Gender, Birthday, Weight, Height, Blood Type).

There is a difference in the flow of patient management depending on the operating mode.

Patient information is used separately for each mode of operation.

- Continuous
- Spot & Triage

Continuous Mode

In continuous mode, you can manage the patient admission and discharge of hospital.
The admit patient is maintained even when the monitor is turned off and on. If the operating mode is switched, the admit patient is discharged. Admit is also discharged when using demo mode.

Patient Admission(Continuous Mode)

How to admit a patient

1. Press the Patient window.
2. Press the New button.
3. Enter the Patient Information.

   Please select a field. The data entry screen appears. Click the letter of the word you want to input. If you made a mistake, click Backspace and try again. ID is mandatory.

4. Click on Admit.

Patient Discharge(Continuous Mode)

The patient should be discharged before the other patient is admitted. Otherwise, the data will be stored following the previous patient data.

How to discharge a patient

1. Press the Patient window.
2. Press the Discharge button.
3. When the patient is successfully discharged, a banner with the following message is displayed.

Spot / Triage Mode

In the spot and triage modes, patient information is not maintained when the monitor is turned off. Patient information is entered as unknown id and can be used without registration. You can also register by pressing the new button. When switching to that mode, id is entered as unknown patient. When you change the patient, all relevant data is deleted from the monitor.

How to register a new patient

1. Press the Patient window.
2. Press the New button.
3. Enter the Patient Information.
4. Click the OK button.

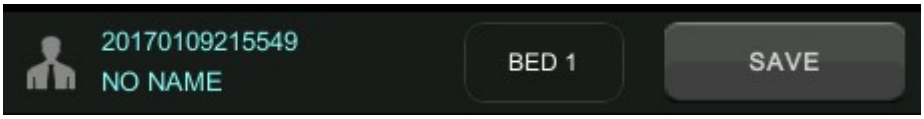
NOTE
• To change a patient's classification (adult, pediatric or neonate), access the patient settings menu. • If you change the patient's classification, you will have to select again because the weight choices disappear. • Additional settings (Gestational Age and Birth Weight) are available for neonate mode. Day of Life and Corrected GA values are also displayed in read-only fields. • Patient's height and weight related items and changes affect all other monitor menus and displays that use this information. • Patient data can be stored for up to 5000 people, and more than 5,000 patients will be erased from old patients.

Patient Type Image

Type	Male Admit	Female Admit	Discharge(*c)
ADULT			
PEDIATRIC			
NEONATE			

(*c)Continuous mode only

Patient Window By Operation Mode

Mode	Patient Window
Continuous	
Spot & Triage	

Patient Settings

	Main Menu	Sub Menu
	**A. ADMIT / DISCHARGE**	
	B. PATIENT INFORMATION	**B-1.** PATIENT INFORMATION
	C. DEFAULT SETTING	
	D. USER DRUG CHANGE	
	E. DRUG CALCULATION	**E-1.** SETTING
		E-2. TITRATION TABLE

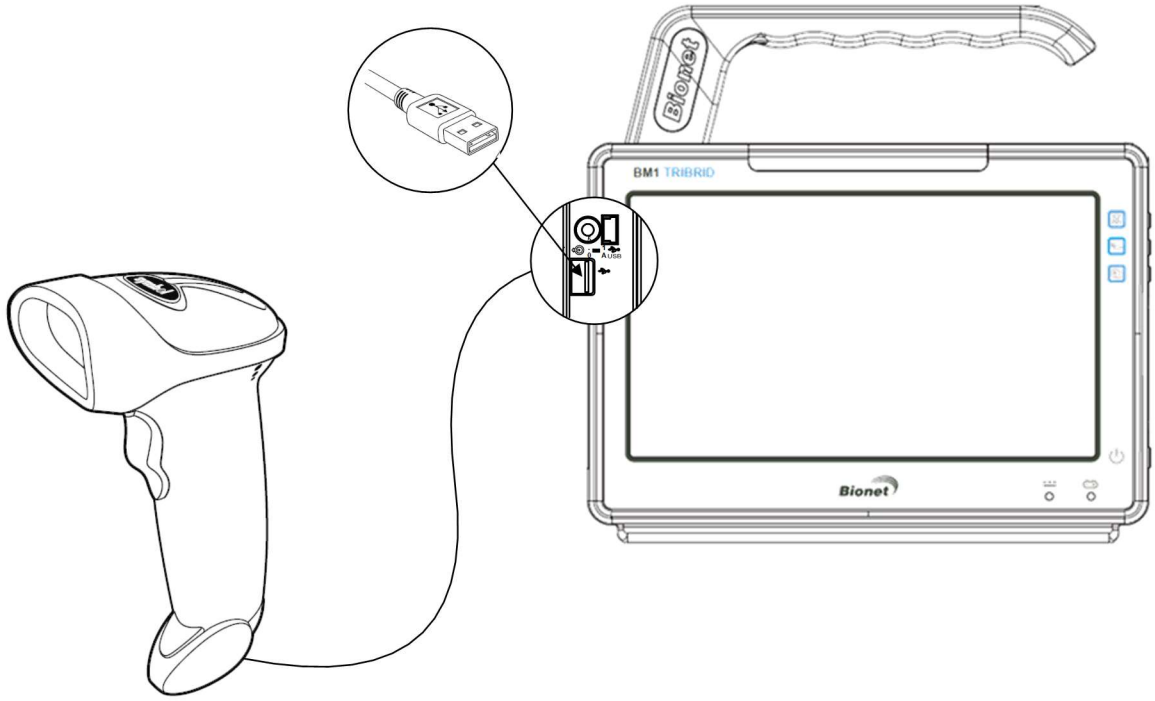
Menu	Description	Available Settings
A. PATIENT WINDOW		
A-1. PATIENT INFORMATION		
A-1. PATIENT TYPE	Patient Type setting	ADULT/ PEDIATRIC/ NEONATE
A-2. ID	Patient ID setting	
A-3. FIRST NAME	First Name setting	
A-4. LAST NAME	Last Name setting	
A-5. GENDER	Gender setup	MALE/ FEMALE
A-6. BIRTHDAY	Birthday setting menu	YYYY/ MM/ DD
A-7. WEIGHT	Weight setting	XXX.XX Kg
A-8. HEIGHT	Height setting	XXX.XX Cm
A-9. BLOOD TYPE	Blood Type setting	A Rh+/ Rh-/ -D-/ Rh

		Null B Rh+/ Rh-/ -D-/ Rh Null O Rh+/ Rh-/ -D-/ Rh Null AB Rh+/ Rh-/ -D-/ Rh Null Unknown
A-10. BED NO(*s,t)	Bed number setting	
A-11. STAFF(*s,t)	Staff setting	

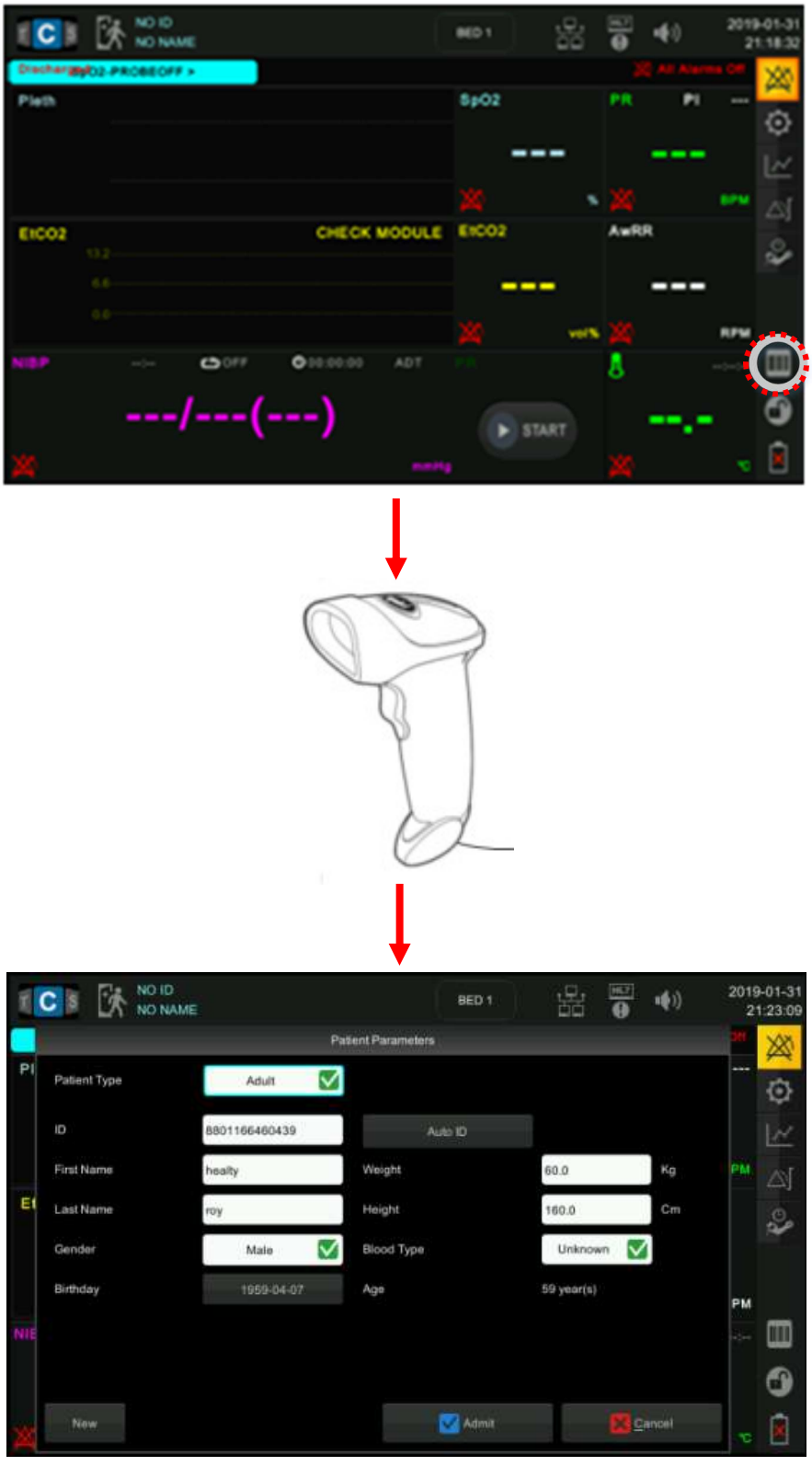
How to Manage Patient Information Using the Barcode Scanner

This product can input PATIENT ID in barcode format to the device by using USB barcode scanner.

Connect the barcode scanner to the USB HOST connecter on the left side (from the front) of the device, as shown below. Barcode functionality can be used once after BEEP sound is made and barcode icon( ) is displayed at the screen.



1. ID will be scanned then sent to device after aligning index LED from the scanner to desired barcode and pressing input button.
2. The patient information dialog will be popped up with the id entered.
   - by Admit : Using the HL7 Admit, the patient information stored in the server can be loaded.
   - by stored in the device : If the ID has already been used, ID and patient information are stored in the device. When ID is entered as scanner, patient information is loaded together.
   - Patient information loaded in HL7 Admit has higher priority than stored in the device.


NO ID
NO NAME
BED 1
2019-01-31
21:18:32
Pleth
SpO2
PR
PI
EtCO2
CHECK MODULE
EtCO2
AwRR
NIBP
START
NO ID
NO NAME
BED 1
2019-01-31
21:23:09
Patient Parameters
Patient Type
Adult
ID
8801166460439
Auto ID
First Name
healty
Weight
60.0
Kg
Last Name
roy
Height
160.0
Cm
Gender
Male
Blood Type
Unknown
Birthday
1959-04-07
Age
59 year(s)
New
Admit
Cancel

5. ALARM

ALARM Overview

In continuous mode the monitor displays the alarm limit (parameter threshold) and can be configured by the user to raise an alarm if exceeded. Limits are displayed both in the alarm limits table and in the parameter box. If this limit is exceeded, a visual or audible alarm will occur.

The bedside monitor is the primary alarm device, and there may be other secondary alarm devices depending on how you configured the device / network. Depending on the alarm condition, the monitor generates an alarm using one or more of the following devices:

- Hearing sound reflecting alarm severity
- Change the color in the parameter box of the alarm parameter
- Alarm messages in the local message area
- Alarm banner indicating alarm status
- External alarm device such as nurse call system
- Activate alarm recording

The monitor generates an alarm when the parameter in the Alarm Limits table is ON. It is not a prerequisite that the parameter is displayed on the display or connected in the event of an alarm.

ALARM Priority

The alarm type is divided into a patient status alarm and a product status alarm. The patient status alarm status is not checked in Spot and Triage modes.

The patient status alarm sounds when the alarm upper and lower limits are exceeded, and there

are levels of HIGH, MEDIUM, LOW and MESSAGE, and there is a difference in the order and volume of the alarm.

The patient status alarm provides the highest priority alarm.

The features of each alarm are described as follows. The alarm priority is HIGH> MEDIUM> LOW> MESSAGE.

Alarm priority	Alarm sound	Alarm status window	Number flashes	Alarm lamp
HIGH	-5	RED	250	R
MEDIUM	-3	YELLOW	250	Y
LOW	-1	YELLOW	250	Y
MESSAGE		BLUE	250 (No Blinking)	

Product status alarm -It is labeled as 'Technical Alarm' in the instrument.

Alarm priority	Alarm sound	Alarm status window	Number flashes	Alarm lamp
LOW	-1	BLUE	250	C
MESSAGE		BLUE	250	

R : Blinking red alarm lamp on the front panel.

: Blinking yellow alarm lamp on the front panel.

: Blinking cyan alarm lamp on the front panel.

Audible alarm		
Alarm priority	**BIONET**	**IEC**
HIGH	1 high sound per 5 seconds	5 consecutive beeps for every 5 seconds
MEDIUM	1 high sound per 15 seconds	3 consecutive beeps for every 15 seconds
LOW	1 low sound per 30 seconds	1 beep for every 30 seconds

ALARM Management

Users can change to various alarm modes using the alarm mode change key on the top front of the monitor.

Change Alarm Mode:

To change alarm mode you can use the 'Alarm control key' on the side of the monitor.
Alarm mode changes from Normal → Audio Paused → Alarm Paused → Normal.
Press and hold the alarm control key for 3 seconds to switch from Normal to 'Audio Off' or 'Alarm Off mode'

Audio_Paused:

The alarm is temporarily silenced for 1 minute to hold the audible alarm. A banner with the message Audio Paused and a countdown timer are displayed on the screen. However, the visual alarm, that is, the alarm status is still displayed on the screen. In this state, if a new alarm occurs during the silence period of an alarm, or if the alarm condition continues to occur even after 1 minute, which

is the silence period of the alarm, the alarm silence is canceled and the alarm sound is generated again.

Alarm_Paused:

It transitions to a paused alarm for a user-defined time period, suspending visual and audible alarms. A banner with the message Alarm Pause and a countdown timer are displayed on the screen. In this state, if the alarm continues to occur even if the user presses the alarm mode key again or the timeout period has elapsed during the alarm pause period, the alarm pause is canceled and the alarm display and alarm sound are generated again.

Alarm_Off:

Stop visual and audible alarms. A banner with the message Alarm Off is displayed on the screen. All alarms remain stopped until the user switches to another alarm mode.

Audio_Off:

Stop an Audible Alarm. A banner with the message Audio Off is displayed on the screen. The monitor remains silent until the user switches to another alarm mode.

Alarm Control:

Various alarm functions, such as alarm hold, validity and alarm limit indicators, can only be configured in the alarm control menu, accessible only through the password protected unit manager menu.

Nurse Call:

If the monitor is sounding an alarm, the Nurse Call system is signaling.

When an audible alarm is silenced (Audio Pause or Audio Off) at the bedside unit, the Nurse Call system will not alarm.

Your system administrator can change the alarm priority level for the Nurse Call signal.

If the priority level is set to High , only high-priority alarms will sound on the Nurse Call system.

NOTE
● Audio Paused and Audio Off mode stops only the Alarm sound, so a Touch or Key Sound may occur. ● To adjust Touch or Key Sound, please use the Key Sound menu in Setup.

ALARM Settings

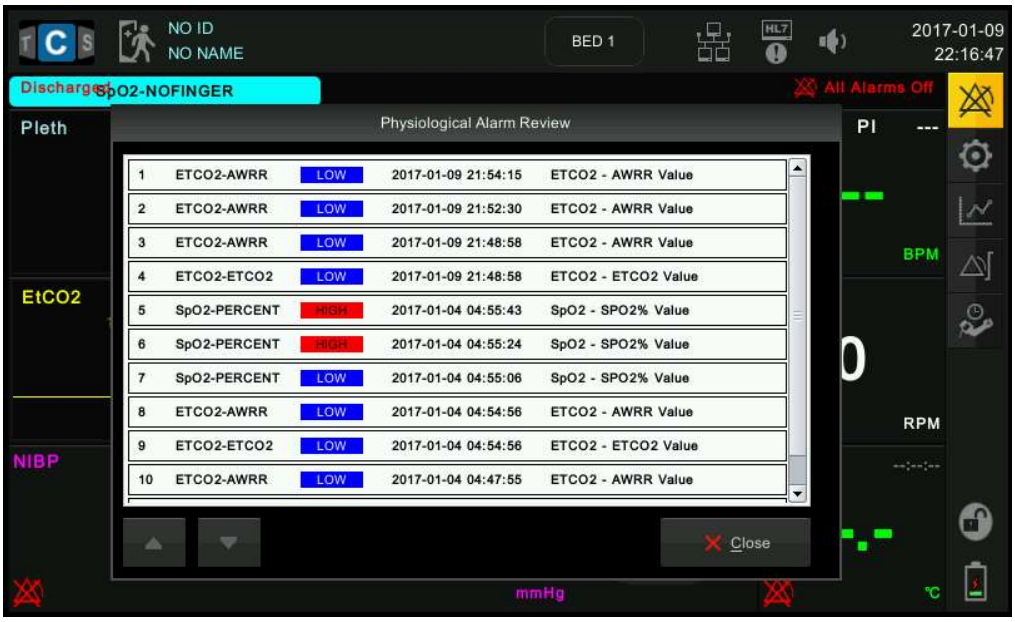
	Main menu	Sub menu
	**A. ALARM SETUP**	**A-1.** PARAMETER ALARM LIMIT
		A-2. SYSTEM ALARM CONDITION
		A-3. ALARM PARAMETER
		A-4. NURSE CALL
		A-5. SETUP
	B. ALARM REVIEW(*c)	

MENU	Description	Available Settings
A. ALARM SETUP		
A-1. PARAMETER ALARM LIMIT	All parameter alarm, level, activate Setup menu	
A-1-1. PARAMETER TYPE		SpO2, NIBP, TEMP, ETCO2(*c)
A-1-2. PARAMETER ALARM LIMIT(*c)	ALARM	ON/OFF
	LEVEL	MESSAGE/LOW/MEDIUM/HIGH
	UPPER LIMIT	Alarm high limit for each parameter
	LOWER LIMIT	Low alarm value of each parameter

A-1-3. TECHNICAL ALARM CONDITION	ALARM	ON/OFF
	LEVEL	MESSAGE/LOW/MEDIUM/HIGH
A-2. SYSTEM ALARM CONDITION		
A-2-1. SYSTEM LOW BATTERY	ALARM	ON/OFF
	LEVEL	MESSAGE/LOW/MEDIUM/HIGH
A-3. ALARM PARAMETER	Alarm Settings menu	
A-3-1. ALARM VOLUME	The volume can be changed from OFF to 10% to 100%.	10~ 100%
A-3-2. ALARM SOUND	Alarm sound type	IEC-60601/ BIONET
A-3-3. ALARM PAUSE TIME	Set alarm time in Alarm Paused mode.	1,2,3,5,10,15min
A-4. NURSE CALL	User setting menu	
A-4-1. SETUP	NURSE CALL function ON / OFF; After setting ON, check if relay sound is heard in ALARM situation.	ON/OFF
A-4-2. CALL TYPE	Set nurse call status in normal situation.	Normal Open Normal Close
A-4-3. DURATION	Set the frequency of nurse call occurrence in alarm situation	One Time Continue Cycling
A-4-4. LEVEL	Set at which level the nurse call is triggered.	Low Medium High
B. ALARM REVIEW		

(*c)Continuous mode only

Alarm Review



6. EWS(Early Warning Score)

EWS Overview

EWS(Early warning score)

EWS(Early warning score) is a guideline used by clinicians to quickly determine the patient's risk.

EWS can be used to monitor examination, pre- and post-operative, accident and emergency patients.

Parameters

Respiration Rate, O2 Saturation, Systolic Blood Pressure, Pulse Rate, Level of conciouness, Temperature, Urine.

EWS Variations

MEWS(Modified Early Warning Score)

NEWS(National Early Warning Score)

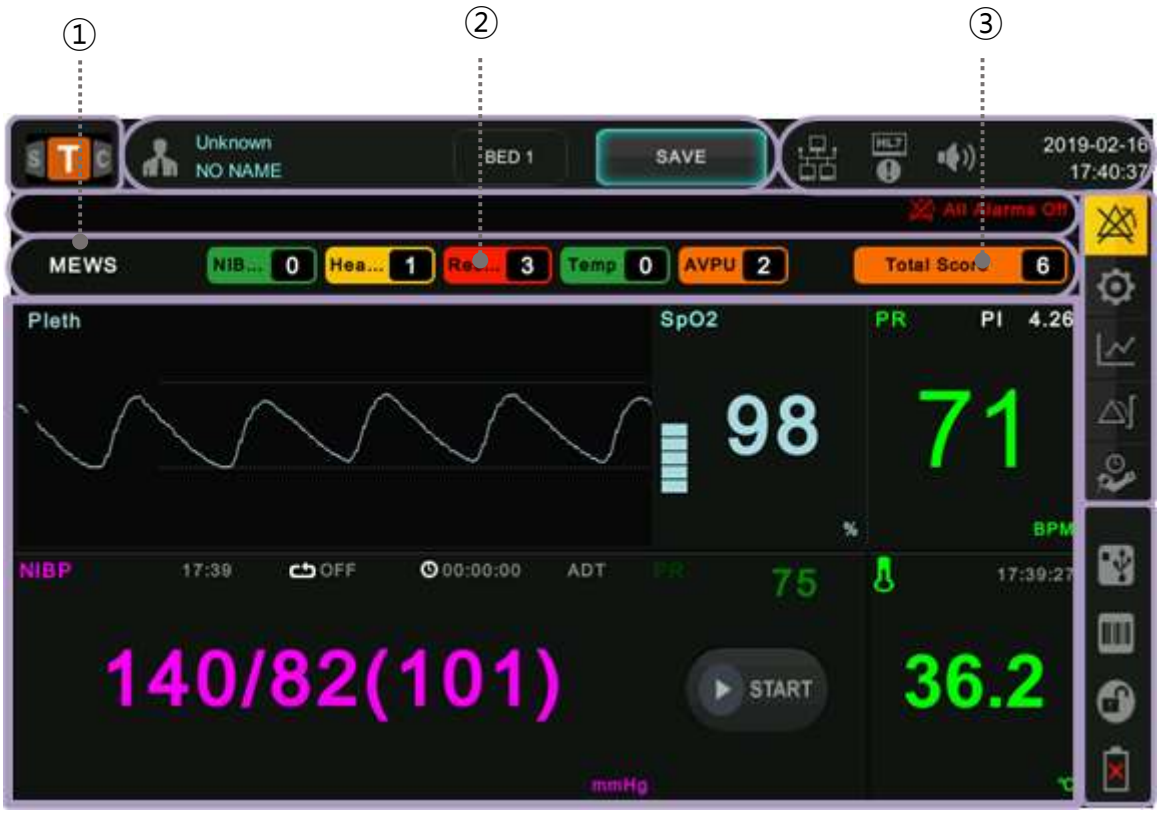
PEWS(Pediatric Early Warning Score)

MEOWS(Modified Early Obstetric Warning Score)

TEWS(Triage Early Warning Score)

How to Use EWS

EWS Score Display (Triage mode only)



①	EWS type
②	Score by parameter
③	Total score

Save EWS Data

Automatic saving by trigger:

The EWS study is automatically saved as Nibp or Temp is measured.

By pressing the save button save directly(none measurement items):

EWS window -> Enter the score -> Press EWS save button

EWS Type Setting

EWS window -> Press the setting icon  -> Enter the user password -> Select the desired EWS type and click the OK button

EWS Type Export and Save

EWS Import

Insert the USB memory -> EWS window -> Press the setting icon  -> Enter the user password -> Press Import Button

EWS Export

Insert the USB memory -> EWS window -> Press the setting icon  -> Enter the user password -> Press Edit button -> Select the type you want to change -> Press Export button

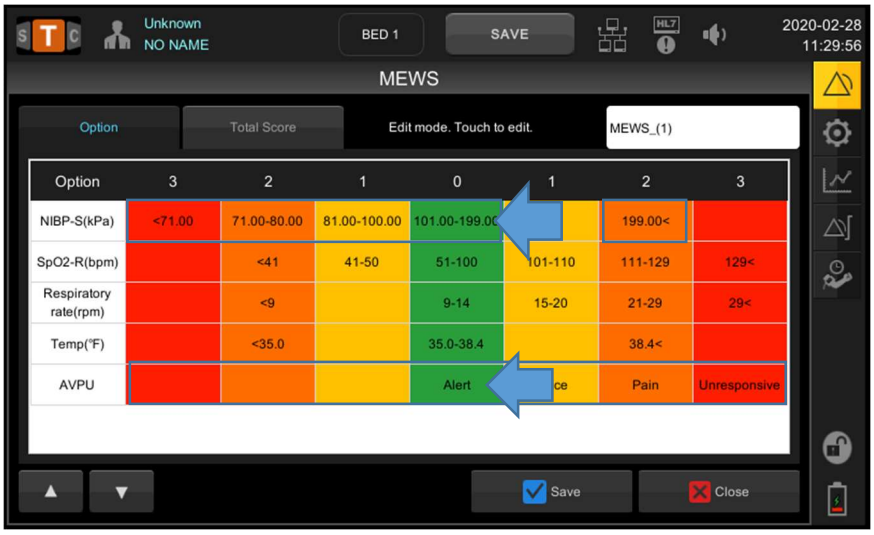
EWS Type Delete

EWS window -> Press the setting icon  -> Enter the user password -> Press Edit button -> Select the type you want to change -> Press Delete button -> Press OK button

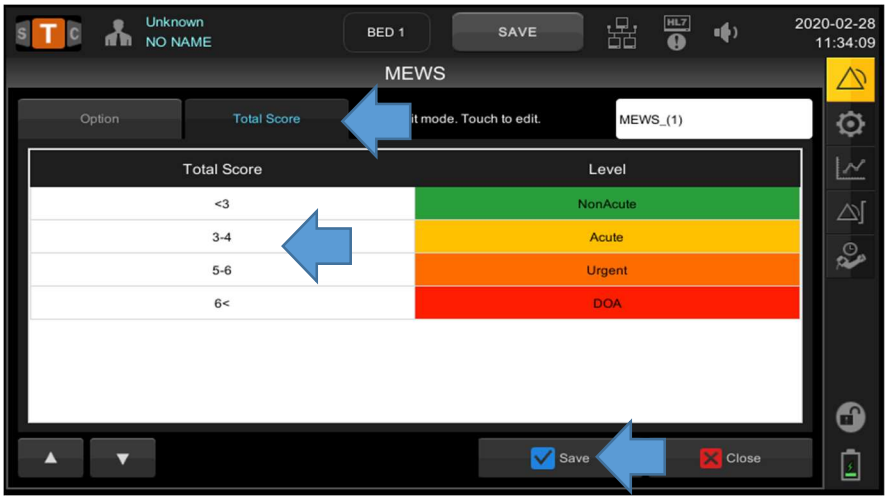
Up to 10 EWS type files can be saved.

Edit EWS Type

EWS window -> Press the EWS title button -> Press Edit button -> Enter the user password -> Press Enter -> Press the numeric window you want to edit -> Edit item -> Press OK button



<Click the numeric window you want to edit>



<Edit total score items>

<Edit numeric items>

<Edit text item>

7. TREND

TREND Overview

The monitor can stores trend data for connected signal. Users can request trend recording and can also export the screen of trends displayed.

Stores trends according to the characteristics of the operating mode.

Continuous Mode

Graphical Trend

Trend graph shows saved trend data as individual graph type for each parameter. These graphs show that the displayed parameters are active over a significant period of time Shows four channels at a time. Confirmation color and scale Meter labels and numbers are displayed on the left side of the trend channel. Vertical lines in each graph. This displays the time distribution. Trends keeps the most up-to-date data. It is automatically updated on the right side of the graph.

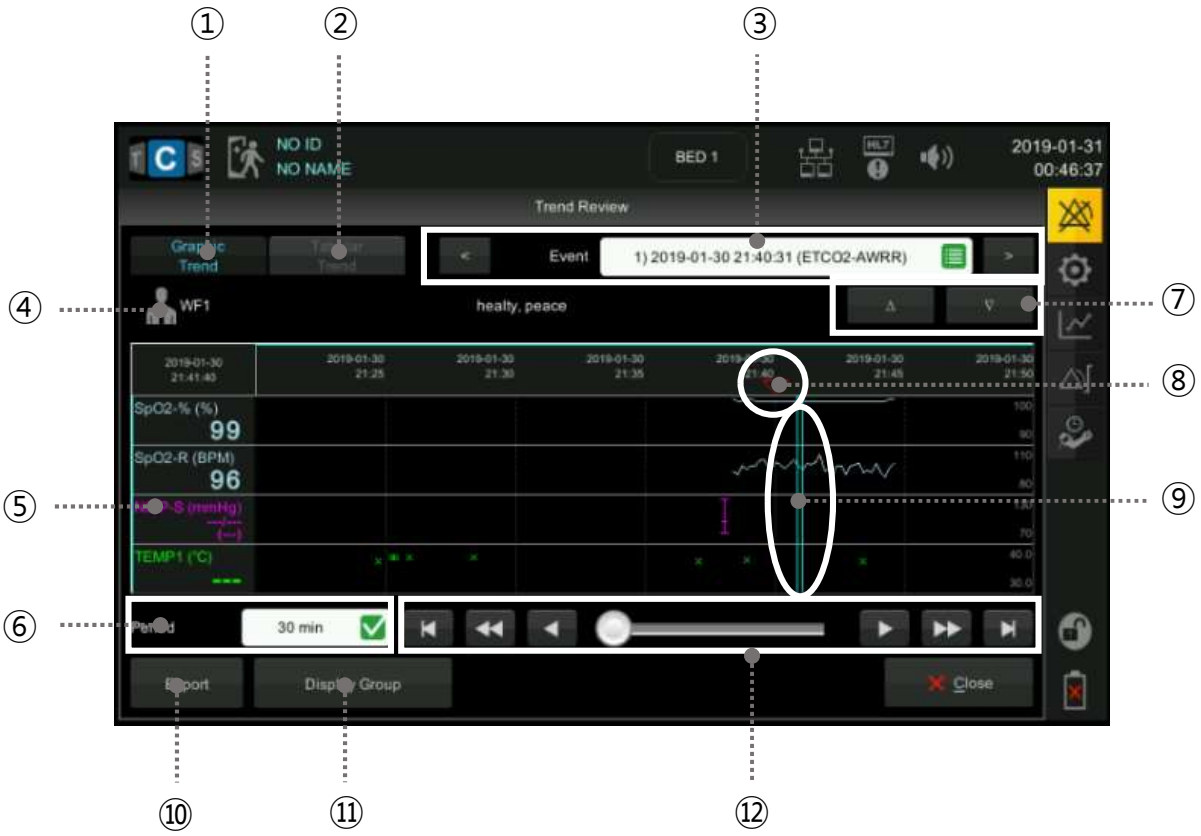
Tabular Trend

The Trends table displays the trend data in an easy-to-read table format. Up to four are displayed, updated every minute. The time stamp above each column indicates the interval at which the data in that column was trended. The value displayed is the last one acquired during the interval, and the most recent data is displayed in the rightmost column.

The monitor deletes all trend data when the patient is discharged.

At the top of the trend screen, a summary of the auto-saved events (alarms) is displayed.

TREND Display (Continuous Mode)

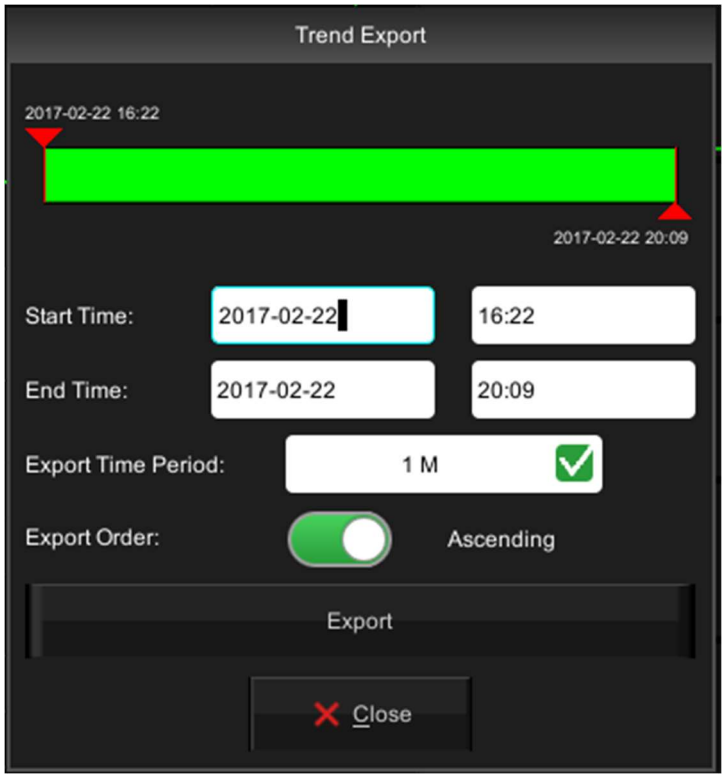


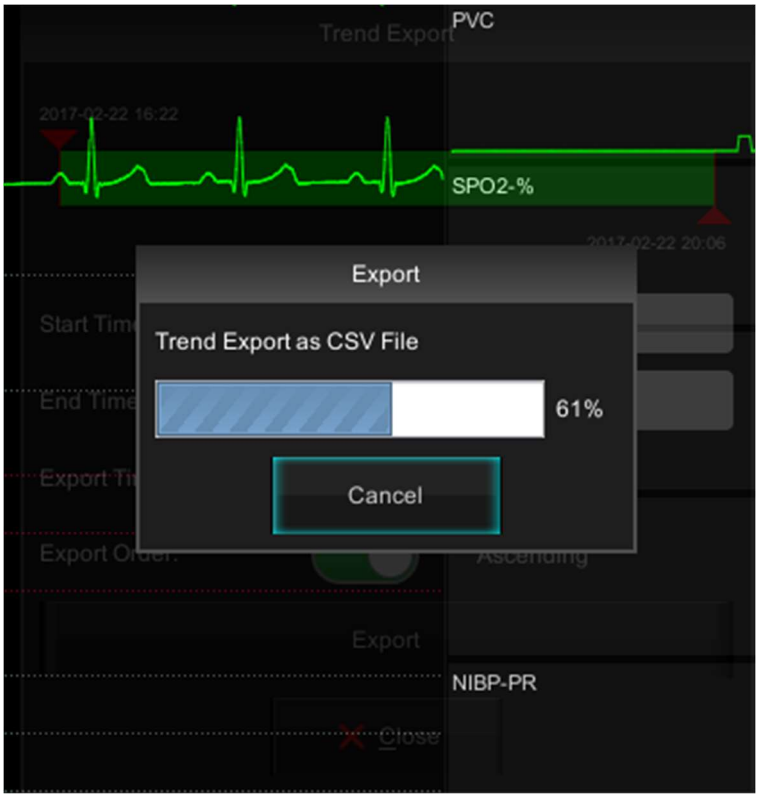
①	Graphic trend select button
②	Tabular trend select button
③	Event list menu & Event previous/next menu
④	Patient information : ID and name.
⑤	Parameter numeric window
⑥	Period setup menu
⑦	Parameter window selection menu
⑧	Event mark
⑨	Focus bar
⑩	Export button
⑪	Display group button
⑫	Navigator button

File Export

The file extract function can transfer trend to a file using USB memory.

1. Confirm USB memory connection.
2. Press TREND > Export button.
3. Set a start time, end time, export time period, and export order.
4. Press Export button.
5. The data is transferred to USB memory. A completion message is displayed when the transmission is completed.





TREND Setup (Continuous Mode)

	Main menu	Sub menu
	**A. TREND**	

MENU	Description	Available settings
A. TREND SETUP		
A-1. GRAPHIC TREND		
A-2. TABULAR TREND		
A-3. EVENT LIST		
A-4. PERIOD	**Graphic Trend** : Saved data can be viewed graphically in sections. **Tabular Trend** : Time period setting	**Graphic Trend** : 30min, 60min, 90min, 2hour, 3hour, 4hour, 6hour, 8hour, 12hour **Tabular Trend**:

		1min, 5min, 10min, 15min, 30min, 1hour, 2hour
A-5. EXPORT	Trend export menu.	
A-5-1. START TIME	Parameter save start time setting menu	hh:mm
A-5-2. END TIME	Parameter save last time setting menu	hh:mm
A-5-3. EXPORT TIME PERIOD	Time period setting	1min, 5min, 10min, 15min, 30min, 1hour
A-5-4. EXPORT ORDER	ascending order setting	Descending Ascending
A-5-5. EXPORT	export button	
A-6. DISPLAY GROUP	Parameter settings menu to display on screen	

Spot / Triage Mode

The saved patient trend is managed. Press the save button to save the trend item. And the trend item is saved according to the auto save trigger setting. The trend item is called spot study.

How to Save Spot Study:

Case 1. Using the save button.

1. After measurement, press Save button in the patient window. If there is no patient information, add the patient information.
2. In Triage mode, enter the EWS values and Press the OK button.

Case 2. Using the auto trigger setting : When trigger setting is on, auto trigger save function is activated.

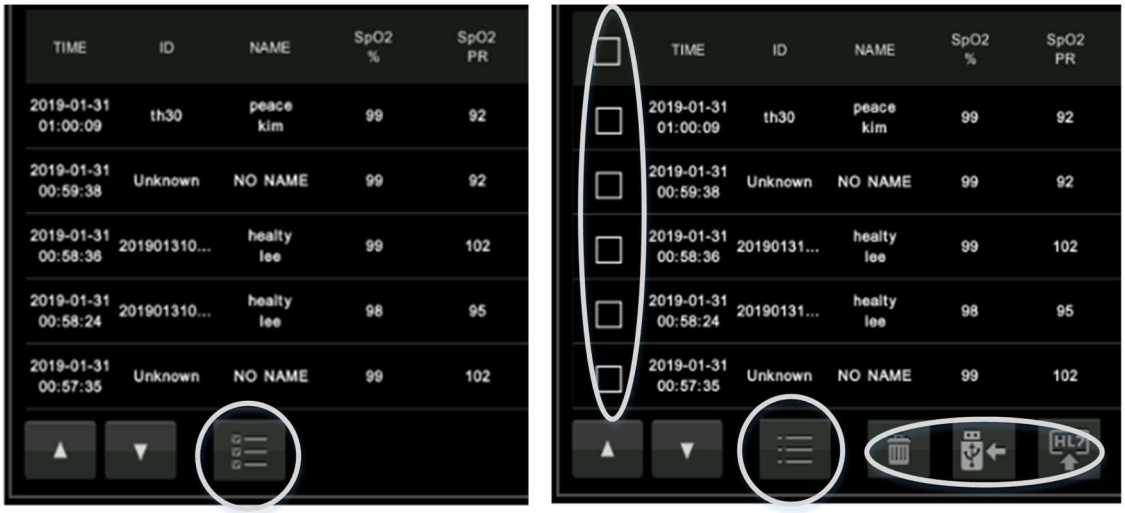
1. Setup->User Services->Check the NIBP Trigger or TEMP Trigger settings
2. STUDY is automatically stored when TEMP or NIBP is measured.

How to View spot Study**:**

1. Press the trend icon ( ).
2. Spot studies saved during the set duration are displayed on the screen.
3. Set the search condition by ID, name and duration.
4. If the ID and name fields are empty, they are searched except for those conditions. If the ID is empty, the search field will search for all IDs.
5. Press the search button ( ) to confirm the spot study of the patient.

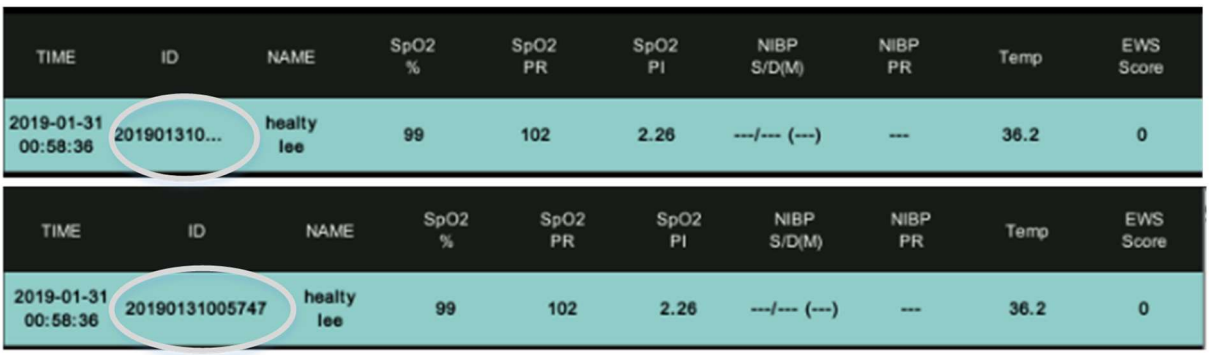
TREND Display (SPOT / TRIAGE Mode)

Study Management



①	Search condition field. : ID, Name, Duration
②	Clickable table header: You can sort by time, ID or name in ascending or descending order by pressed table header(time, ID or name header).
③	Page move button.
④	Study management buttons. : You can select a study to delete, export, or transfer using HL7. When HL7 transmission fails, the TIME and ID columns are displayed in red.
⑤	EWS SCORE: In Triage mode, if the study is stored together with EWS (in Triage Mode), the EWS score will be filled with numbers instead of '---'.

TIP : If the ID or name is omitted as '...', press and hold the omitted ID or name. You can check the omitted text by extending the area.



TREND Setting Menu(SPOT / TRIAGE mode)

	Main Menu	Sub Menu
	**A. TREND**	

Menu	Description	Available settings
A. TREND		
A-1. ID	Search ID	
A-2. NAME	Search Name	
A-3. DURATION	Time the study was saved	1hour, 1day, 1week, 1month, All
A-4. CLEAR	Delete ID and name	
A-5. SEARCH	Study search	
A-6. CHECK	 Change button to multi-selectable state. At checkable status, checked study can be deleted, USB export or HL7 data send. If you press the check box in the table header, you can cancel or check the entire study.  Change the study to a single selectable state. In the single selectable state, the stored EWS score can be check.	 
A-7. DELETE	Delete the checked study.	
A-8. USB EXPORT	Export the checked study to USB.	
A-9. HL7 EXPORT	Export the checked study using HL7.	

NOTE
Saving Patient Data to a USB • Exported patient data on a USB memory drive is not encrypted and therefore raises privacy concerns. So, only authorized personnel should be allowed to view, handle, store or transmit patient data. • The file format of the USB memory drive used for the BM1 patient monitoring device is FAT32.

8. SpO2

SpO2 Overview

SpO2 monitoring is a non-invasive technique that measures the total amount of oxygen in hemoglobin. The pulse rate is measured by measuring the absorption of the wavelength of the selected light. The light emitted by the sensor in the probe passes through the tissue and is converted into an electrical signal by the light-detecting sensor in the probe. The monitor processes the electrical signal and displays the waveform, %SpO2, and pulse rate on the screen as quantified values. Red and infrared rays are passed through the capillaries of the fingertip to detect the pulsating component, calculate HR and oxygen saturation, and alarm according to the set alarm value.

SpO2 Precautions

SpO2 measurements are particularly sensitive to arterial and arteriolar pulse rates. Patients experiencing shock, hypothermia, anemia, or patients taking medications that reduce arterial blood flow may have incorrect measurements.

WARNING
● The pulse oximeter cannot be used as an apnea monitor. ● High oxygen levels can make premature babies vulnerable to retrolental fibroplasia. When this is the case, do not set the maximum alarm limit to 100%, such as the effect of turning off the alarm. Percutaneous SpO2 monitoring is recommended for premature infants receiving supplemental oxygen. ● Inspect the applied area every 2-3 hours to check the skin condition and check if it is attached to the naked eye. If skin conditions change, move the sensor to another location. Change the application site every 4 hours at least.

- Use only Bionet-designated sensors. Other sensors may not provide adequate protection against defibrillation or may put the patient at risk.
- Disposable accessories (disposable electrodes, transducers, etc.) should be used only once. Do not reuse disposable accessories.

SpO2 Patient Preparation

The accuracy of SpO2 monitoring is largely dependent on the strength and quality of the SpO2 signal.

If you use your fingers as a monitoring site, remove the nail polish. Cut the patient's fingernail if needed to improve placement of the sensor. Only use sensors provided by Bionet and apply them according to manufacturer's recommendations on a per-sensor basis.

If the sensor is not attached correctly, the ambient light may interfere with the pulse oximetry, making the measurement irregular or causing the value to disappear. If you suspect interference from ambient light, make sure that the sensor is properly positioned and that the sensor cover with the opaque body is covered.

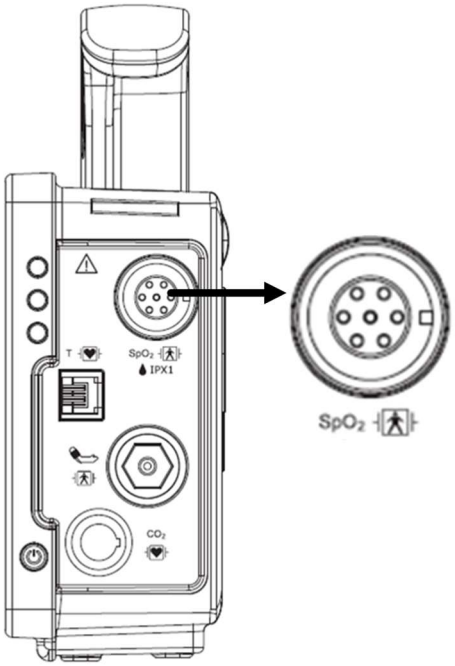
Preparation Order

1. Select the sensor type and size that best suits your patient.
2. If the sensor can be reused, please wash it before use for each patient.
3. Position the sensor correctly and attach it to the patient.
4. Connect the sensor to the patient cable.
5. Check the application area of the sensor from time to time. If the sensor is too tight, it may delay blood flow or overheat the skin and damage the tissue. Do not use a damaged sensor.

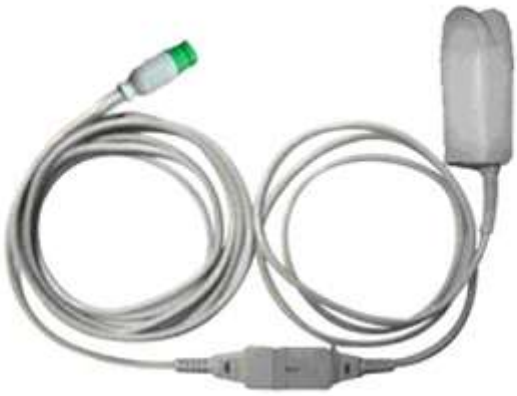
NOTE
Read the documentation that came with your sensor for the best application technology and safety information. Never use a damaged sensor. If the sensor does not turn on after connecting the sensor, observe that a message appears on the monitor. If the sensor-LED does not turn on, replace the sensor.

SpO2 Connector and Measurement Cable

SpO2 Connector

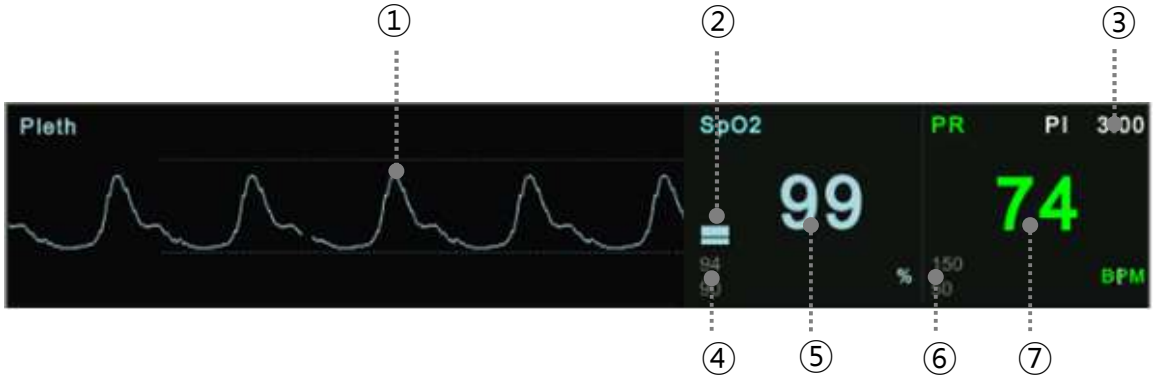


SpO2 Measurement Cable



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 electro surgery.

SpO2 Display



①	SpO2 Wave window
②	SpO2 Strength indicator
③	SpO2 PI(Perfusion Index) display
④	SpO2 Alarm limits display

⑤	SpO2 Value display
⑥	SpO2 Value unit
⑦	SpO2 Pulse rate display

The current SPO2 value and the derived pulse rate (RATE) are displayed.

The block sets indicate the strength of the signal (ten 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.

NOTE
SpO2 wave size is changed automatically.

SpO2 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

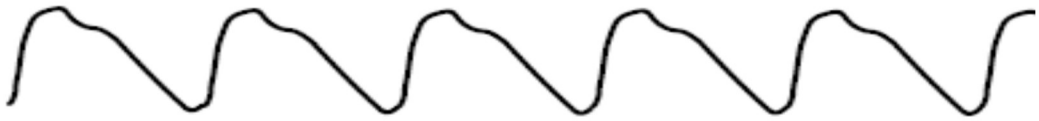
The signal strength bar is displayed within the SpO2 values window. This bar consists of 10 blocks set depending on the strength of the signal. Proper environmental conditions and probe attachment will help to ensure a strong signal.

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.



If noise (artifact) is seen on the waveform because of poor probe placement, the photo detector 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.

Stability of SpO2 Values

The stability of the displayed SpO2 values can also be used as an indication of signal validity.

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.

SpO2 Settings

MENU	Description	Available Settings
A. SpO2		
A-1. SWEEP SPEED	It can set the speed of SPO2 displayed on the screen. Default: 25 mm/s.	6.25mm/s, 12.5mm/s, 25mm/s, 50mm/s
A-2. RATE VOLUME	OFF or 10%~100% setting	OFF, 0%~100%
B. SpO2 Parameters		
B-1. ALARM	SpO2 Alarm setup menu	
B-1-1. PARAMETER ALARM LIMIT(*c)	PERCENT, PR parameter alarm, level, activate setup menu	
B-1-2. TECHNICAL ALARM CONDITION	SPO2-PROBEOFF SPO2-CHECKPROBE SPO2-POORSIGNAL SPO2-LOSTPULSE SPO2-ARTIFACT SPO2-PULSE SEARCH	
B-2. SETTING		
B-2-1. RATE VOLUME	OFF or 10%~100% setting	OFF, 0%~100%
B-2-2. SWEEP SPEED	It can set the speed of SPO2 displayed on the screen. Default: 25 mm/s.	6.25mm/s, 12.5mm/s, 25mm/s, 50mm/s

SpO2 Status Messages

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

Message	Status
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	It indicates that something happened to the pulses; determine if the artifact to be abnormal and irregular.

9. NIBP

NIBP Overview

The monitor can acquire and process non-invasive blood pressure (NIBP) signals and display the output. Blood pressure measurements are determined by the oscillometric method and are equivalent to those obtained by intra-arterial methods, within the limits prescribed by the Association for Advancement of Medical Instrumentation, Electronic Automated Sphygmomanometers (AAMI/ANSI SP-10).

If the pulse signal is poor due to patient movements, improper cuff placement or noise in the signal, the cuff deflates and the monitor attempts a second measurement. For causes and possible remedies for a poor pulse signal see the alarm message tables. The hose connects the cuff to the monitor to determine the contraction, expansion and mean blood pressure of an adult, pediatric or neonatal patient. The monitor can start the blood pressure measurement alone with set intervals, set rest time or persistence lasting more than 5minutes.

NIBP Precautions

Measurement Limitations

The measurement may be inaccurate or impossible:

- Heart rate extremes of less than 40 bpm or greater than 300 bpm
- If the patient is on a heart-lung machine
- With excessive and continuous patient movement such as shivering or convulsions
- If a regular arterial pressure pulse is hard to detect
- With cardiac arrhythmias
- With rapid blood pressure changes
- With severe shock or hypothermia that reduces blood flow to the peripheries

With obesity, where a thick layer of fat surrounding a limb dampens the oscillations coming from the artery

- On an edematous extremity
- The effectiveness of this sphygmomanometer has not been established in pregnant, including preeclamptic patients

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

WARNING
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. Pay attention to not to block connecting hose when you put cuff on patient. Cuff or hose connection for leaks periodically. Measurements can be inaccurate if air leaks. 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. Try to measure infants when they are calm. A kicking or crying baby may disturb or jiggle the cuff, causing noise within the system and resulting in unstable blood pressure readings. If necessary, hold the cuffed limb steady, without impeding circulation. Do not hold onto the cuff and do not pat the cuffed limb to comfort the child. NIBP cannot be taken under all conditions. Even manual methods, employing a sphygmomanometer and stethoscope, will not work on unstable or active patients.

Pressurization of the CUFF can temporarily cause loss of function of simultaneously used monitoring ME EQUIPMENT on the same limb.

The need to check that operation of the NIBP does not result in prolonged impairment of the circulation of the blood of the PATIENT.

NIBP Patient Preparation

It recommended PATIENT position in NORMAL measurement, as below:

1. Comfortably seated
2. Legs uncrossed
3. Feet flat on the floor
4. Back and arm supported
5. Middle of the CUFF at the level of the right atrium of the heart

Cuff Selection and Placement

The quality of NIBP monitoring depends largely on the quality of the signals received by the monitor. For this reason, it is important to select the correct cuff size for your patient. Cuff sizes are clearly marked on the cuff. Measure the circumference of your patient's limb. Use only Bionet cuffs with your monitor.

WARNING

Check periodically to see if the circulation from the cuff to the distal part of the patient's arm is good.

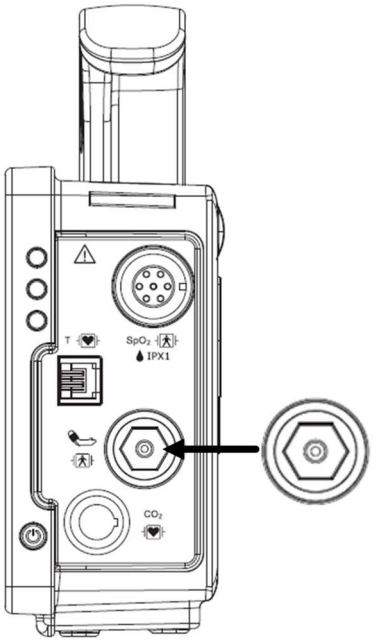
1minute and 2minute intervals When using automatic measurement, check the patient's condition frequently.

It is not recommended for measuring blood pressure for a long time after the measurement time period is set to 10minutes or less.

NOTE
Safety Considerations Software and Hardware for Cuff pressure Blocking: The cuff is automatically reduced when the measurement time is longer than two minutes in Adult / Pediatric mode and more than 90seconds in Neonatal mode. Pressure limits are set for all patient categories to prevent overpressure on the patient. The maintenance is performed every 2 years. Check the following list devises 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. Check for leak in cuff or tubing. 7. Patient may have a weak pulse.

NIBP Connector and Measurement Cable

NIBP Connector



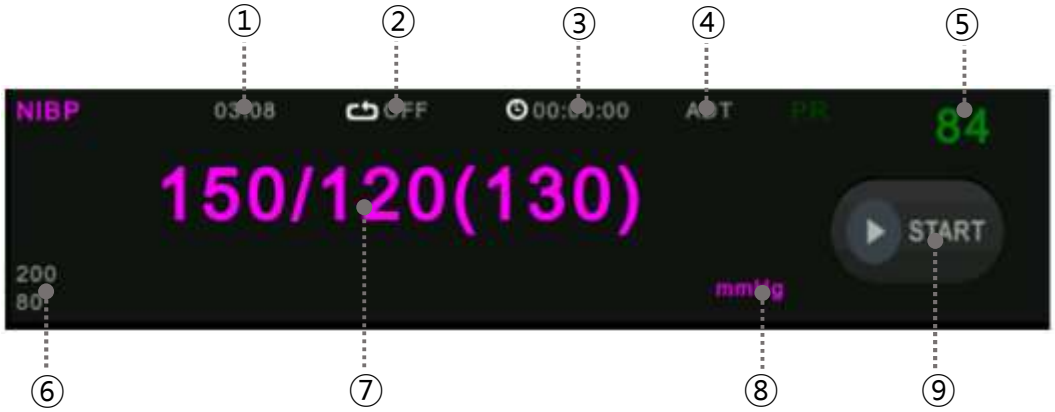
Adult Cuff

Optional Accessory List

Type	Figure	Description
Thigh Adult		Bign Adult NIBP Cuff Cuff Size: 458 * 143 Cm Arm Size: 45 to 56.5
Bign Adult		Bign Adult NIBP Cuff Cuff Size: 458 * 143 Cm Arm Size: 35.5 to 46 Cm
Child		Child NIBP Cuff Cuff Size: 430 * 108 Cm Arm Size: 20.5 to 28.5 Cm
Pediatric		Pediatric NIBP Cuff Cuff Size: 313 * 88 Cm Arm Size: 13.8 to 21.5 Cm
Infant		Infant NIBP Cuff Cuff Size: 210 * 60 Cm Arm Size: 9 to 14.8 Cm
Neonate		NIBP Disposable Cuff Neonate 1 Size: 3.3~5.6Cm
		NIBP Disposable Cuff Neonate 2 Size: 4.2~7.1Cm
		NIBP Disposable Cuff Neonate 3 Size: 5.0~10.5Cm
		NIBP Disposable Cuff Neonate 4 Size: 6.9~11.7Cm

NOTE
The NIBP should be set in the menu because the measured value differs depending on the patient's age and gender.

NIBP Display



①	Current display data measurement time
②	Measurement mode display
③	Interval Time: indicates interval time when measures the blood pressure periodically.
④	Measurement cuff type
⑤	Pulse rates: Indicates pulse rate.
⑥	Systolic and diastolic Alarm limit: Indicates the upper/lower alarm limit of blood pressure.
⑦	Systolic blood pressure / Diastolic blood pressure (Mean blood pressure)
⑧	Unit
⑨	Start NIBP measurement button

NIBP Settings

Menu	Description	Available Settings
A. NIBP		
A-1. ALARM	NIBP Alarm setup menu	
A-1-1. PARAMETER ALARM LIMIT	SYS, MEAN, DIA, PR Parameter alarm limit, level and activation setup	
A-1-2. TECHNICAL ALARM CONDITION	NIBP-OVER PRESSURE NIBP-OVERTIME PRESSURE NIBP-INFLATION FAILURE NIBP-DEFLATION FAILUER NIBP-MEASUREMENT ERROR NIBP-PULSE TOO WEAK NIBP-AIR LEAK NIBP-EXCESSIVE MOTION NIBP-SYSTEM FAULT	
A-2. INFLATION	It is a function to set the range that is usually used by setting pressure at the beginning because it can give pain to the patient when the equipment is turned on and pressurized to the maximum pressure range at the initial pressurization. Default Settings value: ADT: 170 mmHg PED: 140mmHg NEO: 120mmHg	ADT : 120 – 250 mmHg PED : 80 – 170mmHg NEO : 60 – 140mmHg
A-3. Setting Time	How to apply pressurization settings. Once: Applies the set pressure value only once when booting the instrument and registering a patient When the blood pressure is measured for the first time, the pressure is set to the set pressure value, but automatically adjusted according to	Once, Every Time

	the patient's blood pressure value. Every Time: The set pressure is applied every time blood pressure is measured. Whenever blood pressure is measured, pressurize to the set pressure value.	
A-4. Auto MEASUREMENT INTERVAL	A menu to set Interval time when measures the blood pressure periodically. Interval range : 1min, 2, 3, 4, 5, 10, 15, 20, 30, 1hour, 2, 4, 8. After setting INTERVAL, you must press NIBP KEY to start NIBP START periodically.	1min, 2, 3, 4, 5, 10, 15, 20, 30, 1hour, 2, 4, 8
B-1. NIBP STAT	Patients with severe state changes in blood pressure are in continuous mode for 5minutes to check for changes in blood pressure continuously.	OFF / ON
C-1. VITAL SIGN REVIEW	Record the 40 most recently measured blood pressure values.	

NIBP Status Messages

Messages	Status
OVER PRESSURE	When the cuff pressure is excessive
OVER TIME CUFF PRESSURE	When the cuff pressure exceeds the set time
INFLATION FAILURE CHECK CUFF	If the cuff hose is not connected properly
DEFLATION FAILURE	When the cuff breaks and cannot exhaust
MEASUREMENT ERROR	When there is no measurement signal

PULSE TOO WEAK	When the cuff is in the incorrect position
AIR LEAK	When the cuff is leaking
EXCESSIVE MOTION	When the patient moves too much
SYSTEM FAULT	When something goes wrong

10. EtCO2

EtCO2 Overview

When an EtCO2 module is connected to the BM1 monitor, the concentration of end-tidal Co2 (EtCO2) can be measured.

The EtCO2 module can perform mainstream measurements in all monitoring modes and sidestream measurements in the adult and pediatric monitoring modes.

(*c) EtCO2 only works in Continuous mode.

EtCO2 Precautions

WARNING
• The safety and efficacy of breath measurement methods for apnea detection, especially apnea of premature babies and apnea of infants, have not yet been established. • Patient monitors that measure CO2, anesthetics, and / or respiratory mechanics cannot be used as apnea monitoring and / or recording equipment. While these products provide an apnea alarm, the alarm condition begins with the elapsed time from when the last breath was detected. However, there are a number of physiological indications for the clinical diagnosis of real apnea events. • The CO2 alarm is not activated until the first breath is detected after the monitor is turned on or the patient is discharged. • Accuracy of the CO2 and breathing rate measurements may be impaired due to improper attachment of the sensor or due to certain patient conditions and certain environmental conditions. • If the tube connection is faulty, loose or damaged, gas may leak and the accuracy of

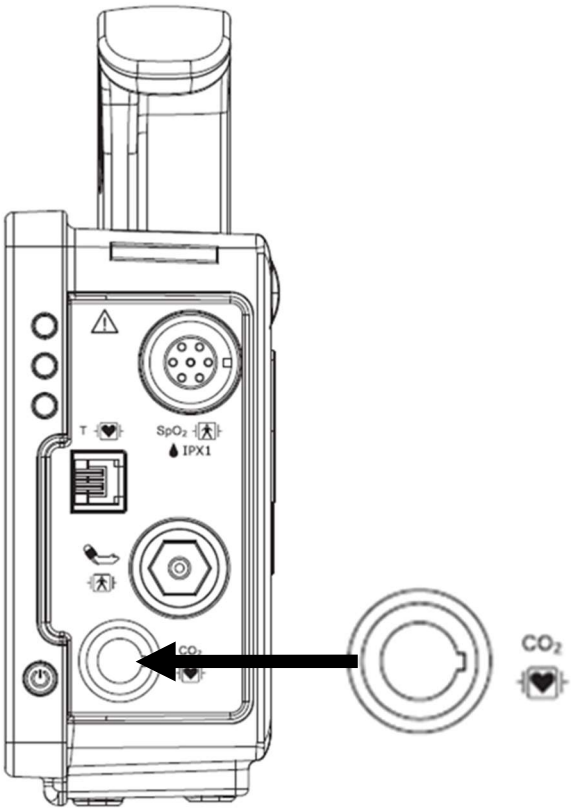
the measurement may be lowered, resulting in poor breathing. To prevent this, connect all component is securely and check the connection according to standard clinical procedures to ensure that there are no leaks.

WARNING

- Industrial safety: Carefully dispose of used sampling tubes and T-connectors as they may cause infection. There is a risk of infection. Dispose of all equipment in accordance with local regulations.
- Optimize reaction time by minimizing dead space and keeping sample collection tubes as short as possible. Long sampling tubes can lead to poor accuracy and slow response times for sidestream measurement techniques.
- Do not place the airway adapter between the suction catheter and the endotracheal tube when using the sample collection line as a closed suction device for tuberous patients. This is to ensure that the airway adapter does not interfere with the function of the suction catheter.

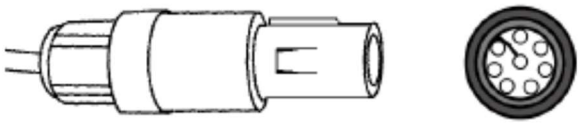
EtCO2 Connector And Accessories

EtCO2 Connector



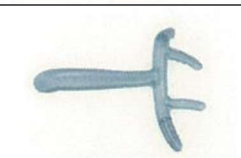
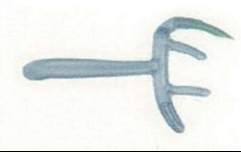
LoFlo Sidestream CO2 Sensor and Connector

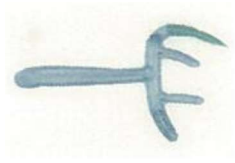
<Sidestream Sensor>



<Sidestream Sensor Connector>

Sidestream EtCO2 Accessories

Intubation Sidestream Accessories			
Part	**Figure**	**Description**	**Type**
3468ADU-00		NasalCO_2 Sampling Cannula	Adult
3468PED-00		Nasal CO_2 Sampling Cannula	Child
3468INF-00		Nasal CO_2 Sampling Cannula	Neonate
3470ADU-00		Oral/Nasal CO_2 Sampling Cannula	Adult
3470PED-00		Oral/Nasal CO_2 Sampling Cannula	Child
3469ADU-00		Nasal CO_2 Sampling Cannula w/ O_2 Delivery	Adult
3469PED-00		Nasal CO_2 Sampling Cannula w/ O_2 Delivery	Child
3469INF-00		Nasal CO_2 Sampling Cannula w/ O_2 Delivery	Neonate
3471ADU-00		Oral/Nasal CO_2 Sampling Cannula w/ O_2 Delivery	Adult

3471PED-00		Oral/Nasal CO_2 Sampling Cannula w/ O_2 Delivery	Child

Intubation Accessories			
3473ADU-00		Airway Adapter Kit w/ Dehumidification Tubing	Adult /Chid (ET Tube Size >4.0 mm)
3473INF-00		Airway Adapter Kit w/ Dehumidification Tubing	Child/Neonate (ET Tube Size <=4.0 mm)

CAPNOSTAT 5 Mainstream CO2 Sensor and Connector

<Mainstream Sensor>

<Mainstream Sidestream Sensor Connector>

Mainstream EtCO2 Accessories

Intubation Patient Airway Adaptor Accessories		
Part	**Figure**	**Description**
6063-00		Adult/Neonate(disposable)
6312-00		Neonate(Disposable)
7007-00		Adult/Neonate (Reusable)
7053-00		Neonate(Reusable)

EtCO2 Connecting and Sampling Method

Connecting the CAPNOSTAT® 5 CO2 Sensor to the Host System

1. Insert the CAPNOSTAT 5 CO2 Sensor connector into the receptacle of the host monitor as shown in Figure 1.

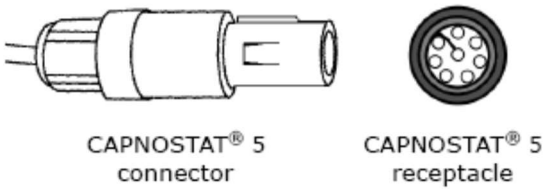
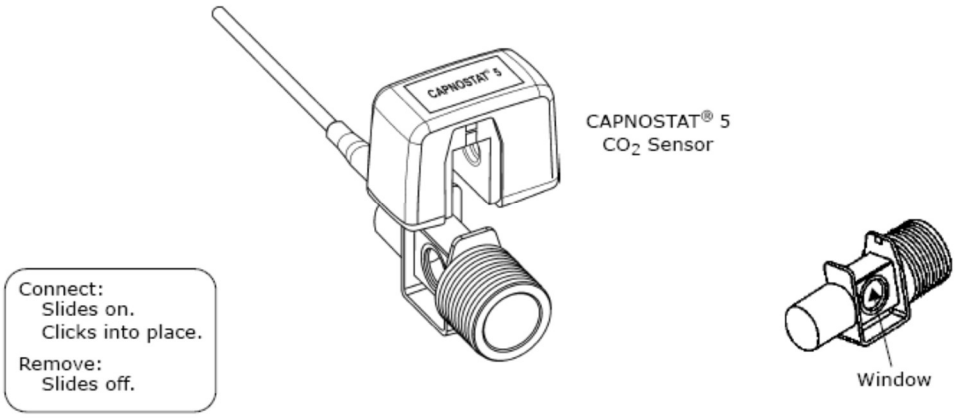
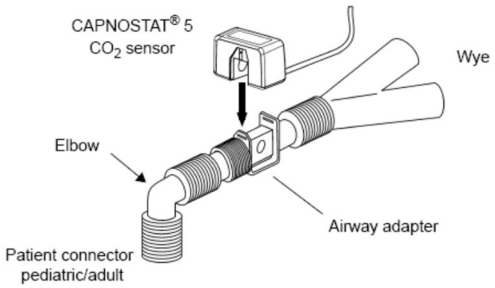


Figure 1

2. Make sure the arrows on the connector are at the top of the connector and line up the two keys of the connector with the receptacle and insert.
3. To remove the connector, grasp the body portion of the connector back and remove. Do not remove by pulling cable.
4. Shown below is the CAPNOSTAT 5 CO2 Sensor connection to a Respironics Novametrix CO2 adapter.



5. Shown below is the CAPNOSTAT 5 CO2 Sensor with a patient circuit.



Connecting the LoFlo Sample Kit

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

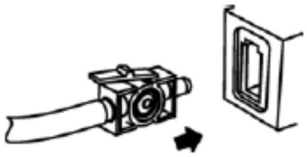


Figure 1

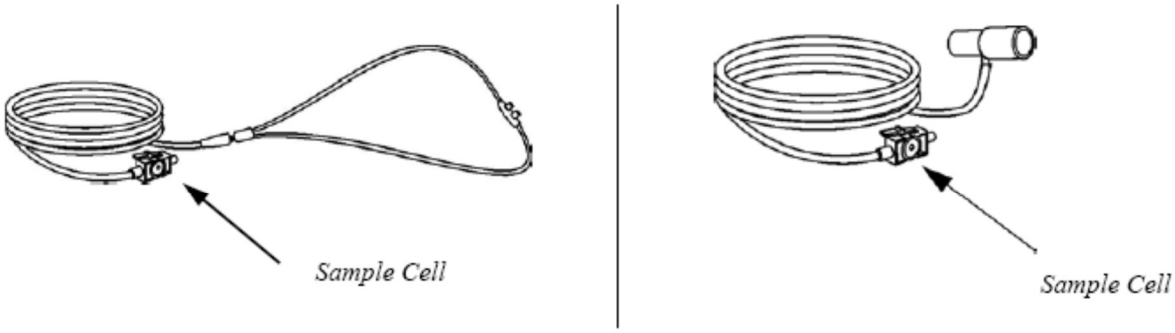
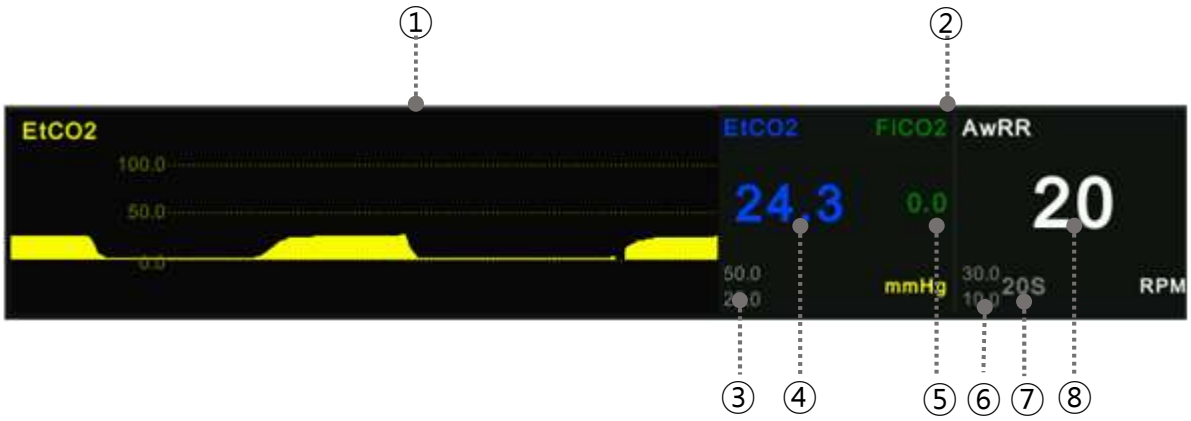


Figure 2

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

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

EtCO2 Display



①	EtCO2 wave window
②	Text window
③	EtCO2 CO2 concentration alarm upper and lower limit value display
④	EtCO2 value (Concentration value at exhalation)
⑤	FiCO2 value (Carbon dioxide concentration value at inhalation)
⑥	EtCO2 AwRR alarm upper and lower limit value display
⑦	Apnea alarm set time in seconds
⑧	AwRR (Respiratory rate per minute)

EtCO2 Settings

A. EtCO2 Menu In Wave Window

Menu	Description	Available settings
A. EtCO2		
A-1. SWEEP SPEED	EtCO2 Waveform sweep speed setup	6.25mm/s, 12.5mm/s, 25mm/s
A-2. SCALE	Display waveform scale setup. The selectable value is the maximum pressure range shown in the waveform.	40mmHg (5.3vol%) 50mmHg (6.6vol%) 60mmHg (7.9vol%) 80mmHg (10.5vol%)

	When you select a range value, the selected pressure range value is displayed below the dotted line above the two dotted lines in the left middle of the WAVE window.	100mmHg (13.2vol%) 150mmHg (19.7vol%)

B. EtCO2 Menu In Text Window

Menu	Description	Available settings
B. EtCO2 Parameters		
B-1. ALARM	EtCO2 Alarm Setup Menu	
B-1-1. PARAMETER ALARM LIMIT	ETCO2, FICO2, AWRR, APNEA parameter alarm, level, action setup menu	
B-1-1-1. ETCO2-ETCO2	Alarm Level Upper/Lower	On/Off Message/Low/Medium /High 0~100(mmHg)
B-1-1-2. ETCO2-FICO2	Alarm Level Upper/Lower	On/Off Message/Low/Medium /High 0~20(mmHg)
B-1-1-3. ETCO2-AWRR	Alarm Level Upper/Lower	On/Off Message/Low/Medium /High 0~150(RPM)
B-1-1-4. ETCO2-APNEA	Alarm Level Upper	On/Off Message/Low/Medium /High 10~60(s)
B-1-2. TECHNICAL ALARM CONDITION	ETCO2-MODULE OFF ETCO2-CHECK ADAPTOR ETCO2-CHECK LINE ETCO2-CHEKC LINE DISCONNECT ETCO2-CO2 INVALID ETCO2-OVER RANGE ETCO2-ZERO REQUIRED	Alarm: On/Off Level: Message/Low/Medium /High

	ETCO2-SYSTEM FAULT ETCO2-TEMP UNSTABLE	
B-2. DISPLAY OPTION	EtCO2 wave display Setup Menu	
B-2-1. SWEEP SPEED	EtCO2 Waveform sweep speed setup	6.25mm/s, 12.5mm/s, 25mm/s
B-2-2. SCALE	Display waveform scale setup. The selectable value is the maximum pressure range shown in the waveform. When you select a range value, the selected pressure range value is displayed below the dotted line above the two dotted lines in the left middle of the WAVE window.	40mmHg (5.3vol%) 50mmHg (6.6vol%) 60mmHg (7.9vol%) 80mmHg (10.5vol%) 100mmHg (13.2vol%) 150mmHg (19.7vol%)
B-3. APNEA DETECT	PNEA detection menu	ON/OFF
B-4. MODULE INFORMATION		
B-4-1. SENSOR PN	The sensor part number	PNXXXXXX
B-4-2. OEM ID	The id is a 7bit identifier which is set at the factory to a unique value for each OEM.	0X01
B-4-3. SENSOR SN	The serial number of the module.	
B-4-4. H/W VERSION	The hardware version number of the module.	
B-4-5. TOTAL USAGE TIME	Total use time of the module.	
B-4-6. LAST ZERO TIME	This is the total time that has elapsed with the sensor in service the last zero.	min
B-4-7. PUMP TOTAL TIME	This is the total time the pump has been on.(LoFlo only)	min
B-4-8. PUMP MAX TIME	This value indicates the maximum rated lifetime of the sampling pump. (LoFlo only)	min
B-5. MODULE SETUP	Module setup	
B-5-1. CURRENT PERIOD	This setting is used to set the calculation period of the $ETCO_2$ value.	1 BREATH, 10SEC,

	The end-tidal CO_2 value is the highest peak CO_2 value of all end of expirations (end of breaths) over the selected time period. If less than two breaths exist in the selected time period, the value will be the maximum $ETCO_2$ value for the last two breaths.	20SEC
B-5-2. BALANCE GAS	This setup mode to setup the gas in the measurement. the type of gas that is mixed with the breathing gas measuring	ROOM AIR N2O HELIUM
B-5-3. SLEEP MODE	Sleep mode is used to save power when the host monitor is in standby mode. There are two sleep modes available for the Capnostat. Using Sleep Mode 1 maintains the heaters so the Capnostat is able to run immediately after exiting the sleep mode. Mode 2 will require the Capnostat to go through its warm up sequence when exiting this mode and a delay will be introduced until the system has stabilized.	NORMAL MODE TURNOFF MODE POWER SAVING
B-5-4. BARO. PRESSURE	This setting is used to set current Barometric Pressure.	400~850mmHg (Default 760mmHg)
B-5-5. GAS TEMPERATURE	This setting is used to set temperature of the gas mixture. This setting is useful when bench testing using static gasses where the temperature is often room temperature or below.	0~50°C (Default 35.0°C)
B-5-6. O2 COMPENSATION	Use this setting to correct for the compensation of the gas mixture administered to the patient.	0~100
B-5-7. ANESTHETIC AGENT	Anesthetic agent is ignored when the	0.0~20.0

	balance gas is set to helium.	
B-5-8. ZERO TYPE	When performing a zero on room air, this setting should be set to room air (the default). Only change to nitrogen (N_2) when performing a zero on 100% N_2 gas; this is provided for use in a laboratory environment.	ROOM AIR / N2
C-1. ZEROING	This function is used to initiate a Capnostat Zero. A zero is used to correct for differences in airway adapter types. The Capnostat zero must be performed free of any CO2 1. Set the Host to the zeroing function. 2. Connect the CAPNOSTAT 5 CO2 Sensor 3. Place the CAPNOSTAT 5 CO2 Sensor onto a clean and dry CO2 adapter that is exposed to room air and away from all sources of CO2, including the ventilator, the patient's breath and your own. Start the adapter zero. The maximum time for a CAPNOSTAT zero is 40seconds. The typical time for a zero is 15~20seconds.	
D-1. MODULE RESET	EtCO2 MODULE initializing.	

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

EtCO2 Status Messages

Following is a list of some of the message that may appear on the monitor when monitoring CO2.

The message should clear when normal operating criteria are met or a solution is found.

Message	Cause	Solution
SENSOR OVER TEMP	The sensor temperature is greater than 40'C.	Make sure sensor is not exposed to extreme heat(heat lamp,etc.).
SENSOR FAULTY	One of the following conditions exist : Capnostat Source Current Failure EEPROM Checksum Faulty Hardware Error	Check that the sensor is properly plugged in. Reinsert or reset the sensor if necessary.
SENSOR WARM UP	Sensor under temperature , Temperature not stable, Source Current unstable	This error condition is normal at startup. This error should clear when the warm up is complete.
CHECK SAMPLING LINE	This error occurs whenever the pneumatic pressure is outside the expected range.	Check that the sampling line is not occluded or kinked. Replace the sample line.
ZERO REQUIRED	Zero Required , Zero Error	To clear, check airway adapter and clean if necessary. If this does not correct the error, perform an adapter zero. If you must adapter zero more than once, a possible hardware error may exist.
CO2 OUT OF RANGE	The value being calculated is greater than the upper CO2 limit(150mmHg)	If error persists, perform a zero.
CHECK AIRWAY ADAPTER	Usually caused when the airway adapter is removed from the Capnostat or when there is an optical blockage on the windows of the airway adapter. May also be caused by failure to perform Capnostat zero to when adapter	To clear, clean airway adapter if mucus or moisture is seen. If the adapter is clean, perform a Capnostat zero.

	type is changed.	
MODULE OFF	It occurs when the equipment and module are separated. Message output	Verify module connections , Service request

EtCO2 Measurement Failure

CO2 value is not output, or numerical error. Troubleshoot procedure

1. Check the connection between the main unit and the module
2. Check the module line connection with the filter line or airway
3. Replace filter line or airway
4. Service Request

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

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

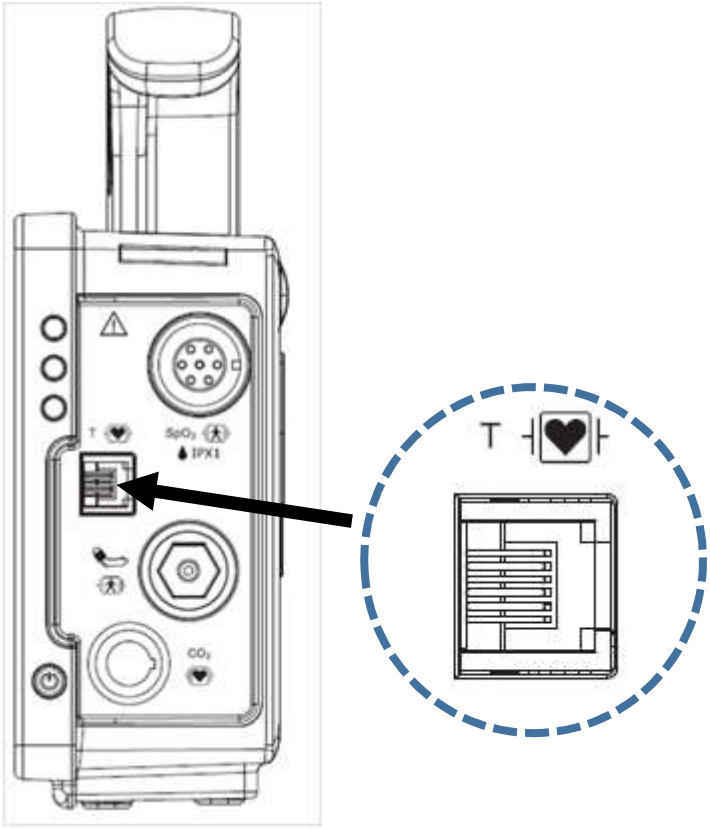
11. Temperature

Temperature Overview

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 Measurement Cable

Temperature Connector



Temperature Measuring Cable

HuBDIC FS-300 Thermometer (Optional)

FS-300

NOTE
Do not change the mode after using the FS-300, but use it in body temperature mode.

<Body Temperature>

<Wide temperature>

- Able to perform measurement only when the FS-300 is in Body Mode.
- The measurement of temperature using this product does not represent a Doctors medical examination.
- Consult with your medical professional if any abnormality is found.

- Do not take a temperature measurement over a scar or open tissue.
- Do not expose the product to temperatures below 20°C (68°F) or above 50°C (122°F) or above humidity of 95% (≥95%RH).
- Do not drop the thermometer as it may cause damage.
- Do not take the temperature with this product near heat sources such as in direct sunlight, near a fireplace or stove.
- Do not use this product if it is not working properly, contact Bionet support.
- There are no user serviceable parts the only service required is battery replacement and general cleaning please follow instructions in this user guide.
- If the product is not going to be used for an extended period of time please remove the batteries and store the thermometer in a cool dry place.
- This product is NOT waterproof. Direct contact with water or other liquids should be avoided.
- Do not leave the thermometer with infants or children at any time.
- The protective glass over the lens is fragile, handle with care. Do not touch the glass of the infrared lens with bare fingers.
- Do not modify or repair the thermometer.
- ASTM laboratory accuracy requirements in the display range of 22 to 40°C(71.6°F to 104.0°F) for IR thermometers is ±0.3°C(±0.5°F), whereas for mercuryin-glass and electronic thermometers, the requirement per ASTM Standards E 667-86 and E 1112-86 is ±0.1°C(±0.2°F)

CAUTION

- The reliability of the measurement cannot be guaranteed if the temperature is measured from parts of body that are not recommended (anywhere other than the forehead or behind the earlobe).
- Similar to other thermometers, measurement error may occur within a range of ±

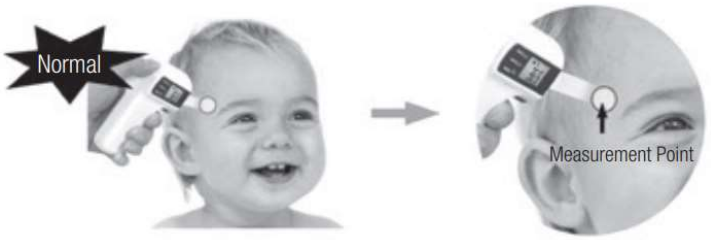
0.2℃ (± 0.4°F).

- Measurement should not be taken until completely relaxed at normal room temperature.
- Please note that measurement may be incorrect after exercising, bathing or getting wet in the rain.
- Temperature between right and left forehead could be different.
- When measuring the temperature of a liquid (milk, water) place the probe as close as possible to the liquid but ensure that it is not immersed into the liquid as this may damage your thermometer.
- Check your product regularly for damage.

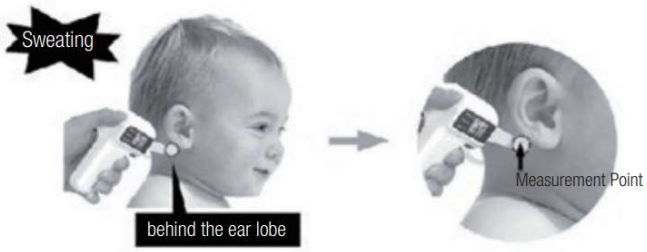
Temperature Display

①	Display data measurement time
②	Temperature alarm limit display
③	Temperature measurement value display
④	Unit

How to Take a Temperature



NOTE
Temperature readings may vary according to the location of measurement from forehead to temple. Therefore we recommend to measure the temperature at more than 2 points on the forehead. Use the highest temperature rating as the most accurate reading.



NOTE
If sweating on the forehead is present we recommend changing the measurement point to behind the earlobe.

NOTE
The body temperature is reflected on the temporal artery. Temporal artery is the artery located closest to the skin and is spread on the forehead. If the blood with body temperature reflection passes the temporal artery on forehead, corresponding amount of infrared rays will be generated. From the infrared rays, the body temperature can be measured. This product is a contactless type thermometer and does not make direct contact with forehead. The temperature measurement can be taken 2 to 3cm away from the body or object. This will decrease discomfort or possible infections caused by touch.

Temperature Settings

MENU	Description	Available Settings
A. TEMP		
A-1. ALARM	Temp Alarm Settings menu	
A-1-1. PARAMETER ALARM LIMIT	TEMP1 Parameter Alarm level , Action setup menu Settings range from 0℃ to 50.0℃/ 32°F to 122°F	0℃ ~ 50.0℃/ 32°F ~ 122°F

12. Maintenance and Troubleshooting

Inspection Equipment

You should perform a visual inspection before every use, and in accordance with your hospital's policy. With the monitor switched off:

- Examine unit exteriors for cleanliness and general physical condition. Make sure that the housings are not cracked or broken, that everything is present, that there are no spilled liquids and that there are no signs of abuse.
- If the EtCO2 module is mounted on the monitor, make sure that it is locked into place and do not slide out without releasing the locking mechanism.
- Inspect all accessories (cables, transducers, sensors and so forth). If any show signs of damage, do not use.

Switch the monitor on and make sure the backlight is bright enough. Check that screen is at its full brightness. If the brightness is not adequate, contact your service personnel or your supplier.

Inspection Cables

- Examine all system cables, the power plug for damage. Make sure that the prongs of the plug do not move in the adaptor. If damaged, replace it with an appropriate Bionet power cord and adaptor.
- Inspect the parameter cable and ensure that it makes good connection with the Monitor. Make sure that there are no breaks in the insulation.
- Apply the transducer or electrodes to the patient, and with the monitor switched on, flex the Patient cables near each end to make sure that there are no intermittent faults

WARNIING
To avoid contaminating or infecting personnel, the environment or other equipment, make sure you disinfect and decontaminate the monitor appropriately before disposing of it in accordance with your country's laws for equipment containing electrical and electronic parts. For disposal of parts and accessories such as thermometers, where not otherwise specified, follow local regulations regarding disposal of hospital waste.

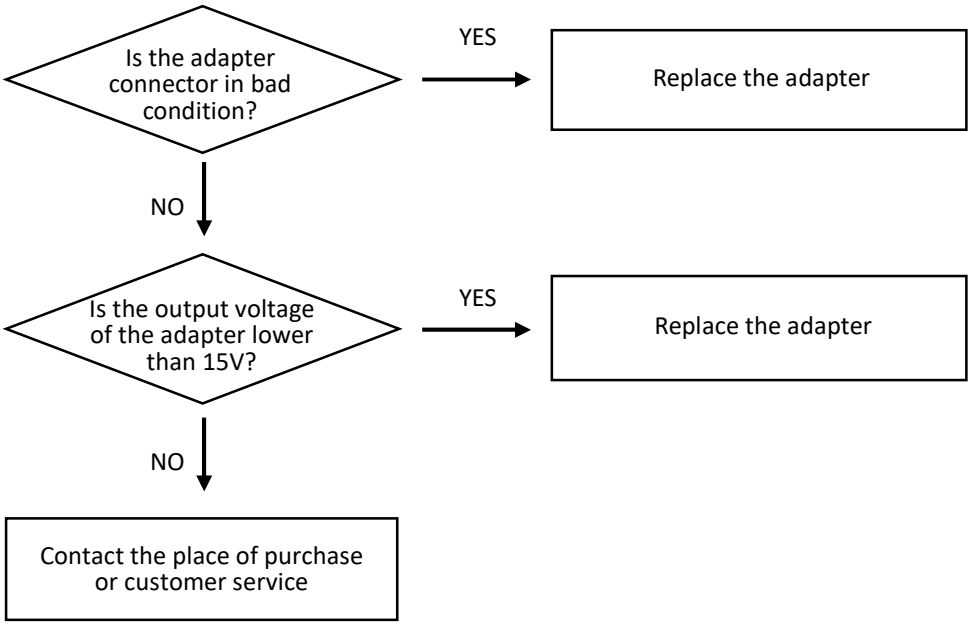
Maintenance Task and Test Schedule

All maintenance tasks and performance tests are documented in detail in the service documentation.

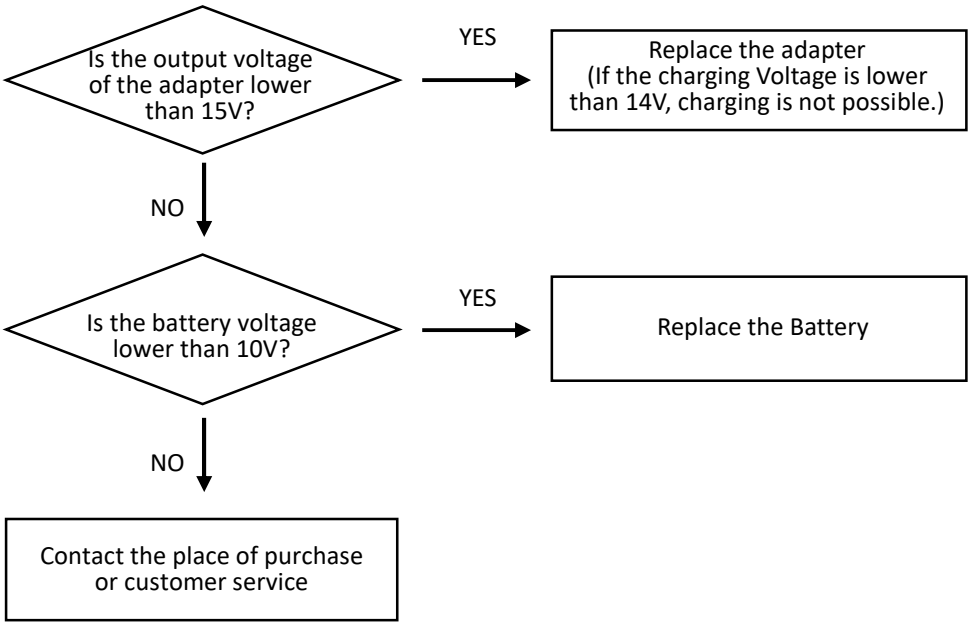
Maintenance and Test Schedule	Frequency
Monitor Tests	
Safety checks. Selected tests on the basis of IEC 60601-1	At least once every two years, or as needed, after any repairs where the power supply is removed or replaced, or if the monitor has been dropped
Monitor Maintenance	
Replace backlight (integrated displays only)	35,000 - 40,000 hours (about four years) of continuous usage, or as needed.
Parameter Module Tests	
Performance assurance for all measurements not listed below	At least once every two years, or if you suspect the measurement values are incorrect.
Parameter Module Maintenance	
NBP calibration	At least once every two years, or as specified by local laws.
Mainstream and sidestream CO2 calibration check	At least once a year, or if you suspect the measurement values are incorrect.
Battery Maintenance	
Battery	See the section on Maintaining Batteries in chapter 1.

Troubleshooting

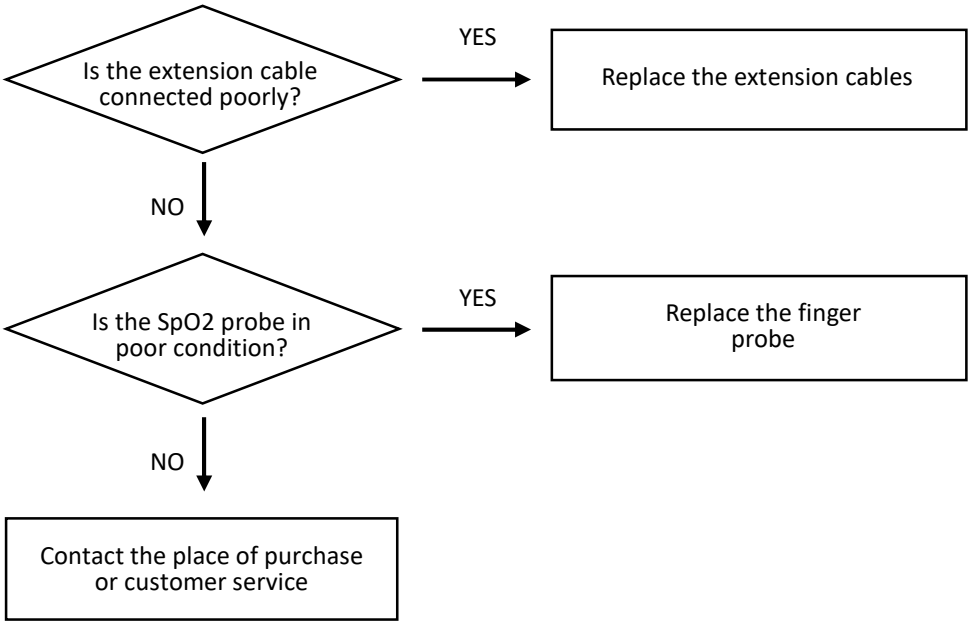
Power Failure



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

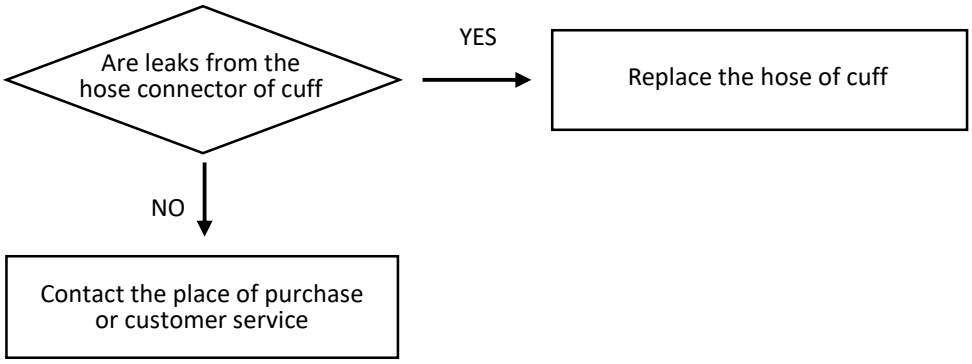


SpO2 Malfunction

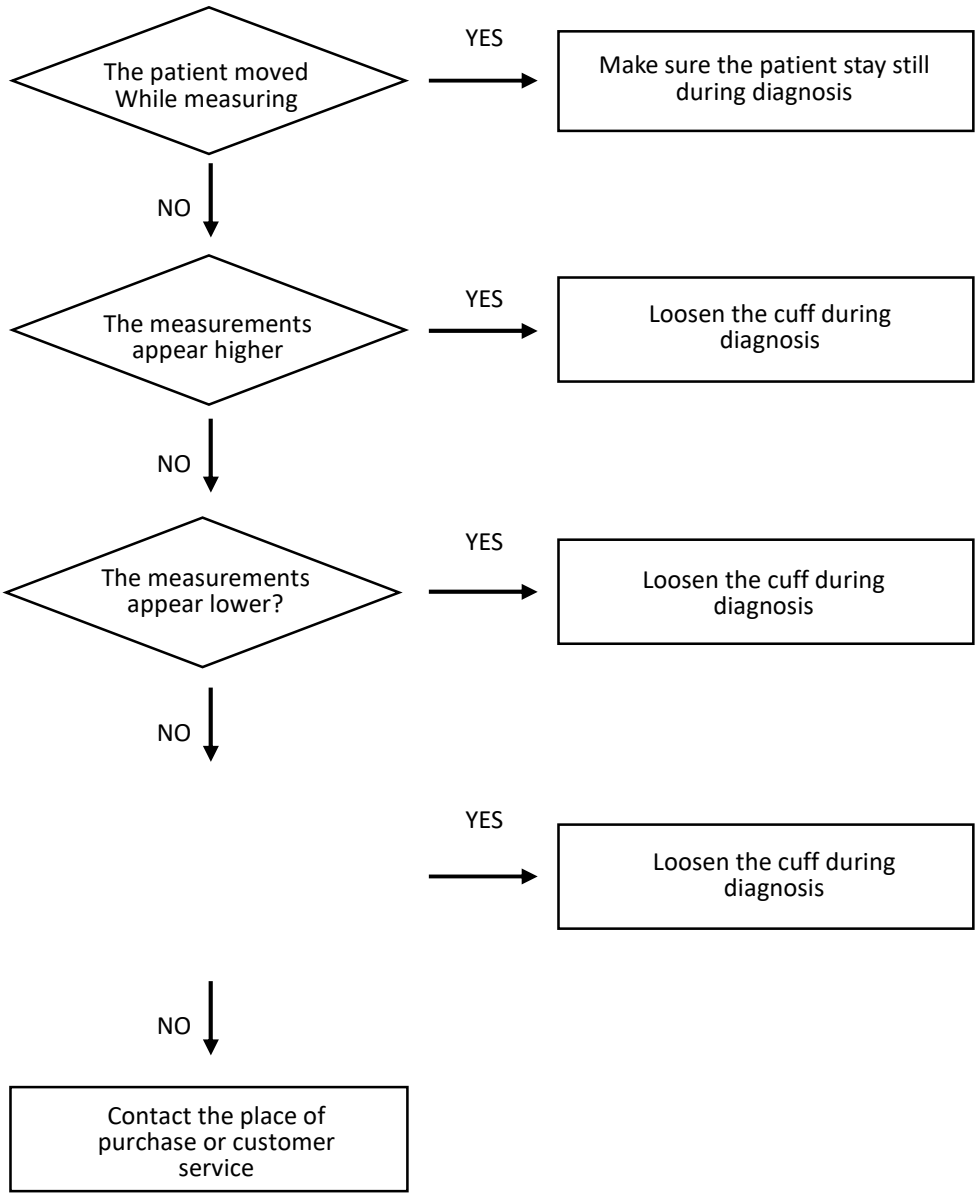


NIBP Malfunction

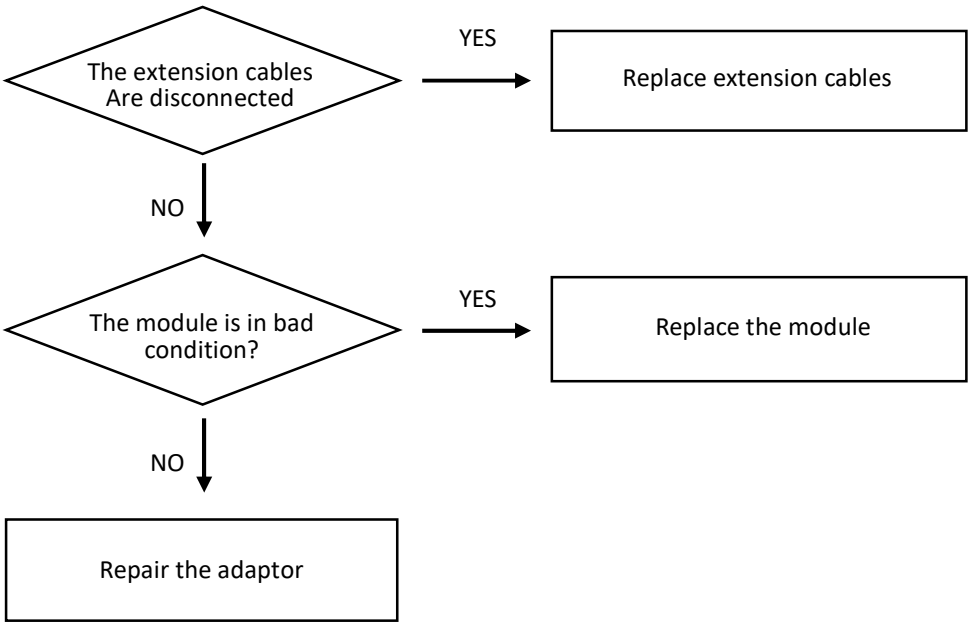
NIBP Connector connection status, confirmation that the hose is normally connected



Abnormality in NIBP measurements



EtCO2 Malfunction



Temperature Malfunction

Cyber security related issues

1) If device is stolen or lost, immediately report it to the hospital staff or manufacturer.

Upon receipt of a report, the hospital network administrator must take measures to prevent the device from accessing the hospital network.

2) If a cyber security threat is detected while using the device, immediately disconnect the device from the network and contact the hospital staff or manufacturer.

Storage lifetime issues

When storage is nearing the end of its life, the following warning message appears when booting the device, admiting a patient (continuous mode), or saving measurements (spot/triage mode).

If the warning message appears, contact the customer center or the purchasing agent to check the equipment.

The storage has expired. Contact the customer center or the store where you purchased the product and inspect the equipment

13. Clean and Care

Clean and Care Overview

Clean the monitor and all accessories after each patient or daily according to your hospital's standard protocol. We recommend the following cleaning solution and procedures. To avoid contamination and unnecessary damage to the equipment, follow the instructions below.

Bionet does not claim the right to the following chemical efficacy, disinfectant method, the ability of the drug to inhibit bacterial infection, environmental impact, safe handling or precautions related to use. For more information on these topics, see the information provided by the detergent manufacturer.

Monitor and Peripherals

Moisture can damage the monitor and peripherals. (For example, around connectors, EtCO2 modules).

Please read the following instructions carefully before cleaning the basic unit or peripherals.

The following pages contain precautions for cleaning certain equipment and peripherals.

- Do not spray detergent on the monitor or peripheral devices. Wipe it off with a damp cloth.
- Disinfect the surface with gauze with diluted alcohol.
- Dry thoroughly with a lint-free cloth.

CAUTION
Do not wet or rinse the monitor and accessories. Disconnect the unit from the power source if you accidentally spilled liquid on the equipment. Contact your technician for stability before operating the equipment.

To prevent damage to the equipment, do not use sharp tools or abrasives. Never immerse the electrical connector in water or other liquids. When cleaning, be careful not to let the liquid stick to the edge of the screen.

Patient's Cable

- Clean the patient cables with a gauze pad moistened with a soap solution.
- To disinfect patient cables, wipe the cables with a gauze moistened with diluted alcohol or a glutaraldehyde-based dis-infectant.
- Ethylene oxide is suitable for intensive disinfection (almost sterilization), but it shows that the service life of cables and lead wires is reduced.
- Dry thoroughly with a lint-free cloth.

CAUTION

Do not use disinfectants that contain phenol as they can spot plastics. Do not autoclave or clean accessories with strong aromatic, chlorinated, ketone, ether, or ester solvents. Never immerse electrical connectors.

When cleaning, do not apply excessive pressure or bend the cable unnecessarily. Excessive pressure can damage the cable.

Reusable SpO2 Sensor

Reuse Clean the SpO2 sensor by wiping it with soapy water gauze. Disinfect the sensor by wiping with 70% alcohol solution. Allow the patient to dry completely with a lint-free cloth before applying to the patient.

Capnostat Sensor

Wipe the sensor surface and sensor window with a damp cloth. Do not attempt to wet the sensor

or disinfect it with hot water. Allow to dry completely with a lint-free cloth. Make sure the sensor window is clean and dry before use.

NOTE
The equipment should be inspected regularly once a year. For inspection items, refer to the user manual or service manual.

Cleaning and Inspection of Equipment

Carefully inspect the main unit and sensor after cleaning the equipment. Do not use damaged or old equipment.

Clean the exterior of the equipment at least once a month using a soft cloth moistened with lukewarm water or alcohol. Do not use lockers, thinners, ethylene, or oxidizers that could damage the equipment.

Make sure that the cables and accessories are free from dust and dirt, then wipe them with a soft cloth moistened with 40 ° C water. Please wipe it with clinical alcohol at least once a week.

Do not immerse the accessory in liquid or detergent. Also, make sure that no liquid penetrates the instrument or probe.

CAUTION
Do not dispose of the disposable probe in a potentially hazardous area. Always be careful about environmental pollution.

CAUTION
There is a backup battery inside the system. When disposing of the battery, dispose of it in an appropriate place for environmental protection.

WARNING
When replacing the backup battery, check the battery electrode.

Installation and Storage of Equipment

If you suspect the installation or disposition of the external ground wire, operate the equipment by means of the internal power supply.

If the unit is not used for a certain period of time, remove the backup battery if safety hazards do not occur.

14. Technical Specification

Technical Specification Overview

The monitor is not user installable. It must be installed by qualified service personnel.

The monitor is intended to be used for monitoring, recording, and alarming of multiple physiological parameters of adults, pediatrics, and neonates in health care facilities. The device is to be used by trained health care professionals.

The monitor is intended for use in health care facilities; the BM1 Monitor is additionally intended for use in transport situations within the hospital setting.

EMC Compatibility (EMC)

Much of the information below has been borrowed from the requirements set forth in the Electromagnetic Compatibility Standard IEC 60601-1-2 for medical electrical equipment issued by the International Electro technical Commission and is available from a variety of sources. Although primarily aimed at equipment manufacturers, most of the information contained here is useful for users interested in medical equipment.

The information contained in this section (such as separation distance) is generally information about the Bionet Patient Monitor detailed above. The numbers provided here are not guaranteed, but are provided with reasonable assurance of error-free operation. This information may not apply to other medical and electrical systems, and older equipment may be particularly susceptible to interference.

NOTE
● Medical electrical equipment requires special precautions for electromagnetic compatibility and must be installed and serviced in accordance with the EMC information in this section and in the operating instructions supplied with the

monitor.

- Portable and mobile RF communication equipment can affect medical electrical equipment.
- Cables and accessories not specified in the user guide are not certified. Using other cables and / or accessories may adversely affect safety, performance, and electromagnetic compatibility (increased electromagnetic emissions and reduced immunity).
- This equipment should not be used near or on top of other equipment. If you need to use it on its side or stacked, you should observe the equipment to make sure it works properly within your configuration.
- This patient monitoring device communicates over a 2.4 GHz 802.11b / g wireless network. Other equipment may interfere with data reception on this wireless network. This is also true if the equipment complies with the CISPR emission requirements. When using patient monitoring equipment to communicate over a wireless network, be sure to check that it is compatible with existing or new wireless systems (eg, cell phones, pager systems, cordless phones, etc.). For example, a Bluetooth-compliant device using the 2.4 GHz frequency band may interfere with the wireless communication of the patient monitor. For more information on wireless deployment, please contact your Bionet representative.
- Low amplitude signals such as EEG and ECG are particularly sensitive to interference from electromagnetic energy. This equipment complies with the tests listed at the bottom, but does not guarantee complete operation. The "quiet" electrical environment is better. In general, the greater the distance between electrical equipment, the lower the likelihood of interference.

Manufacturer's Declaration - Electromagnetic Emission

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

Manufacturer's Declaration - Electromagnetic Immunity

Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the BM1 system			
The BM1 system is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The user of the BM1 system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the BM1 system as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power (W) of transmitter	Separation distance (m) according to frequency of transmitter		
	150kHz to 80MHz	80MHz to 800MHz	800MHz to 2.5GHz
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) accordin g 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 b y 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	3Vrms, 150kHz to 80MHz	3Vrms, 150kHz to 80MHz	3Vrms, 150kHz to 80MHz
Radiated RF IEC 61000-4-3	3V/m, 80MHz to 2.5GHz	3V/m, 80MHz to 2.5GHz	3V/m, 80MHz to 2.5GHz

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.

System Specification

Hardware specifications	
Dimension, Weight	188(W) X 180(H) X 60(D)mm, Approx. 1.5kg (Battery pack excluded)
Visual indicator	Categorized alarms (3 priority levels), Visual alarm lamp handle SpO2 pulse beep, Percent(%) SpO2 pitch tone Battery status, External power LED, Touch screen
Display, Resolution	7" TFT-LCD, 800 x 480
Parameter	SpO2, Pulse Rate, Systolic BP, Diastolic BP, Mean BP, Temperature(IR), EtCO2, FiCO2, Airway Respiration Rate
Trace	2 waveforms : SpO2, EtCO2 Sweep speed : 6.25, 12.5, 25, 50 mm/sec
Indicators	Categorized alarms (3 priority levels), Visual alarm lamp handle SpO2 pulse pitch tone, Battery status, External power LED
Interfaces	DC input connector : 15VDC, 2.0A LAN digital output for transferring data, Nurse call system connection (0.3A @ 125VAC~ 1A @ 24VDC) USB Barcode Scanner, USB data storage
Battery	Rechargeable Li-ion battery (Max 4hours)
Data Storage	168hours trends, 5000 cases of patient data
Language	English, French, Spanish, Italian, Germany, Chinese, Russian, Czech, Bulgarian, Portuguese, Romanian, Hungarian, Turkish, Polish,Korean
Environmental Requirements	
Temperature Range	Operating: 5 ~ +40 °C (41 ~ 104 °F) Storage: –20 ~ +60 °C (–4 ~ +140 °F)
Relative Humidity	Operating: 30% ~ 85%, Non-condensing Storage: 10% ~ 95% (Packing)
Atmospheric Pressure	Operating: 525 ~ 795 mmHg (70 ~ 106 kPa) Storage: 375 ~ 795 mmHg (50 ~ 106 kPa)

SpO2 Performance	
Saturation range	0 to 100%
Saturation accuracy	70 to 100% ±2 digits 0 to 69% unspecified
Pulse rate range	30 to 254 bpm
Pulse rate accuracy	±2 bpm

NIBP Performance	
Method	Oscillometric with linear deflation
Operation Mode	Manual/Automatic/Continuous
Measurement range	Adult Pressure : 20 to 260 mmHg Pediatric Pressure : 20 to 230 mmHg Neonate Pressure : 20 to 120 mmHg
Accuracy	mean error: less than ±5 mmHg standard deviation : less than 8 mmHg Meets accuracy requirements of ANSI/AAMI SP10:1992 and 2002

Temperature Performance	
Measurement range	34 to 42.5℃ (93.2 to 108.5℉)
Accuracy	36℃to 39℃: ±0.2℃ Other: ±0.3℃

Sidestream CO2 (Option)	
Measurement range	0 to 150 mmHg, 0 to 19%
Accuracy	0-40mmHg ±2 mmHg, 41-70mmHg ±5% of reading 71-100mmHg ±8% of reading,

	101-150mmHg ±10% of reading
Respiration rate	2 to 150 breath per minute
Respiration accuracy	±1breath per minute

Mainstream CO2 (Option)	
Measurement range	0 to 150 mmHg, 0 to 19%
Accuracy	0-40mmHg ±2 mmHg, 41-70mmHg ±5% of reading 71-100mmHg ±8% of reading, 101-150mmHg ±10% of reading
Respiration rate	0 to 150 breath per minute
Respiration accuracy	±1breath per minute

Default Alarm Level

	High	Medium	Low	Message
NIBP - S		○		
NIBP - M		○		
NIBP - D		○		
NIBP- PR				○
SpO_2			○	
SpO_2-Rate				○
TEMP				○
EtCO2			○	
FiCO2				○
AWRR			○	
APNEA				○
LEAD FAULT				○
CABLE OFF				○
LOW BATTERY				○

Parameter Limit

	Adult	Pediatric	Neonate
NIBP-S	80 – 200	60 – 160	40 – 100
NIBP-M	40 – 140	40 – 120	30 – 70
NIBP-D	20 – 120	30 – 100	20 – 60
NIBP-PR	50 – 150	50 – 160	50 – 170
SpO_2	90 – 100	90-100	88-100
SpO_2-Rate	50 – 150	50 – 160	50 – 170
TEMP °C / °F	34.0/93.2 - 39.0/102.2	34.0/93.2 - 39.0/102.2	34.0/93.2 - 39.0/102.2
AWRR	10 – 30	10 – 50	15 – 100
EtCO2	25 – 50	25 – 50	25 – 50
FiCO2	0 – 5	0 – 5	0 – 5
Apnea	0 – 20	0 – 20	0 – 15

Default Display

Item	Value
NIBP Interval	Off
Alarm Volume	50%
Pulse Volume	Off
SpO2 Probe Off	Message
Units for Height	cm
Units for Weight	Kg
Temperature Units	℃
NIBP Limit Type	Systolic

Abbreviations

Abbreviations and symbols are alphabetized by reference, which can be read while reading the manual or using the equipment.

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,	minminute
MM, mm	millimeters
MM/S	millimeters persecond
MMHG, mmHg	millimeters of mercury
mV	millivolt

N

NIBP	non-invasive 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	temperature

V

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

X

X	multiplier when used with a number (2X)

Symbols

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

PRODUCT WARRANTY

Product Name	**Patient Monitor**
Model Name	**BM1**
Approval Number	
Approval Date	
Serial Number	
Warranty Period	**1 year from date of purchase** **(2 years in Europe)**
Date of Purchase	
Customer section	**Hospital Name :** **Address :** **Name :** **Phone :**
Sales Agency	
Manufacturer	

* * This product is a "medical device".

* Thank you for purchasing BM1

* The 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.

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