

# DYNASCOPE 8000 Series Patient Monitor

# DS-8200 system

Ver. 02

## Maintenance Manual



- \* Before using the product,  
please read this manual thoroughly.
- \* Store this manual where it can be  
always referred to.

**This manual is for the DS-8200 System Version 02.**



Federal Law restricts this device to sale by or on the order of a physician.

### **CAUTION**

- Only physician or persons instructed by physicians are allowed to use the equipment.
- The information contained in this document is subject to change without notice due to improvement in the equipment.

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# Preface

## Introduction

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Thank you for purchasing this product. Read the "Safety Precautions" thoroughly before use to ensure correct and safe use of the product.

Before using or installing this product, read this manual thoroughly.

## Important Notice

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### For Safe Operation of the Equipment

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- (1) Before using this equipment, read this operation manual.
- (2) Fukuda Denshi cannot predict all the dangers which may be caused by misusage of this product or environmental condition.
- (3) For using this equipment, there are many items that "should be performed", "should not be performed", and "cannot be performed". It is not possible to cover all these items in this manual or warning labels. Therefore, it is necessary to also follow the general safety precaution other than the items described in this manual.
- (4) To prevent accidents, usage other than intended, or usage, cleaning, and maintenance not described in this manual should not be performed.
- (5) When using this equipment, follow the respective regulation to minimize the probability of accidents.

## Intended Use of this Equipment

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This equipment is designed for the following <Intended Use>.

### <Intended Use>

The Fukuda Denshi DynaScope Model DS-8000 Series Patient Monitor provides a simple and reliable method to display and document the continuous hemodynamic, cardiovascular observations that are typically required of critically ill patients. The target populations of the system are adult, pediatric, and neonatal patients, who may be located in a hospitals ICU, CCU, OR, ER, recovery or other critical care area, with the exception of the ST segment, arrhythmia analysis, and SpHb for which the target populations are adult and pediatric only excluding neonates. The DS-8000 Series monitor can also be used to follow patients whose treatment requires close observation of specific physiological parameters. These patients may be in a clinic or other healthcare environment under the care of a physician.

The availability of DS-LAN connection, through either a built in Ethernet LAN or external telemetry transmitter, allows remote monitoring when combined with Fukuda Denshi Central Station Monitors.

Parameters such as ECG, heart rate, respiration, non-invasive blood pressure (NIBP), pulse rate, arterial oxygen saturation (SpO<sub>2</sub>), carboxyhemoglobin saturation (SpCO), methemoglobin saturation (SpMet), and total hemoglobin concentration (SpHb), plethysmograph, temperature, invasive blood pressure (IBP), cardiac output, carbon dioxide concentration (CO<sub>2</sub>), nitrous oxide concentration (N<sub>2</sub>O), oxygen concentration (O<sub>2</sub>), anesthetic agent concentration (AG), and Spirometry may be monitored individually or in any grouping required by the clinician.

The Fukuda Denshi DynaScope Model DS-8000 Series Patient Monitor is not recommended for home use, when it has not been ordered by a physician.

This equipment is intended for monitoring one patient. It is not intended for monitoring multiple patients.

For specification of this equipment, refer to "Chapter 14 Specification" of this Operation Manual.

The operation and maintenance of this equipment should be performed by well-trained and authorized personnel. Also, your local regulation must be followed. If this equipment is used for the purpose other than intended, or if the user does not follow the safety instructions, the following hazard may result.

- ♦ Hazard to the Life and Health of the Patient or the User
- ♦ A Problem Related to Medical Practice
- ♦ Damage to the Equipment

## Copyright

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- (1) The copyright of this manual is owned by Fukuda Denshi. No part of this document may be copied or transmitted in any form without the prior written permission of Fukuda Denshi Co., Ltd.
- (2) This manual includes the description for the optional equipments that can be connected.
- (3) The illustration in this manual may differ with the actual equipment.
- (4) If you lose or damage this manual, contact your nearest sales representative. Using the equipment without this manual may cause accidents.
- (5) When handing over this equipment, make sure to also pass this manual to the next owner.

## Maintenance, Repair, Replacement

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Fukuda Denshi is liable for the safety, reliability, and performance of its equipment only if;

- ♦ Maintenance, modifications, and repairs are carried out by authorized personnel or organization.
- ♦ Components are used in accordance with Fukuda Denshi operating instructions.

A full technical description of the DS-8200 System is available from your local Fukuda Denshi sales representative.

## Contact

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If you need more detailed information, please contact following.

- (1) Fukuda Denshi Co., Ltd., Head Office

3-39-4 Hongo, Bunkyo-ku, Tokyo, Japan  
Phone:+81-3-5684-1455 Fax:+81-3-3814-1222  
E-mail: info@fukuda.co.jp  
Home Page: <http://www.fukuda.com>

- (2) Sales Representative

Write the name, address, phone, fax number of your local sales representative.

(Name of Sales Representative, Address, Phone/Fax)

## About This Manual

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### Expression Used in This Manual

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#### Meaning of the Symbols

Type of Precaution	Description
 DANGER	Failure to follow this message may cause immediate threat of death or serious injury.
 WARNING	Failure to follow this message may result in death or serious injury.
 CAUTION	Failure to follow this message may cause injury or failure to the equipment.
NOTE	"Note" is used to emphasize important information.
REFERENCE	"Reference" is used to provide useful information.
	Indicates the reference page for the procedure and precaution.
*	Used in a table which indicates that there is detailed explanation outside the table.

#### Indications for the Screens and Keys

The keys displayed on the monitor screen are indicated by [ ].  
(Ex.: [Display Config.], [Manual Printing], etc.)

The expressions displayed on the monitor screen are indicated by " " .  
(Ex.: "Volume", "Admit/Discharge", etc.)

The messages displayed on the screen are indicated by < >.  
(Ex: <Searching>, <Alarm Suspend>, etc.)

## Composition of This Manual

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The operation manual is composed of the following chapters.

Chapter Title	Description
Preface	Outline and purpose of this manual (Important Notice, About This Manual)
Safety	Warning, Precautions for Safety
1. General Description	Composition, features, menu configuration of this equipment
2. Name of Parts and Their Functions	Name and function of each part, external appearance
3. Operation Procedure and Screen Examples	Operation procedure, home display, window, procedure to return to the previous display, user key setup
4. Preparation	Installing the recording paper, power ON/OFF, time/date, daily checks
5. Admit/Discharge	Entering patient information (name, age, etc.) at admittance, discharging the patient, user mode selection, suspend monitoring
6. Alarm Function	General description of alarm function, alarm-related setups
7. Monitoring	Measurement condition setup of the monitoring parameters, size/scale setup, etc. Setup of the stop watch, connector
8. Review Function	Arrhythmia analysis, 12-lead analysis, trend, recall, NIBP list, ST measurement, hemodynamics, lung function, alarm history, other bed display, full disclosure waveform
9. Printing	Recorder output function
10. System Configuration	Setup of the display configuration, tone/volume, color, etc.
11. Troubleshooting	Message list, maintenance and troubleshooting of this equipment
12. Setup Item/Default Value	Setup details and default value
13. Accessories	List of accessories and optional accessories of this equipment
14. Specification	Specification and performance of this equipment

The maintenance manual is composed of the following chapters.

Chapter Title	Description
Preface	Outline and purpose of this manual (Important Notice, About This Manual)
Safety	Warning, Precautions for Safety
1. Installation of the Unit	Precautions about the operating environment, system construction, trolley usage
2. Network System Construction	Network connection and setup
3. Using the CF card / SD card	Procedure to use the CF card / SD card
4. Connection to the External Devices	External equipment connection and setup
5. Initial Settings	Initial setup, administrator setup, alarm/measurement setup, user I/F, user mode registration
6. Setup Item/Default Value	Default and backup of setup items
7. Replacement Parts	Precautions about the periodic replacement parts, consumable parts
8. Cleaning/Disinfecting/Storing	Procedure to handle, clean, store this equipment
9. Maintenance Check	Daily and periodic checks, self-diagnosis function, software version software install

# Safety

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# Safety

## About the Safety Precautions

### The Meaning of Each Safety Precaution

Read this manual thoroughly before use to ensure correct and safe use of the product.

Be sure to follow the precautions indicated below, as these are important messages related to safety.

Type of Precaution	Description
<b>DANGER</b>	Failure to follow this message may cause immediate threat of death or serious injury.
<b>WARNING</b>	Failure to follow this message may result in death or serious injury.
<b>CAUTION</b>	Failure to follow this message may cause injury or failure to the equipment.

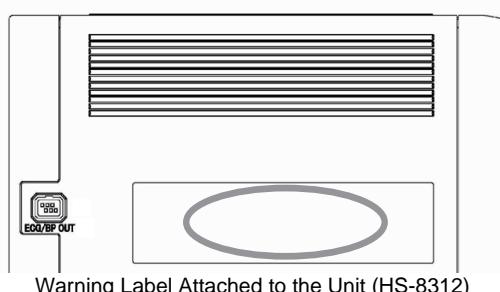
### Warning Labels Attached to the Unit

Make sure to read the warning label attached to the equipment and comply with the requirements while operating the equipment.



- Do not damage or erase the warning label attached to the equipment.  
This warning label contains descriptions important for handling and operating the equipment properly and safely. A damaged label may compromise safe operation.

#### Super Unit (HS-8312M / HS-8312N)



Warning Label Attached to the Unit (HS-8312)

<b>DANGER</b> Risk of explosion if used in the presence of flammable anesthetics.
<b>CAUTION</b> Before connecting, read instruction manual.
<b>CAUTION</b> To reduce the risk of electric shock, do not remove the cover. Refer servicing to qualified service personnel.

Warning Label

## Graphic Symbols

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Refer to the following for the meaning of the symbol indicated on the equipment.

Symbol	Description
	Follow operating instructions (Warning); indicated in blue. Failure to follow operating instructions could place the patient or operator at risk.
	Follow operating instructions (Information). Indicates the need to refer to the related accompanying documents before operation.
	General precaution
	Potential Equalization Terminal Indicates the terminal to equalize the potential difference when interconnecting the devices.
	Protective Earth Indicates the protective earth inside the equipment.
	Alternating Current (Main Power Input Indicator)
	Indicates that the equipment is in normal operation.
	Indicates that the equipment is in standby mode.
	Electrostatic Sensitive Part Directly touching this connector part with hands should be avoided.
	Type CF Applied Part with Defibrillation-Proof Indicates the degree of protection against electric shock is Type CF Applied Part with defibrillation-proof.
	Type BF Applied Part with Defibrillation-Proof Indicates the degree of protection against electric shock is Type BF Applied Part with defibrillation-proof.
	Signal Output
	GAS Input
	GAS Output
	Signal Input/Output
	Battery
	Waterproof Standard Indicates this equipment complies with IPX1. (Combination of LC-8210, HSB-80, HS-8000 and BS-8210: IPX1, Other situation: IPX0)

## Precautions for Safe Operation of Medical Electrical Equipment

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### CAUTION

- ♦ Users should have a thorough knowledge of the operation before using this equipment.
- 

### □ Precautions about the Location of Installation and Storage of the Equipment

- ♦ Set the monitor to the user's intended position where the user can easily recognize the visual and audible monitoring conditions. Normally it is recommended to set at a distance of 1m from the user.
- ♦ Install or store in a place where the equipment will not be exposed to splashing water.
- ♦ Install or store in a place where the equipment will not be adversely affected by atmospheric pressure, temperature, humidity, ventilation, sunlight, dust or atmosphere containing salt or sulfur.
- ♦ Place the equipment on a stable surface where there is no inclination, vibration, or shock (including during transportation).
- ♦ Do not install or store in an area where chemicals are stored or gasses are evolved.
- ♦ Verify the power frequency, voltage and allowable current (or power consumption).
- ♦ Ensure the grounding is proper by connecting the accompanying power cable to the hospital grade outlet.

### □ Precautions Before Using the Equipment

- ♦ Verify the power voltage. Charge the battery pack fully before operating the system with the battery pack.
- ♦ Check the cable connection and polarity to ensure proper operation of the equipment.
- ♦ Make sure the power system has adequate earth ground.
- ♦ Ensure that all cables are firmly and safely connected.
- ♦ Pay special attention when the equipment is used in conjunction with other equipment as it may cause erroneous diagnosis and danger.

### □ Precautions During Using the Equipment

- ♦ Always observe the equipment and patient to ensure safe operation of the equipment.
- ♦ If any abnormality is found on the equipment or patient, take appropriate measures such as ceasing operation of the equipment in the safest way for the patient.
- ♦ Do not allow the patient to come in contact with the equipment.
- ♦ On start-up of the system, verify that the start-up tone generates and alarm indicator lights.
- ♦ For the connectors which are not Type BF, CF applied part, do not touch them and the patient at the same time.

### □ Precautions After Using the Equipment

- ♦ Unplug all the cables from the patient before turning off the power.
- ♦ When unplugging the cables, make sure to pull from the connector part of the cable and avoid applying excessive force.
- ♦ Clean the accessories and cables, and keep them together in one place.
- ♦ Keep the equipment clean to ensure proper operation for the next use.

### □ Precaution when Equipment Failure Occurs

- ♦ If the equipment is damaged and in need of repair, the user should not attempt service. Label the unit "OUT OF ORDER" and contact our service representative.

## □ Precaution about Disassembling/Remodeling the Equipment

- ♦ Do not disassemble or remodel the equipment.
- ♦ If water or other liquids enter the equipment, cease using the equipment and contact your nearest service representative.

## □ Precautions about Maintenance Check

- ♦ Make sure to periodically check the equipment, accessories and cables.
- ♦ When reusing the equipment which was left unused for a while, always check that the equipment operates properly and safely before use.

## □ Precautions when Using with Other Equipment

- ♦ To prevent patient from burn injury, verify proper attachment of patient ground plate, ECG electrode type when using the electrosurgical knife, and verify paste volume, output energy when using the defibrillator. Also, verify that each equipment is properly grounded.

# Precautions about the Maintenance

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### **⚠ WARNING**

- ♦ Never open the housing while the equipment is in operation or connected to hospital grade outlet as it may result in electric shock.

### **⚠ CAUTION**

#### Precautions about Safety Check

- ♦ For safe operation of the equipment, regular inspection and maintenance are required. Once a year, check all cables, devices, and accessories for damage, earth impedance, earth and leakage currents, and all alarm functions. Also, ensure that all safety labels are legible. Maintain a record of these safety inspections.
- ♦ Immediate maintenance has to be carried out for the following case.
  - ♦ When the equipment was subjected to extreme mechanical stress, e.g. after a heavy fall.
  - ♦ When the equipment was subjected to liquid spill.
  - ♦ When the monitoring function is interrupted or disturbed.
  - ♦ When parts of the equipment enclosure are cracked, removed, or lost.
  - ♦ When any connector or cable shows signs of deterioration.

# Precautions about the Network System

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## Medical Telemetry

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### **⚠ CAUTION**

#### Precautions about the Installation

- ♦ The medical institution (hereinafter referred as "Institution" ) must decide the telemetry installation plan for the medical institution in order to prevent interference between transmitters (telemetry based on destination country's radio law). When telemetry has already been installed and been used, radio format, frequency, and antenna power are required to be examined to prevent interference.
- ♦ When using telemetry which requires zone location, the institution is to set up the zones as an operation unit for each transmitter to prevent electronic interference between telemetry throughout the Institution.
- ♦ When using telemetry which requires zone location, display and identify each prepared zone in the equipment.
- ♦ When laying receiver antenna for each transmitter, the Institution has to examine the installation so that

electronic interference does not occur.

- Based on the above examination result, the Institution should place each receiver antenna as required.

### **CAUTION** Precautions about the Management

- The institution appoints a person to manage the wireless channels for the whole medical institution. And when using telemetry which requires zone location, the Institution should nominate a person to manage the wireless channels in each zone (a "Zone Manager"). However, when using such telemetry in a local medical institution, one person can perform both functions.
- Select a telemetry manager who understands the characteristics and functionality of telemetry systems, and is skilled in operating telemetry.
- When installing telemetry, the Overall Manager and the Zone Manager have to understand the precautions for use of the telemetry in advance.
- The Overall Manager takes responsibility of wireless channel management and transmitter storage for the whole Institution by giving proper instruction.
- The Overall Manager should create a management log (hereinafter referred to as the "log"), which contains a list of the management status of the wireless channels for the whole Institution. When changing a wireless channel, register it in the log and give proper instructions to the Zone Manager or to the user.
- The Zone Manager assumes responsibility for managing the wireless channels, storing, and managing telemetry.
- The Zone Manager assigns the transmitter to the user, and provides enough education for use inside the zone.
- The telemetry user verifies operation of the transmitter/receiver before use.
- The telemetry user, if using the telemetry in a zone location, follows the instructions of the Zone Manager for the zone and gives instructions to the patient if required.
- When interference or breakdown occurs in telemetry communication, the user is required to inform the zone manager and the overall manager of the problems. The Zone Manager and Overall Manager are to deal with the problem properly and/or contact their nearest Fukuda Denshi representative for service.

## Precautions when Using with Other Equipment

### Pacemaker

#### **WARNING**

- Minute ventilation rate-adaptive implantable pacemakers can occasionally interact with certain cardiac monitoring and diagnostic equipment, causing the pacemakers to pace at their maximum programmed rate. The cardiac monitoring and diagnostic equipment may possibly send wrong information. If such event occurs, please disconnect the cardiac monitoring and diagnostic equipment, or follow the procedures described in the operation manual of the pacemaker. For more details, contact FUKUDA DENSHI personnel, your institution's professionals, or your pacemaker distributors.
- Rate meters may continue to count the pacemaker rate during occurrences of cardiac arrest or some arrhythmias. Do not rely entirely upon rate meter alarms. Keep pacemaker patients under close surveillance.

#### Reference

"Minute Ventilation Rate-Adaptive Pacemakers"

FDA alerts health professionals that minute ventilation rate-adaptive implantable pacemakers can occasionally interact with certain cardiac monitoring and diagnostic equipment, causing pacemakers to pace at their maximum programmed rate.

[Based on a safety bulletin issued by FDA Center for Devices and Radiological Health on October 14, 1998]

## Non-Explosion Proof

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### DANGER

- Never operate the equipment in the presence of flammable anesthetics, high concentration of oxygen, or inside hyperbaric chamber. Also, do not operate the equipment in an environment in which there is a risk of explosion.

Explosion or fire may result.

## Defibrillator

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### WARNING

- When defibrillating, keep away from the electrodes or medicament applied to the patient chest. If this is not possible, remove the electrodes or medicament before defibrillating.  
If the defibrillator paddles are directly in contact with the electrodes or medicament, an electrical shock may result by the discharged energy.
- When defibrillating, make sure that the electrodes, sensor cables, or relay cables are firmly connected to the device.  
Contacting the metal part of the disconnected cable may result in electrical shock from the discharged energy.
- When defibrillating, do not touch the patient and the metal part of the device or cables.  
Electric shock may result from the discharged energy.
- This equipment will return to standard operating mode within 10 seconds after defibrillating. However, when in diagnosis mode, it may require 10 seconds or more after defibrillation to display the normal ECG waveform as the time constant setting is large.  
The stored data will not be affected. The measurement accuracy will temporarily decrease during defibrillation, but it will not compromise the safety of patient and the equipment.
- The QRS synchronized signal is not intended to be used as synchronized signal for defibrillator.

## Electrosurgical Instrument

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### WARNING

- The monitoring system contains protection against burn injury and interference generated by electrosurgical instruments. However, depending on the operating conditions, surgery site with respect to the location of ECG electrodes, ground plate attachment condition, or the type of instrument used, it may cause burn injury at the electrode site or noise on the ECG. The noise is generated at the tip of the electrical knife and is difficult to completely eliminate because of the frequency components of the ECG. To reduce electrosurgical interference, take the following precautions:

#### Location:

Locate the electrosurgical unit as far as possible from this equipment and the patient cable. This will help reduce interference on the ECG through the monitor or cables.

#### Power Supply:

Connect the electrosurgical unit to a power supply that is different from that of this equipment. This will help prevent interference through the power cable.

#### Electrode Placement

Place the ECG electrodes as far away as possible from the surgery site and the ground plate. Do not place electrodes in the path between the surgery site and the ground plate. Position (+) and (-) electrodes as close as possible to each other.

#### Ground Plate

When using electrosurgical instruments, make sure the contact between the patient and the ground plate is

secure. If the connection is incomplete, the patient may suffer from burn at the electrode site.

- ♦ The stored data will not be affected. The measurement accuracy will temporarily decrease during electrosurgery, but it will not compromise the safety of patient and the equipment.

## MRI (Magnetic Resonance Imaging)

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### **WARNING**



MR-Unsafe -keep away from magnetic resonance imaging (MRI) equipment.

- ♦ Do not use this equipment in magnetic resonance imaging (MRI) environments.
- ♦ When conducting MRI test, remove the electrodes and sensors connected to the patient (test subject). This equipment may be pulled towards the MRI device. Also, the local heating caused by the induced electromotive force may cause burn injury to the patient (subject) or performance degradation of this equipment.

For details, refer to the operation manual for the MRI testing device.

## Precautions about Connections to Peripheral Devices

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In the interest of safe and sufficient performance of this equipment, the connection of other manufacturers' equipment to the monitor is not authorized, unless the connection is explicitly approved by Fukuda Denshi. It is the user's responsibility to contact Fukuda Denshi to determine the compatibility and warranty status of any connection made to another manufacturer's equipment.

### **WARNING**

- ♦ When multiple equipments are connected to the patient, the total amount of leakage current may exceed the limit specified on IEC 60601-1.
- ♦ For the connector with  mark, only the peripheral devices specified by Fukuda Denshi should be connected with the given procedure. Use of an unspecified device may cause electric shock to the patient and/or operator due to excessive leakage current.

### **CAUTION**

- ♦ Although the peripheral device connectors on the DS-8200 System are isolated from the power supply, the connecting peripheral devices should comply with IEC 60601-1 inside the patient environment. In other cases, to maintain operator and patient safety, consider the requirements of IEC 60601-1. It is the user's responsibility to ensure that the overall system provides a level of safety in compliance with IEC 60601-1.
- ♦ To prevent danger of electric shock, always position the peripheral devices away from the patient.
- ♦ Network equipment including printer and hub should be located outside the "Patient Environment". If located inside the "Patient Environment", it may result in electric shock to the patient or the operator.
- ♦ Combinations of medical equipment with non-medical equipment must comply with IEC 60601-1-1. Never use a multiple portable socket-outlet or extension cord when combining equipment unless the socket outlet is supplied specifically for use with that equipment.

## Precautions for Using the Equipment

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### This System

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#### **DANGER**

- When connecting to other equipments, contact your nearest representative.  
Danger such as electric shock may result to the patient and operator.

#### **WARNING**

#### Warnings about the System

- Do not connect any damaged / unspecified equipment or cable to any I/O connector. If done so by mistake, the device cannot deliver its maximum performance and the connected units may be damaged, resulting in a safety hazard.
- If this equipment is used under an environment not fulfilling the specified condition, not only that the equipment cannot deliver its maximum performance, the equipment may be damaged and safety cannot be ensured. If using the equipment under condition other than specified, contact your nearest representative.
- Use only the supplied 3-way AC power cable. Use of other cables may result in electric shock to the patient and the operator.
- The power cable must be connected to a hospital grade outlet.
- When using multiple ME equipment simultaneously, perform equipotential grounding to prevent potential difference between the equipments. Even a small potential difference may result in electric shock to the patient and the operator.
- Carefully route cables to reduce the possibility of patient entanglement and strangulation.
- When lifting this equipment, hold it by the handle or the bottom part of the main unit.

#### **WARNING**

#### Warnings about the Monitoring

- The patient classification selection influences the precision of the QRS detection and NIBP measurement. Make sure the correct selection is made.
- The pacemaker use selection influences the precision of the QRS detection and arrhythmia analysis. Make sure the correct selection is made.
- If the QRS pace mask function is set to [OFF], [10ms] or [20ms], the pace pulse may be erroneously be detected as a QRS complex and HR, Asystole alarms may not generate due to incorrect HR (counting pace pulse as QRS complex). Select [OFF], [10ms], or [20ms] only if you are sure that pacing failure will not occur, or when the patient can be constantly monitored.
- When measuring the SpO<sub>2</sub> of patient with high fever or peripheral circulatory insufficiency, check the sensor attachment periodically and change the attachment site. The temperature of the attachment site will rise 2 to 3°C due to the sensor heat which may result in burn injury.
- For the following case, accurate measurement of SpO<sub>2</sub> may not be possible.
  - Patient with excessive abnormal hemoglobin (COHb, MetHb)
  - Patient with the pigment injected to the blood
  - Patient receiving CPR treatment
  - When a sensor is applied to a limb with NIBP cuff, arterial catheter, or intracatheter
  - When measuring at site with venous pulse
  - Patient with body motion
  - Patient with small pulse
- Before the NIBP measurement, make sure the patient classification ([Adult]/[Child]/[Neonate]) is properly

- selected. Otherwise, correct measurement cannot be performed, and congestion or other injury may result.
- ♦ When the system alarm is suspended, all the alarms will be suspended even if the parameter alarm is set to [ON]. Also, the alarms will not be stored as recall events.
  - ♦ If the upper/lower alarm limit of the parameter is set to [OFF], or arrhythmia alarm is set to [OFF], alarm will not function even if the system alarm is set to [ON]. Pay attention when setting them [OFF].
  - ♦ Objective and constant arrhythmia detection is possible through the fixed algorithm incorporated in this monitor. However, excessive waveform morphology change, motion artifact, or the inability to determine the waveform pattern may cause an error, or fail to make adequate detection. Therefore, physicians should make final decisions using manual recording, alarm recording and recall waveform for evaluation.
  - ♦ The RR/APNEA alarm will not be generated unless the parameter key (Numeric Data Box) corresponded to the selected RR/APNEA source is displayed. Make sure to display the parameter key (Numeric Data Box) for the RR/APNEA source.
  - ♦ When selecting [0] for "Volume" or [Timer] for "Display" for the Night Mode, pay attention not to miss any important alarm by simultaneously monitoring the patient on central monitor or other monitors.
  - ♦ When the alarm sound is suspended, the alarm sound will not generate for the fixed amount of time. Pay attention not to miss any important alarm by simultaneously monitoring the patient on central monitor or other monitors.

**⚠️ WARNING Warnings about the SpO<sub>2</sub> Monitoring (HS-8312M)**

- ♦ Pulse rate measurement is based on the optical detection of a peripheral flow pulse and therefore may not detect certain arrhythmias. The pulse oximeter should not be used as a replacement or substitute for ECG based arrhythmia analysis.
- ♦ A Pulse CO-Oximeter should be considered an early warning device. As a trend towards patient hypoxemia is indicated, blood samples should be analyzed by laboratory instruments to completely understand the patient's condition.
- ♦ For measurements of high or low SpHb readings, blood samples should be analyzed by laboratory instruments to completely understand the patient's condition.
- ♦ SpO<sub>2</sub> is empirically calibrated to functional arterial oxygen saturation in healthy adult volunteers with normal levels of carboxyhemoglobin (COHb) and methemoglobin (MetHb). A pulse oximeter can not measure elevated levels of COHb or MetHb. Increases in either COHb or MetHb will affect the accuracy of the SpO<sub>2</sub> measurement.
  - ♦ For increased COHb: COHb levels above normal tend to increase the level of SpO<sub>2</sub>. The level of increase is approximately equal to the amount of COHb that is present.

**NOTE**

- ♦ High levels of COHb may occur with a seemingly normal SpO<sub>2</sub>. When elevated levels of COHb are suspected, laboratory analysis (CO-Oximetry) of a blood sample should be performed.

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- ♦ For increased MetHb: the SpO<sub>2</sub> may be decreased by levels of MetHb of up to approximately 10% to 15%. At higher levels of MetHb, the SpO<sub>2</sub> may tend to read in the low to mid 80s. When elevated levels of MetHb are suspected, laboratory analysis (CO-Oximetry) of a blood sample should be performed.
  - ♦ Interfering Substances: Dyes, or any substance containing dyes, that change usual blood pigmentation may cause erroneous readings.
  - ♦ Hemoglobin synthesis disorders may cause erroneous SpHb readings.
  - ♦ Elevated levels of Total Bilirubin may lead to inaccurate SpO<sub>2</sub>, SpMet, SpCO, SpHb measurements.
  - ♦ Motion artifact may lead to inaccurate SpMet, SpCO, SpHb measurements.
  - ♦ Severe anemia may cause erroneous SpO<sub>2</sub> readings.
  - ♦ Very low arterial Oxygen Saturation (SpO<sub>2</sub>) levels may cause inaccurate SpCO and SpMet measurements.

- ♦ With very low perfusion at the monitored site, the readings may read lower than core arterial oxygen saturation.
- ♦ Do not use tape to secure the sensor to the site; this can restrict blood flow and cause inaccurate readings. Use of additional tape can cause skin damage or damage the sensor.
- ♦ If the sensor is wrapped too tightly or supplemental tape is used, venous congestion/pulsations may occur causing erroneous readings.
- ♦ Venous congestion may cause under reading of actual arterial oxygen saturation. Therefore, assure proper venous outflow from monitored site. Sensor should not be below heart level (e.g. sensor on hand of a patient in a bed with arm dangling to the floor).
- ♦ Venous pulsations may cause erroneous low readings (e.g. tricuspid value regurgitation).
- ♦ Loss of pulse signal can occur when:
  - The sensor is too tight.
  - The patient has hypotension, severe vasoconstriction, severe anemia, or hypothermia.
  - There is arterial occlusion proximal to the sensor.
  - The patient is in cardiac arrest or is in shock.
- ♦ The pulsations from intra-aortic balloon support can be additive to the pulse rate on the oximeter pulse rate display. Verify patient's pulse rate against the ECG heart rate.
- ♦ Misapplied sensors or sensors that become partially dislodged may cause either over or under reading of actual arterial oxygen saturation.
- ♦ Avoid placing the sensor on any extremity with an arterial catheter or blood pressure cuff.
- ♦ High intensity extreme lights (including pulsating strobe lights) directed on the sensor may not allow the Pulse CO-Oximeter to obtain readings.
- ♦ The Pulse CO-Oximeter can be used during defibrillation, but the readings may be inaccurate for up to 20 seconds.
- ♦ Before use, carefully read the sensor's Directions for Use.
- ♦ Tissue damage can be caused by incorrect application or use of a sensor, for example by wrapping the sensor too tightly. Inspect the sensor site as directed in the sensor's Directions for Use to ensure skin integrity and correct positioning and adhesion of the sensor.
- ♦ The Pulse CO-Oximeter is NOT intended for use as an apnea monitor.
- ♦ To avoid cross contamination only use Masimo single use sensors on the same patient.
- ♦ Unless otherwise specified, do not sterilize sensors or patient cables by irradiation, steam, autoclave or ethylene oxide. See the cleaning instructions in the directions for use for the Masimo re-usable sensors.

**⚠️ WARNING** Warns about the CO<sub>2</sub> Monitoring (HPD-800/HPD-810, HCP-800/HCP-810)

- ♦ For HPD-800/HPD-810 with Capnostat 5;
  - ♦ Use only the specified airway adapter manufactured by Respiromedics Novametrics, LLC. Refer to the section on "Optional Accessories" for list of specified airway adapters.  
(☞ Operation Manual "CO<sub>2</sub> Concentration Measurement (Respiromedics)" P13-6)  
These accessories may be purchased from Fukuda Denshi or any authorized Respiromedics Novametrics, LLC distributor.
  - ♦ Always consider the circumference of the intubation tube when using the airway adapter. If inappropriate airway adapter is used for a patient with low ventilation, CO<sub>2</sub> may mix in to the inspired air resulting in incorrect measurement, or apnea detection may become difficult.
- ♦ For HCP-800/HCP-810;
  - ♦ When using a sampling line for intubated patients with a closed suction system, do not place the airway adapter between the suction catheter and endotracheal tube. This is to ensure that the airway adapter does not interfere with the functioning of the suction catheter.
  - ♦ Loose or damaged connections of the sampling line may compromise ventilation or cause an inaccurate

measurement of respiratory gases. Securely connect all components and check connections for leaks according to standard clinical procedures.

- ♦ Do not cut or remove any part of the sampling line. Cutting the sample line could lead to erroneous readings.
- ♦ If too much moisture enters the sampling line (i.e., from ambient humidity or breathing of unusually humid air), the message "Check Sample Line" will appear in the message area. Replace the sampling line once the "Check Sample Line" message appears.
- ♦ Carefully route the sampling line to reduce the possibility of patient entanglement or strangulation.
- ♦ Do not lift the HCP-800/HCP-810 by the sampling line, as the sampling line could disconnect from the equipment, causing the equipment to fall on the patient.
- ♦ CO<sub>2</sub> readings and respiratory rate can be affected by sensor application errors, certain ambient environmental conditions, and certain patient conditions.



### **WARNING** Warnings about the 12-Lead ECG Analysis Function

- ♦ The 12-Lead ECG analysis function is designed to acquire and interpret ECG data from a resting, supine patient. If ECG signals from moving or shaking patients are acquired, erroneous 12-lead interpretation result may occur. Always ensure that the patient is kept motionless during 12-lead ECG signal acquisition and analysis.
- ♦ The 12-lead ECG analysis is intended for use with adult and pediatric patients.
- ♦ All computerized ECG analysis results should be reviewed by a physician before making decision for the patient treatment.



### **CAUTION** Precautions about the System

- ♦ Do not assess the patient's condition by only information from this equipment. A clinical judgment based on the information from the equipment should be made by a doctor who fully understands functions of the equipment, in a comprehensive manner combined with clinical findings and other test results.
- ♦ Do not assess the patient's condition by only alarm from this equipment. When the alarm is set to OFF or low priority, a sudden change of the patient may not be noticed.
- ♦ If an alarm generates, check the patient's condition first and ensure the safety. Depending on the alarm, take appropriate measures to remove the problem. If the problem lies with the alarm setting, set the alarm properly.
- ♦ When measuring for a long period of time, make sure not to compress the patient with the lead cables and the electrodes. Compressing the same site for a long duration may inhibit the blood flow and generate compression necrosis and burn injury.
- ♦ Use only the spare parts specified for this equipment. Otherwise, proper function cannot be executed.
- ♦ Do not use the touch panel with the film attached. Malfunction of the touch panel or damage may result.
- ♦ Due to its material characteristic, the touch panel expands/contracts depending on the temperature/humidity. When the touch panel is left unused for a while, or when the ambient temperature is low, the surface film of the touch panel may expand, but this is not an abnormal condition. This expansion will be reduced in few hours or half a day after the power is turned ON.
- ♦ For quality improvement, specifications are subject to change without prior notice.
- ♦ The display unit utilizes LED for the backlight. Since this LED deteriorates by the life cycle, the display may become dark, scintillate, or may not light by the long term use. In such case, contact our service representative.
- ♦ This equipment is intended to be used for only one patient.
- ♦ The installation of this equipment should be performed by our service representative or a person who is well acquainted with this equipment.
- ♦ If the main unit will be unused for a long period, disconnect the power cable and the lithium-ion battery from the main unit.
- ♦ The lithium-ion battery can only be charged in the specified operating temperatures of the equipment. Refer to the operation manual of the lithium-ion battery (BTO-008) for details.

**⚠ CAUTION****Precautions about the ECG Monitoring**

- ♦ If any electrodes get detached from the patient after being connected to the lead cable and patient monitor, pay attention that the metal part of the electrode does not get in touch with any metal parts of the bed or any conductive parts. Also, the operator should not touch any conductive parts with bare hands. Otherwise, it may result in electric shock to the patient and/or operator.
- ♦ The indication for continuous use of the electrode is about one day.
- ♦ Replace the electrode if the skin contact gets loosen due to perspiration, etc.
- ♦ When an electrode is attached to the same location for a long period, some patients may develop skin irritation. Check the patient's skin condition periodically and change the electrode site as required.
- ♦ For stable arrhythmia detection and ECG monitoring, verify proper electrode placement, lead, waveform size, and filter mode selection. If not properly selected, it may cause erroneous detection.
- ♦ The arrhythmia detection level is related with the displayed waveform size. Set a proper waveform size for monitoring.
  - ♦ When the ECG waveform size is x1/4, x1/2, or x1 the detection threshold is 250 µV.
  - ♦ When the ECG waveform size is x2, x4 the detection threshold is 150 µV.
- ♦ The arrhythmia detection leads, monitoring leads on the central monitor, recording leads are fixed as ECG1 and ECG2. Especially for arrhythmia detection, set the most appropriate leads with high QRS for ECG1 and ECG2.
- ♦ In ESIS Mode, although artifacts such as electrosurgical noise or EMG can be largely reduced, QRS amplitude attenuation, waveform distortion, or ST segment change may occur compared with other filter modes.
- ♦ There are some cases when the pacemaker pulse can not be detected depending on the pacemaker type, pulse voltage, pulse width, electrode lead type (unipolar, bipolar), or electrode placement which causes the pacemaker pulse amplitude to decrease and disables the pacemaker pulse detection.
- ♦ If signals similar to a pacemaker pulse are present, such as electric blanket noise or excessive AC frequency noise, these may be erroneously detected and displayed as a pacemaker pulse.
- ♦ When a spontaneous QRS and pacemaker pulse overlap (ex. fusion beat, etc.), QRS detection cannot be performed properly. In this case, the heart rate is degraded.
- ♦ If a pacemaker pulse is continuously detected due to AC frequency interference, QRS detection will be suspended and the heart rate will be reduced. Arrhythmia will not be detected either.

**⚠ CAUTION****Precautions about the ST Measurement**

- ♦ The ST algorithm has been tested for accuracy of the ST segment data. The significance of the ST segment changes need to be determined by a clinician.
- ♦ For the lead which the electrode is detached, the reference waveform setup cannot be performed. Check if the electrode is appropriately attached, and perform the setup again.

**⚠ CAUTION****Precautions about the 12-Lead Analysis**

- ♦ Interpretation and Minnesota codes given by this equipment do not instruct the physician as to the kind and degree of cardiac disease. Accordingly, four value judgements are given for ECG waveform and although "abnormal" indicates a large possibility of organic cardiac disease, there are cases where no cardiac disease exists despite an abnormal ECG (that is, an abnormal ECG may be caused by something other than heart). On the other hand, care should be taken in the event any preclinical coronary arteriosclerosis could be present despite a normal ECG interpretation.

Therefore, for a proper diagnosis, the ECG should be integrated with other interpretations.

- ♦ ECG Recording by the Mason-Likar System

The 12-lead ECG recorded with the torso placement of the limb leads (Mason-Likar 12-lead system) may differ from the standard 12-lead ECG. Moreover, waveforms may differ somewhat also in a supine position and a standing position (sitting position).

Fukuda Denshi recommends to carry out the recording of the ECG by taking into consideration the waveform differences according to electrode positions or postures.

- ♦ For the model installed with ECG analysis program  
The ECG analysis program is intended to analyze the standard 12-lead ECG waveforms. Therefore, the analyzed result for waveforms recorded with the torso placement of the limb leads (Mason-Likar 12-lead system) may differ from that of the standard 12-lead ECG waveforms.
- ♦ Select "Used" for the pacemaker setting on the patient admit/discharge menu if a patient has a pacemaker.
- ♦ The threshold values for classification of 12-lead ECG interpretation and Minnesota code are set by age and sex as follows:
  1. Male and Female of ages 19 years old and above
  2. Male of age 12 through 18 years old
  3. Female of age 12 through 18 years old
  4. Male and Female of ages 3 through 11 years old
  5. Male and Female of ages below 2 years old
- ♦ If no patient information (i.e. Default : "Class." [Adult], "Sex": undetermined, and "Age" [0]) has been entered, the system algorithm will handle the patient as a "35 years old male".
- ♦ Before the analysis, make sure the patient classification ([Adult] / [Child]) is properly selected. If [Neonate] is selected, the 12-lead ECG analysis will not function.
- ♦ Enter the age of patient if known. If no age information (i.e. Default: [0]) has been entered, the system algorithm will handle the patient as "35 years old".
- ♦ Enter the sex of patient if known. If no sex information (i.e. Default: undetermined) has been entered, the system algorithm will handle the patient as "Male".
- ♦ If the patient classification is set as [Child] and no age (i.e. Default: [0] ) has been entered, the system algorithm will handle the patient as "less than 2 years old."

### CAUTION Precautions about the SpO<sub>2</sub> Monitoring

- ♦ Make sure to use only the specified sensor/relay cable. Otherwise inaccurate measurements may be caused.
- ♦ Discontinue use if patient sensor is damaged in anyway.
- ♦ If the nail is rough, dirty, or manicured, accurate measurement will not be possible. Change the finger or clean the nail before attaching the sensor.
- ♦ If irritation such as skin reddening appears with the sensor use, change the attachment site or stop using the sensor.
- ♦ Do not wrap the supplemental tape on the sensor too tight. At the same time, check the blood flow constantly so that congestion is not generated at the peripheral.
- ♦ Do not use tape to secure the sensor to the site.
- ♦ Even a short duration of attachment may inhibit the blood flow and generate compression necrosis and burn injury.
- ♦ Check the sensor attachment site constantly in every 4 hours when probes or reusable sensor are used, and at least every 8 hours when single patient use sensors are used. Be especially careful of a patient with bad perfusion. If the sensor attachment position is not changed constantly, skin irritation or skin necrosis due to compression may be developed. For the patient with bad perfusion, check the sensor attachment position at least every 2 hours.
- ♦ As skin for neonate/ low birth weight infant is immature, change the sensor attachment site more frequently depending on the condition.
- ♦ Direct sunlight to the sensor area can cause measurements error. Place a black or dark cloth over the sensor.
- ♦ When not performing the measurement, unplug the relay cable and sensor from the SpO<sub>2</sub> connector. Otherwise, the measurement data may be erroneously displayed by the ambient light.
- ♦ The pulse wave is normalized for SpO<sub>2</sub> measurement. It does not indicate perfused blood volume. Check proper probe attachment by observing the pulse wave.

- ♦ Precautions for Reusable Type Sensor

The light-emitting part of the sensor should be over the root of the fingernail. Do not insert the finger too far into the sensor as it may hurt the patient. For additional warnings, cautions, or contraindications when using sensors with Nellcor Unit (HS-8312N)/Masimo Unit (HS-8312M), refer to SpO<sub>2</sub> sensor instruction manual.

- ♦ Precautions for Single-Patient-Use Type Sensors

The sensor can be reused on the same patient as long as the adhesive tape attaches without slippage. But do not reuse on other patients to avoid cross contamination. It is intended for single patient use only. For additional warnings, cautions, or contraindications when using sensors with Nellcor Unit (HS-8312N)/Masimo Unit (HS-8312M), refer to SpO<sub>2</sub> sensor instruction manual.

- ♦ If " - - " is displayed for the SpO<sub>2</sub> numeric data, make sure that the sensor is properly attached.
- ♦ Measuring on a limb with NIBP cuff, arterial catheter, or intracatheter may result in incorrect measurement.
- ♦ Venous congestion may cause under reading of actual oxygen saturation. Therefore, assure proper venous outflow from monitored site. Sensor should not be below heart level (e.g. sensor on hand of a patient in a bed with arm dangling to the floor).

**⚠ CAUTION** Precautions about the SpO<sub>2</sub> Monitoring (HS-8312M)

- ♦ Do not use the Pulse CO-Oximeter or oximetry sensors during magnetic resonance imaging (MRI) scanning. Induced current could potentially cause burns. The Pulse CO-Oximeter may affect the MRI image, and the MRI unit may affect the accuracy of the oximetry measurements.
- ♦ If using pulse CO-oximetry during full body irradiation, keep the sensor out of the irradiation field. If the sensor is exposed to the irradiation, the reading might be inaccurate or the unit might read zero for the duration of the active irradiation period.
- ♦ Exercise caution when applying a sensor to a site with compromised skin integrity. Applying tape or pressure to such a site may reduce circulation and/or cause further skin deterioration.
- ♦ Circulation distal to the sensor site should be checked routinely.
- ♦ A functional tester cannot be utilized to assess the accuracy of the Pulse CO-Oximeter or any sensors.
- ♦ Do not modify or alter the sensor in any way. Alterations or modification may affect performance and/or accuracy.

**⚠ CAUTION** Precautions about the NIBP Monitoring

- ♦ Do not apply the NIBP cuff to site of injury. An injury may be worsened by the measurement.
- ♦ Do not apply the NIBP cuff to the arm on side treated axillary lymph nodes dissection. It may lead to lymphatic edema by the cuff pressure.
- ♦ Measuring on a limb with SpO<sub>2</sub> sensor, arterial catheter, or intracatheter may result in incorrect measurement.
- ♦ An operator must not get away from a patient during the NIBP measurement. However, when getting away from the patient is necessary, do not activate the Alarm Suspend and Silence functions in order not to miss any sudden changes in the patient's condition.
- ♦ Pay attention when measuring the NIBP of patient with bleeding disorders or hyper coagulation. The cuff inflation may cause petechia or circulatory failure by the blood clot.
- ♦ For the following situation, measurements will be terminated.
  - ♦ When the measurement time has exceeded 160 seconds for adult and child, 80 seconds for neonate.
  - ♦ When the inflation value has exceeded 300mmHg for adult, 210mmHg for child, and 150mmHg for neonate.
- ♦ If used with the incorrect patient classification, it will not only cause erroneous measurement, but the inflating level for the adult may be applied to child or neonate causing dangerous situation to the patient.
- ♦ The continuous measurement and 1-minute interval measurement will automatically stop after 12 minutes (maximum 15 minutes).
- ♦ If the mean MAP display is set to OFF, the MAP alarm will not be generated. Also the MAP data will not be displayed for the tabular trend or the NIBP list.



### Precautions about the BP Monitoring

- ♦ Do not reuse / re-sterilize the disposable type transducers.
- ♦ If using a reusable blood pressure transducer, disinfect it according to the manufacturer's guidelines.
- ♦ The long-term use of the blood pressure transducer, tube and catheter may increase the risk of infection. Perform periodic replacement with new one. The guidelines of the CDC (Disease Control and Prevention) recommend replacing within 96 hours.
- ♦ If the ambient temperature of the blood pressure transducer has changed greatly, the zero balance may cause the drift. Perform the zero balance again.
- ♦ An operator must not get away from a patient during the BP measurement. However, when getting away from the patient is necessary, do not activate the Alarm Suspend and Silence functions in order not to miss any sudden changes in the patient's condition.
- ♦ Be sure to perform Daily Check. Use of faulty equipment might harm the patient or operator.
- ♦ If the Equipment Status Alarm occurs or if you feel the unusual operation of the equipment, perform the inspections to confirm the safety or contact our service representative.
- ♦ If the transducer get disconnected, pay attention that the metal part of the transducer does not get in touch with any metal parts of the bed or any conductive parts. Also, the operator should not touch the conductive parts with bare hands. Otherwise, it may result in electric shock to the patient and/or operator.
- ♦ When the power is turned ON, the BP value will not be displayed until zero balance is performed. Make sure to perform the zero balance. Once the zero balance is performed, the zero balance information will be maintained, and the BP value will be displayed.
- ♦ Each time the blood pressure transducer or tubing is replaced, the zero balance procedure is required to ensure accurate measurements.
- ♦ The zero balance procedure is required for the following case.
  - ♦ When starting the measurement.
  - ♦ When the position of the heart has changed due to body movement.
  - ♦ When the position of the transducer has changed.
  - ♦ When measuring for a long period of time and there is a possibility of measurement error due to change in ambient temperature, etc.
  - ♦ When a connector is connected/disconnected, or a transducer is replaced.
- ♦ Note that Systolic Pressure (SYS) = Peak Systolic Pressure (PSP) for the graphic trend, data base, and alarm setup.
- ♦ When ECG is not measured, Peak Diastolic Pressure (PDP) cannot be calculated.
- ♦ The undisplayed BP data (SYS/DIA/Mean) will not generate a BP alarm or be displayed in the tabular trend. Select the appropriate display type according to the monitoring purpose.



### Precautions about the CO<sub>2</sub> Monitoring (HCP-800/HCP-810)

- ♦ Conduct CO<sub>2</sub> calibration for the following case.  
If the CO<sub>2</sub> gas calibration is not performed at a specified interval, CO<sub>2</sub> measurement accuracy may be affected and also subsequent gas calibration may not be possible.
  - ♦ When the accumulated measurement time exceeds 1,200 hours from the first use.  
However, if the first calibration was performed before the accumulated measurement time reaches 720 hours, another calibration is required when the accumulated measurement time exceeds 1,200 hours from the first calibration.
  - ♦ When 12 months has elapsed or the accumulated measurement time has exceeded 4,000 hours from the previous calibration.
  - ♦ When EtCO<sub>2</sub> measurement is not stable or accuracy is degraded compared with other measuring device.
  - ♦ When the patient monitor was not used for a while, or when EtCO<sub>2</sub> was not measured for a while.

- ♦ Perform the calibration 5 minutes after turning ON the power on the HCP-800/HCP-810.
- ♦ Do not disconnect the sampling tube during calibration. If disconnected, calibration will cease.
- ♦ Dispose of calibration gas according to the regulation of each medical institution.
- ♦ Microstream® EtCO<sub>2</sub> sampling tubes are designed for single patient use, and are not to be reused. Do not attempt to clean, disinfect, sterilize or flush any part of the sampling tube as this can cause damage to the monitor.
- ♦ Dispose of sampling tubes according to standard operating procedures or local regulations for the disposal of contaminated medical waste.
- ♦ Before use, carefully read the Directions for Use for the Microstream® EtCO<sub>2</sub> sampling tube.
- ♦ Only use Microstream® EtCO<sub>2</sub> sampling lines to ensure the monitor functions properly.

** CAUTION** Precautions about the CO<sub>2</sub> Monitoring (HPD-800/810 Gas Unit I/F)

- ♦ The airway adapter should be attached with the thicker side facing to the patient. If attached oppositely, it may damage the CO<sub>2</sub> sensor or airway adapter.

** CAUTION** Precautions about the Alarm

- ♦ Alarm messages will be displayed according to the priority. (Level S > Level H > Level M > Level L > Level N)
- ♦ For the same alarm priority, the alarm message for the newer alarm will be displayed.
- ♦ The alarm message for the arrhythmia alarm will continue to be displayed for 30 seconds after the alarm is resolved.
- ♦ While the "LEAD OFF" or "Check Electrodes" message is displayed, HR alarm and arrhythmia alarm will not function. Leaving this condition unresolved may result in missing a sudden change of the patient. Promptly check the electrodes when these messages are displayed.
- ♦ For the HPD-800/810 Gas Unit I/F and HCP-800/810 CO<sub>2</sub> Gas Unit, the upper EtCO<sub>2</sub> alarm will not generate if the upper limit is set to 100mmHg/13.4kPa and above as the measurement range is 0 to 99mmHg / 0 to 13.3kPa.
- ♦ Whether to use the SpO<sub>2</sub> second alarm function and its threshold selection should be based on the patient's clinical indication/potent and medical evaluation.
- ♦ If the SpO<sub>2</sub> alarm and second alarm setup is set to [OFF], the second alarm integral value will be set to 0.
- ♦ Pay attention not to set the alarm volume too low to avoid missing any important alarms.
- ♦ On a wired network, the alarm generated on the bedside monitor will be output to the network with a maximum delay of 1 second, and to the central monitor with a total delay of 2.5 seconds.
- ♦ If the same or similar equipments with different alarm settings are used in the same facility or same department, pay attention not to misjudge the alarms.

** CAUTION** Precautions about the System Setup

- ♦ When the waveform and numeric data display for each parameter is set to OFF, the alarm and trend input will be also suspended.
- ♦ If the HR/PR source is set to [BP], and if BP waveform/numeric data is set to [Disp. OFF], the PR value will not be displayed.
- ♦ If the HR/PR source is set to [SpO<sub>2</sub>], and if SpO<sub>2</sub> waveform/numeric data is set to [Disp. OFF], the PR value will not be displayed.
- ♦ If the RR source is set to [CO<sub>2</sub>/GAS], and if CO<sub>2</sub> waveform/numeric data is set to [Disp. OFF], the RR value will not be displayed.
- ♦ Do not set the same remote control bed ID to more than one monitors on the same floor.  
Otherwise, it may cause to remote control more than one monitor at the same time.
- ♦ After the remote control setup, check that the remote control unit is properly operating.
- ♦ If the time/date is not correctly set, or changed during monitoring, malfunction may occur with NIBP measurement, periodic recording, trend, NIBP list data, and age calculation from the birth date.

**⚠ CAUTION** Precautions about the Patient Admit/Discharge

- ♦ If monitoring of a new patient is started without discharging the previous patient, data of the new patient will be added to the data of the previous patient which will result in inaccuracy.
- ♦ The user mode setting (alarm/display configuration) will remain effective even when the power is turned OFF or when the patient is discharged. Before monitoring, make sure the current user mode is suitable for the patient's condition.
- ♦ Resuming monitoring will also resume the alarm in suspension.

**⚠ CAUTION** Precautions about the CF/SD Card

- ♦ Use only the specified CF/SD card.
- ♦ Use only the CF/SD card formatted with this equipment.
- ♦ Make sure to turn the power OFF and ON again after the setup data is read from the CF/SD card. The read setup data will become effective after the power is turned OFF and ON again.
- ♦ Reading the patient data from the CF/SD card will erase all previous patient data stored in the patient monitor.

**⚠ CAUTION** Precautions about the Maintenance

- ♦ When cleaning the touch panel, never use strong-acidic cleaning solution.
- ♦ A special coating is applied to the surface of the touch panel. Do not wipe the surface with a cloth or gauze with coarse texture. Wipe the surface with an eyeglass cleaning cloth.
- ♦ Clean the equipment frequently so stains can be removed easily.
- ♦ To prevent injury, it is recommended to wear gloves when cleaning the equipment.
- ♦ Do not allow liquids or cleaning solution to enter the equipment or connectors.
- ♦ Do not use organic solvents, thinner, toluene and benzene to avoid damaging the resin case.
- ♦ Do not polish the housing with abrasive or chemical cleaner.
- ♦ When sterilizing the entire room using a spray solution, pay close attention not to have liquids get into the equipment or connectors.
- ♦ The surface resin coating may be damaged, resulting in discoloration, scratches, or other problems.

Example:

Do not use chemical cloth, scrub brush, abrasive, polishing powder, hot water, volatile solvent and chemicals (cleanser, thinner, benzine, benzol, and synthetic detergent for house and furniture), or sharp-edged tools.

- ♦ Do not open the housing.
- ♦ Avoid alcohol or other liquids from getting into the equipment.
- ♦ Replace the periodic replacement parts periodically as specified.

## Wired Network (DS-LANII/ DS-LANIII)

**⚠ WARNING**

- ♦ Do not connect unspecified device to the wired network.
- ♦ Do not mix devices with DS-LANII and DS-LANIII setting in the same wired network. The network may cease and proper monitoring may not be possible.

**⚠ CAUTION**

- ♦ When using the wired network transmission, configure the display so that the numeric data corresponded to the waveform is displayed. If not, the displayed waveform or numeric data may not be transmitted.
- ♦ The Bed ID is factory set to 000. If connected to the wired network with the ID unchanged, monitoring on the central monitor will not be possible.
- ♦ When connected to the wired network, make sure that there are no other bedside monitors with the same Bed ID. If there are more than one bedside monitors with the same Bed ID, the duplicated bedside monitors cannot

- be monitored on the central monitor.
- ♦ When connected to the DS-LANII network, set the Bed ID in the range from "001" to "048".
  - ♦ When connected to the DS-LANIII network, set the Bed ID in the range from "001" to "100".
  - ♦ There are following restrictions when connecting the DS-8200 System to the wired network.
    - ♦ The BP measurement unit setting should be the same for all central monitors and bedside monitors. If the BP measurement unit is different among the monitors, data such as BP waveform, BP numeric data, NIBP numeric data, NIBP list will not be transmitted. It will be treated as not measured data, and will not be displayed on the central monitor. Also, the alarm limit setup from the central monitor cannot be performed.
    - ♦ For the DS-LANII network, arrhythmia alarm of TACHY, BRADY, COUPLET, PAUSE, TRIGEMINY will not be transmitted.
    - ♦ For the DS-LANII network, arrhythmia alarm of "SLOW VT" will be transmitted as "VT".
    - ♦ For the wired network, waveform, numeric data, and alarm of TEMP3 to 6 will not be transmitted. Also, the displayable waveform, numeric data, and alarm will differ depending on the central monitor model type. Refer also to the operation manual for the respective central monitor.
    - ♦ The PR\_IBP alarm will not be transmitted to the central monitor.
    - ♦ If the "RR/APNEA alarm source" is other than [Impedance] (or, if [Auto] selects a setting other than [Impedance]), the RESP waveform will not be transmitted on a wired network.
    - ♦ If the "RR/APNEA Alarm Source" setting is other than [CO<sub>2</sub>] (Or, if [Auto] selects a setting other than [CO<sub>2</sub>]), the CO<sub>2</sub> waveform will not be transmitted on a wired network.
    - ♦ For the numeric data displayed as "xxx", maximum or minimum value of measurable range will be transmitted.
    - ♦ The numeric data displayed as "---" will be treated as not measured data.
    - ♦ If the measurement unit of CO<sub>2</sub> concentration is mmHg and [99mmHg] is selected for "CO<sub>2</sub> (mmHg) Upper Limit of Transmission" ([Initial Settings]>[System]>[DS-LAN]), the CO<sub>2</sub> value of 100mmHg or above will be transmitted as 99mmHg.
  - ♦ As the DS-8200 System do not have the arrhythmia template display and 12-lead ST display function, waveforms and other data will not be displayed for these displays on the central monitor connected by the DS-LAN network.
  - ♦ When connected to the wired network, time/date will be synchronized with the central monitor. Even if the time/date is changed on the DS-8200 System, it will be corrected to the time/date of the central monitor.
  - ♦ Depending on the central monitor model type, the ST display will be distorted if the ECG lead (ECG1 or ECG 2) is changed on the DS-8200 System. Redrawing the ST display will return the display to normal.
  - ♦ On the central monitor, the respiration waveform and RR value based on the RR/APNEA alarm source selected on the DS-8200 System will be displayed. The RR and APNEA monitored on the central monitor and the DS-8200 System will be the same.

## Wireless Network System

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### **DANGER**

- ♦ When monitoring a patient using wireless telemetry, make sure the patient data is properly received at the central monitor. Pay special attention when the channel ID at the bedside monitor is changed.

### **WARNING**

- ♦ A password can be set to access the channel ID setup menu to allow only the telemetry channel administrator to change the channel ID.
- ♦ Some type of wireless combinations may generate interference with other telemetry.
- ♦ Before selecting a channel, verify it will not interfere with other channels.

- ♦ Inform the supervisor of the use of telemetry channels to avoid interference with other telemetry.
- ♦ If transmitters are used in a neighboring medical facility, your facility and the neighboring facility must make agreements on the setting of the telemetry channels to prevent telemetry interference.



### CAUTION Precautions about the Telemetry

- ♦ When performing telemetry transmission, configure the display so that the numeric data corresponded to the waveform is displayed. If not, the displayed waveform or numeric data may not be transmitted.
- ♦ The setup of channel ID and group ID should be performed only by the telemetry channel administrator or our service representative. Users should not perform this procedure as malfunction may occur.
- ♦ When the measurement unit of BP is "kPa", corresponding waveform and numeric data will not be transmitted. When using a wireless network, use "mmHg" for the BP measurement unit.
- ♦ BP waveform with a scale above the set scale can not be properly transmitted. When transmitting the BP waveform, pay attention to the displayed BP scale.
- ♦ If the measurement unit of CO<sub>2</sub> concentration is mmHg and [99mmHg] is selected for "CO<sub>2</sub> (mmHg) Upper Limit of Transmission" ([Initial Settings]>[System]>[Telemeter]), the CO<sub>2</sub> value of 100mmHg or above will be transmitted as 99mmHg.

## RTC and Data Backup



- ♦ This equipment is equipped with a built-in clock. When the power of this equipment is turned OFF, this clock is backed up by a lithium primary battery. If incorrect time is displayed when turning ON the power, a low battery may be the cause. In such case, contact Fukuda Denshi service representative for replacing the battery.
- ♦ To protect the data during voltage dip, short interruptions and voltage variations on power supply input lines or during short duration of power turned OFF, this equipment performs 5-minute (approx.) data backup using the secondary battery. The data may not be protected if the power is turned OFF within 30 minutes from power ON.

## Precautions about the Ventilator Monitoring



- ♦ The ventilator alarm sound is set to OFF at factory default setting.  
The alarm sound can be turned ON on the Sound setup screen.
- ♦ If the DS-8200 System does not generate an alarm even though the ventilator is generating an alarm, or if any other malfunction occurs, immediately check the ventilator, DS-8200 System, cable, and replace the cable if necessary. If the malfunction persists, stop using the equipment.
- ♦ The alarm generation on the DS-8200 System is not assured if the alarm other than specified generates at the ventilator.  
( Maintenance Manual "Ventilator Measurement and Alarm Input" P4-1)



- ♦ The ventilator operation should be performed by well-trained and authorized personnel.
- ♦ When connecting this equipment and the ventilator, use only the specified connection cable.
- ♦ Verify that this equipment and the ventilator are properly connected.
- ♦ When connecting the cable, verify that the main power of this equipment and the ventilator is OFF.

- When Servo-i/s or SV-300 is connected, RESISTANCE (Insp, Exp), COMPLIANCE, P-V loop, F-V loop display function is not available.

## Precautions about the SpO<sub>2</sub> Sensor

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### **⚠ DANGER** Danger of Burn Injury Caused by the SpO<sub>2</sub> Sensor

- When monitoring SpO<sub>2</sub>, make sure to use only the specified sensor/relay cable. If any other sensor/relay cable is used, a high temperature rise of the sensor may place the patient in danger of burns.  
If there are any questions regarding the sensor/relay cable use for SpO<sub>2</sub> measurements of this equipment, please contact Fukuda Denshi service representative.

## Precautions about the NIBP Cuff

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### **⚠ CAUTION**

- Some of the NIBP cuffs used for this equipment contain natural rubber latex which may cause allergic reactions.  
(FDA: Medical Alert on Latex Products, "Allergic Reactions to Latex-Containing Medical Devices", Food & Drug Administration, 10903 New Hampshire Avenue, Silver Spring, MD 20993, 1991.)

## Precautions about Disposing of the Equipment, Accessories, or Components

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### **⚠ CAUTION**

- When disposing of this equipment, accessories, or components, use an industrial waste distributor. Do not dispose of as ordinary waste.
- When disposing of the battery, separate it from other wastes and contact your nearest service representative.

## Precautions about Transportation

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### **⚠ CAUTION**

- When transporting this equipment, pack it with specified packing materials.  
Also, transport it under appropriate environment condition.  
(Operation Manual "Specification" P14-1)

## Monitoring after Power Failure

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When the power failure is within 30 seconds, monitoring will resume with the display mode and patient information unchanged. When the power failure is 30 seconds or more, monitoring will resume with the default display mode of factory setting or user setting, or the display mode which was last set, only if the equipment was operated for 30 minutes or more before the power failure.

HPD-800/HPD-810, HCP-800/HCP-810 will start up from the warm-up mode. The warm-up time differs for each unit.

## To Prepare for Emergency Use

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### Accessories/Optional Accessories

- The ECG electrodes are consumable products. Always prepare extra supplies of electrodes.

- ♦ Check once a week that there is no wire break on the patient cable.

### Battery Pack

- ♦ Even if the battery pack is not in use, the remaining capacity decreases due to self-discharge. Make sure to verify periodically that the battery pack is fully charged
- ♦ To fully charge the empty battery pack, it takes 8 hours during operation, and 3.5 hours when the power is OFF and AC cable is connected.
- ♦ The performance of the battery deteriorates with repeated use. To ensure performance of the battery, it is recommended to replace it once a year.

## Electromagnetic Compatibility

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The performance of this device under electromagnetic environment complies with IEC 60601-1-2: 2007.

### Precautions for Safe Operation under Electromagnetic Influence

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If any sorts of electromagnetic wave, magnetic field, or static electricity exist around the device, noise interference or malfunction of the device may occur. If any unintended malfunction or noise occurs during monitoring, check the electromagnetic influence and take appropriate countermeasures.

The following are examples of the common cause and countermeasures.

#### **⚠ DANGER** Static Electricity

In a dry environment (room), static electricity is likely to occur. Take the following countermeasures.

- ♦ Both operator and patient should remove any static electricity before entering the room.
- ♦ Humidify the room.

#### **⚠ WARNING** Cellular Phone

- ♦ The radio wave may cause malfunction to the device.

Cellular phones and radio sets should be turned off in the room (building) where medical device is located.

#### **⚠ CAUTION** Lightning

A lightning nearby may induce excessive voltage to the equipment. If any danger is suspected;

- ♦ Use the uninterruptible power supply system.
- ♦ Use the battery.

#### **⚠ CAUTION** High frequency noise interference from other device through the power outlet

- ♦ Check where the noise is originated and remove it using filtering device, etc.
- ♦ Stop using the device that is originating the noise.
- ♦ Use other power outlet.

## EMC Guidance

This equipment complies with IEC 60601-1-2: 2007. However, if portable transmitter or wireless LAN equipment is used extremely nearby, the electromagnetic influence may largely exceed the compliance level and may cause unexpected phenomenon such as noise interference on the waveform, etc.

This equipment should be used in a location specified by each medical institution.

If any unexpected noise interference on the waveform or failure to the peripheral device occurs, stop using the equipment and follow the instruction of the technical engineer.

The following is the information relating to EMC (Electromagnetic Compatibility).

(When using this equipment, verify that it is used within the environment specified below.)

### Compliance to the Electromagnetic Emissions

The DS-8200 System is intended for use in the electromagnetic environment specified below. It should be assured that the device is used in such an environment.

When measuring only the vital parameters without connection to peripheral equipments (including HLX-801 and Display Unit Extension Cable)

Guidance and Manufacturer's Declaration - Electromagnetic Emissions		
Emissions Test	Compliance	Electromagnetic Environment - Guidance
RF Emissions CISPR 11	Group 1	The DS-8200 System uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF Emissions CISPR 11	Class B	
Harmonic Emissions IEC 61000-3-2	Class A	The DS-8200 System is suitable for use in housing environment and establishments directly connected to the public low-voltage power supply network which is supplied to buildings in housing environment.
Voltage Fluctuations/ Flicker Emissions IEC 61000-3-3	Complies	

When measuring the vital parameters with connection to peripheral equipments (including HLX-801 and Display Unit Extension Cable)

Guidance and Manufacturer's Declaration - Electromagnetic Emissions		
Emissions Test	Compliance	Electromagnetic Environment - Guidance
RF Emissions CISPR 11	Group 1	The DS-8200 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	
Harmonic Emissions IEC 61000-3-2	Class A	The DS-8200 System is suitable for use in all establishments other than housing environment and those directly connected to the public low-voltage power supply network which is supplied to buildings in housing environment.
Voltage Fluctuations/ Flicker Emissions IEC 61000-3-3	Complies	

**Compliance to the Electromagnetic Immunity (1)**

The DS-8200 System is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-8200 System should assure that it is used in such an environment.

Guidance and Manufacturer's Declaration - Electromagnetic Immunity			
Immunity Test	IEC 60601-1-2 Test Level	Compliance Level	Electromagnetic Environment - Guidance
Electrostatic Discharge (ESD) IEC 61000-4-2	±6kV: contact ±8kV: air	±6kV: contact ±8kV: air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2kV: power supply lines ±1kV: input/output lines	±2kV: power supply lines ±1kV: input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1kV: differential mode ±2kV: common mode	±1kV: differential mode ±2kV: common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines. IEC 61000-4-11	<5% $U_T^*$ (>95% dip in $U_T$ ) for 0.5 cycles  40% $U_T$ (60% dip in $U_T$ ) for 5 cycles  70% $U_T$ (30% dip in $U_T$ ) for 25 cycles  <5% $U_T$ (>95% dip in $U_T$ ) for 5 sec.	<5% $U_T$ (>95% dip in $U_T$ ) for 0.5 cycles  40% $U_T$ (60% dip in $U_T$ ) for 5 cycles  70% $U_T$ (30% dip in $U_T$ ) for 25 cycles  <5% $U_T$ (>95% dip in $U_T$ ) for 5 sec.	Mains power quality should be that of a typical commercial or hospital environment.  If it is required to continuously operate the DS-8200 System during power failure, it is recommended to operate on an uninterrupted power supply.
Power Frequency (50/60Hz) Magnetic Field IEC 61000-4-8	3A/m	3A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

\*:  $U_T$  is the AC mains voltage prior to application of the test level.

## Compliance to the Electromagnetic Immunity (2)

The DS-8200 System is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-8200 System should assure that it is used in such an environment.

Guidance and Manufacturer's Declaration - Electromagnetic Immunity			
Immunity Test	IEC 60601-1-2 Test Level	Compliance Level	Electromagnetic Environment - Guidance
Conducted RF IEC 61000-4-6	3Vrms 150kHz to 80MHz	3Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the DS-8200 System, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended Separation Distance $d = 1.2 \sqrt{P}$
Radiated RF IEC 61000-4-3	3V/m 80MHz to 2.5GHz	3V/m	<p><math>d = 1.2\sqrt{P}</math> 80MHz to 800MHz  <math>d = 2.3\sqrt{P}</math> 800MHz to 2.5GHz</p> <p>Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey<sup>*1</sup>, should be less than the compliance level in each frequency range<sup>*2</sup>.</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
<p>Note 1: At 80MHz and 800MHz, the separation distance for the higher frequency range applies.</p> <p>Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p> <p>*1: Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast can not be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the DS-8200 System is used exceeds the applicable RF compliance level above, the DS-8200 System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the DS-8200 System.</p> <p>*2: Over the frequency range 150kHz to 80MHz, field strength should be less than 3V/m.</p>			

**Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the DS-8200 System**

The customer or the user of the DS-8200 System can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the DS-8200 System as recommended below, according to the maximum output power of the communications equipment.

Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the DS-8200 System			
Rated Maximum Output Power of Transmitter (W)	Separation Distance according to Frequency of Transmitter (m)		
	150kHz to 80MHz $d = 1.2 \sqrt{P}$	80MHz to 800MHz $d = 1.2 \sqrt{P}$	800MHz to 2.5GHz $d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be determined using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer. P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1: At 80MHz and 800MHz, the separation distance for the higher frequency range applies.

Note 2: These guidelines may not apply in all situations.  
Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

**Essential Performance Statement**

- ♦ This equipment complies with the requirements of 6.2.1.10 of IEC 60601-1-2:2007 and the accuracy requirements of heart rate range, accuracy and QRS detection range except sub clauses ESD and electrosurgery.
- ♦ This equipment will not change the operation state, lose or change any stored data, generate errors in control software that cause an unintended change in output, or cause errors in blood pressure readings that are outside of 6.2.1.10 of IEC 60601-1-2:2007 and the accuracy requirements of accuracy of systolic and diastolic pressure except for sub clauses ESD and electrosurgery. These criteria do not apply to ESD testing.<IBP>
- ♦ Pulse oximeter equipment meets the requirements of IEC 60601-1-2. <SpO<sub>2</sub>>
- ♦ This equipment will not change the operation state, lose or change any stored data, generate errors in control software.<NIBP/TEMP/CO/RESP/EtCO<sub>2</sub>>



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# Chapter 1 Installation of the Unit

## Precautions for Installing the Equipment

This section describes the environmental condition to use this equipment.

### CAUTION

- ♦ The installation of this equipment should be performed by our service representative or a person who is well acquainted with this equipment.

## Operating Environment

- ♦ The following environmental conditions should be observed when operating the equipment.
  - ♦ Surrounding Temperature: 10 to 40°C (10 to 35°C)
  - ♦ Relative Humidity: 30 to 85% (non-condensing)
- ♦ This equipment is intended for patient monitoring in surgery room, ICU, ward, emergency room, or during transportation in the medical facility. Do not use in MRI environment or in a home-care setting.
- ♦ The power source should fulfill the following condition.
  - ♦ Use a hospital grade 3-way outlet.
  - ♦ Verify power voltage and frequency before connecting to an AC power source.
  - ♦ Use the power source that can provide adequate power to the device.Refer  Operation Manual "Specification" P14-1 for power voltage, frequency, and power consumption.
- ♦ Pay attention when installing or storing the equipment. Do not install or store in the following locations.
  - ♦ where chemicals are stored or gas may generate
  - ♦ where the equipment will be subject to splashing water or humidity from a nebulizer or vaporizer
  - ♦ where the equipment will be subject to direct sunlight
  - ♦ where the equipment will be subject to inclination, vibration, or shock.
- ♦ Ensure proper ventilation to cool the device.
  - ♦ A minimum space of 5 cm is required between vents on the rear side of the monitor and the wall. If the monitor is embedded in a wall or surrounded by a wall, a minimum space of 10 cm is required.
- ♦ The Recorder Unit (HR-800) must be transversely installed. If installed in incorrect direction, water or chemicals may enter the equipment and cause damage. It may also cause paper jam.

### WARNING

- ♦ If the equipment is used under an environment not fulfilling the specified condition, not only that the equipment cannot deliver its maximum performance, the equipment may be damaged and safety cannot be ensured.  
If using in an environment other than specified above, contact our service representative.

**⚠ CAUTION**

- Equipotential Grounding
  - ♦ When connecting multiple equipments, electrical potential difference may be generated between the equipments. This may result in electric shock to the patient connected to these equipments. Pay special attention for use in Operating Room, ICU, CCU, Cardiac Catheter Laboratory, and Cardiovascular X-ray room. To avoid such electrical potential difference, use the ground cable to connect each equipment's potential equalization terminal to the same ground terminal. This is called equipotential grounding.

## System Construction

This section describes the connection procedure of this equipment.

The DS-8200 System is composed of Display Unit (LC-8210), HS Adapter (HSB-80), and Base Unit (BS-8210). Other units such as Super Unit (HS-8000 Series) and Recorder Unit (HR-800) can be connected as required.

**⚠ CAUTION**

- By installing the battery in the HSB-80, the system can be used without connecting the BS-8210.
- To use the system without connecting the BS-8210, there are following restrictions.
  - External monitor cannot be connected.
  - Attachment to the trolley is not possible.
  - Connection to the wired network is not possible. Connect to the wireless network using the HLX-801.

## Connecting the Display Unit (LC-8210)

**⚠ WARNING**

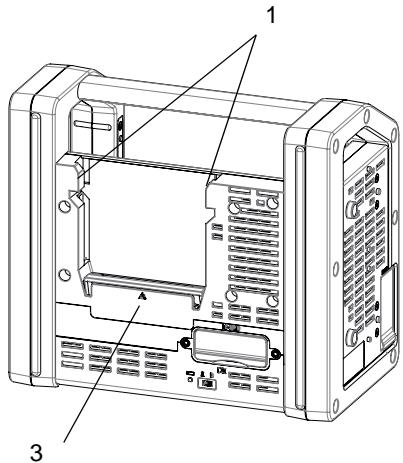
- When lifting this equipment with the display unit and HS Adapter attached, hold the handle or the bottom part of the HS Adapter.
- When attaching the display unit, make sure that it is securely attached and locked.

1

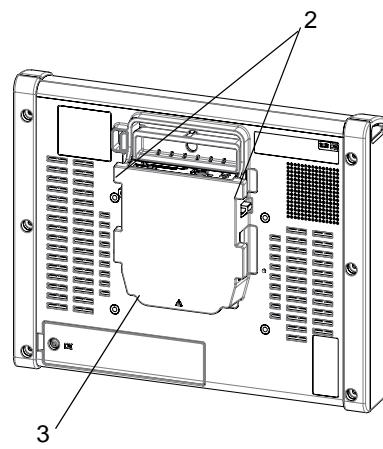
Prepare the HS Adapter.

**NOTE**

- Place the HS Adapter in a direction shown in the illustration.



HS Adapter (HSB-80)



Display Unit (LC-8210)

1 Locking Tab (for connecting the display unit)

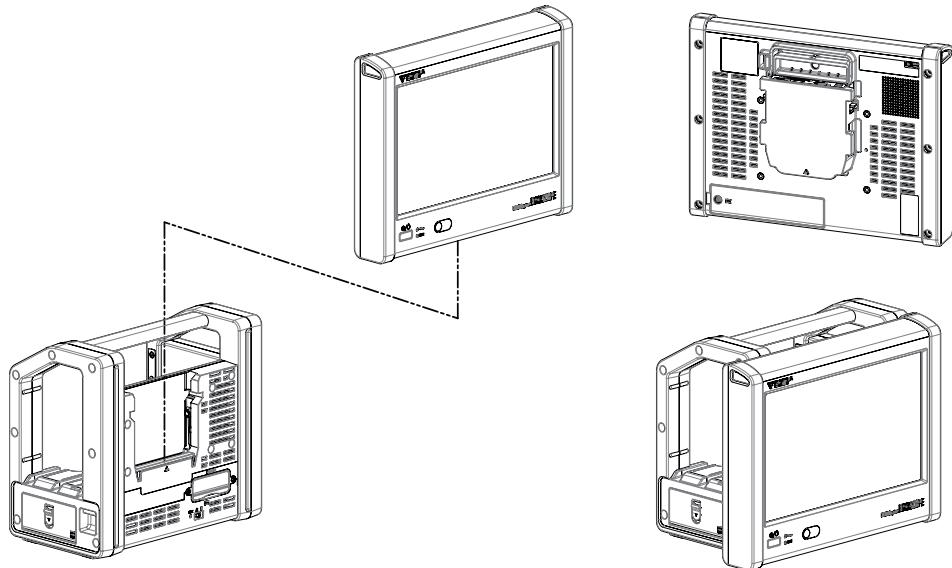
2 Guide (for connecting the HS Adapter)

3 Connector

**2** Slide the display unit along the guide on the HS Adapter downwards until it locks into place with a click sound.

**NOTE**

- Slowly attach the display unit so that it will not apply force to the connector.



**3** Make sure that the display unit is locked.

## Connecting the HS Adapter (HSB-80)

### **⚠ WARNING**

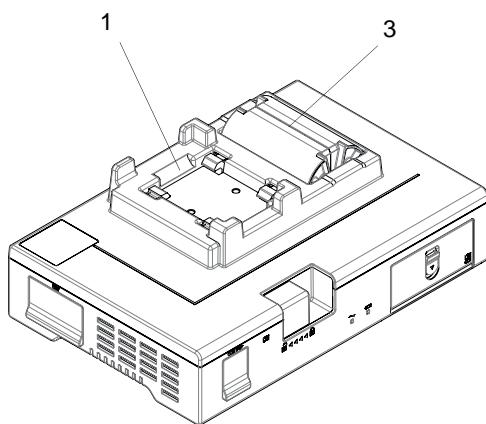
- When lifting this equipment with the Base Unit and HS Adapter attached, hold the bottom part of the Base Unit.
- When attaching the HS Adapter, make sure that it is securely attached and locked.

**1**

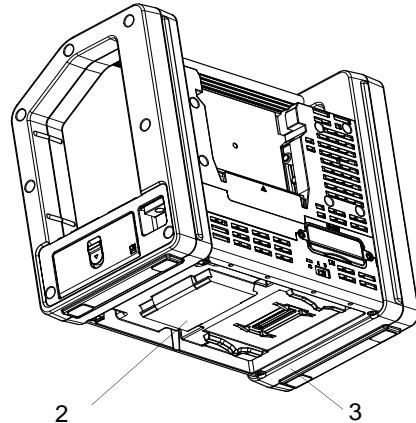
Prepare the Base Unit (BS-8210).

#### **NOTE**

- Place the Base Unit in a direction shown in the illustration.



Base Unit (BS-8210)



HS Adapter (HSB-80)

1 Locking Tab (for connecting the HS Adapter)

2 Attachment (for connecting the Base Unit)

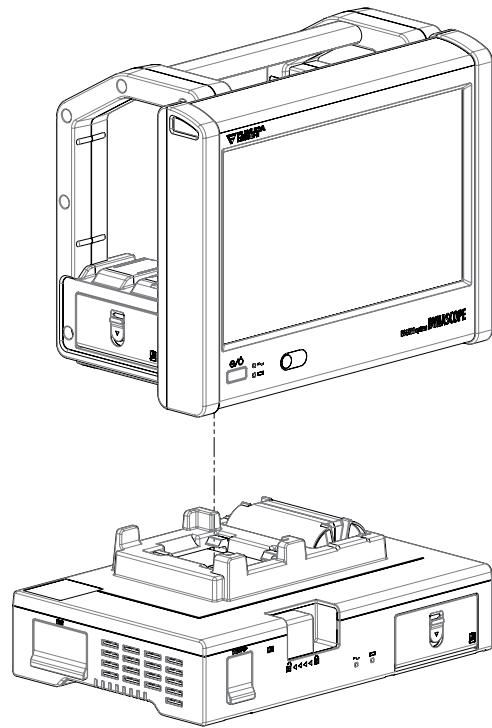
3 Connector

**2**

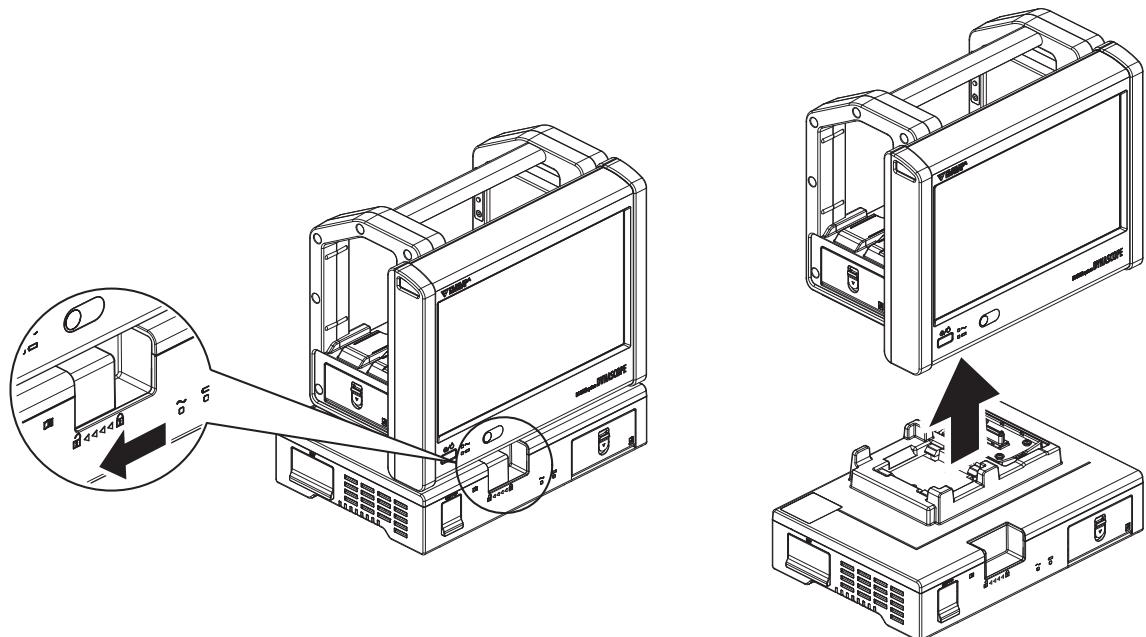
Attach the HS Adapter to the Base Unit until it locks into place with a click sound.

#### **NOTE**

- Slowly attach the HS Adapter so that it will not apply force to the connector.



- 3** To disconnect the HS Adapter from the Base Unit, lift up the HS Adapter while sliding the release lever on the Base Unit.



## Connecting the Super Unit (HS-8000 Series)

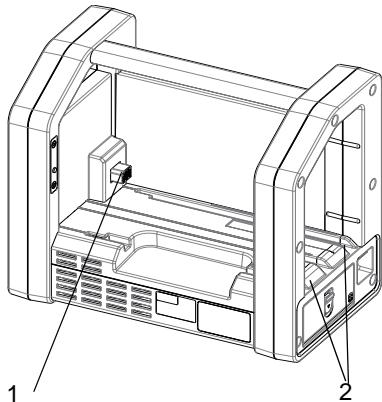
### **⚠ WARNING**

- When lifting this equipment with the Base Unit and HS Adapter attached, hold the bottom part of the Base Unit.
- When attaching the HS Adapter, make sure that it is securely attached and locked.

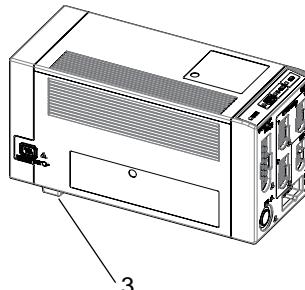
**1** Prepare the HS Adapter (HSB-80).

#### **NOTE**

- Place the HSB-80 in a direction shown in the illustration.



HS Adapter (HSB-80)



Super Unit (HS-8000)

1 Connector

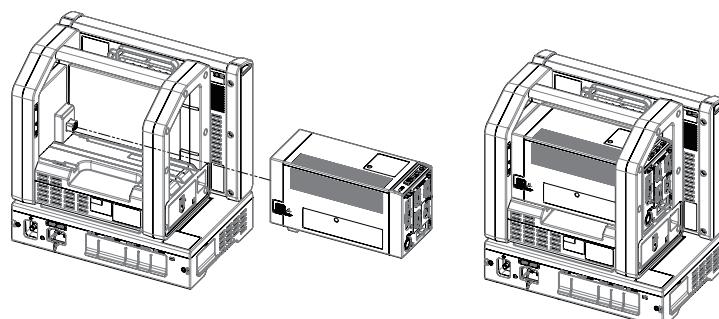
2 Guide (for connecting the Super Unit)

3 Feet of Super Unit

**2** Slide the feet of Super Unit along the guide on the HS Adapter until it locks into place with a click sound.

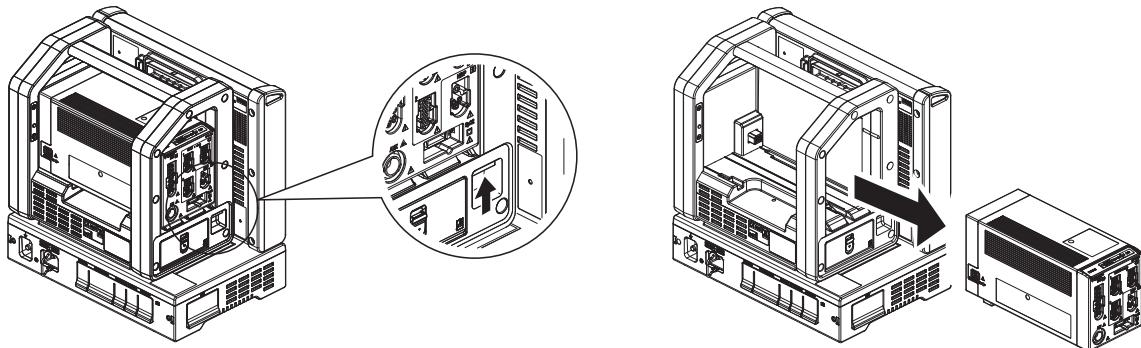
#### **NOTE**

- Slowly slide the main unit so that it will not apply force to the connector.



**3** Make sure that the Super Unit is locked.

**4** To remove the Super Unit from the HS Adapter, pull out the Super Unit while sliding up the release lever on the HS Adapter.



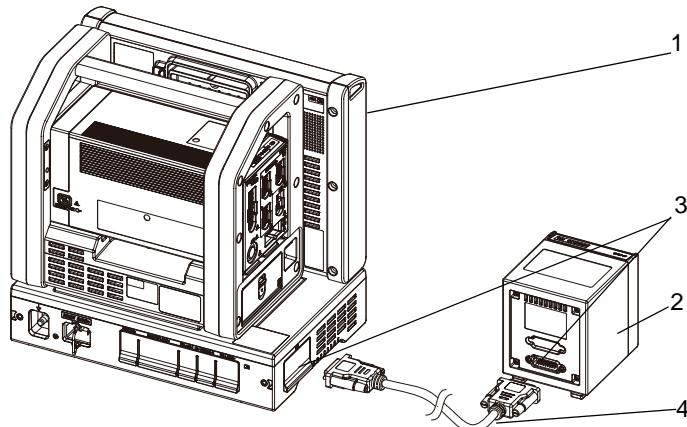
## Connecting the Recorder Unit (HR-800)

### **⚠ WARNING**

- When lifting this equipment with the Base Unit and HS Adapter attached, hold the bottom part of the Base Unit.

**1** Connect the DS-8200 system and the Recorder Unit with the unit connection cable (CJO-09SSxx).

- 1 DS-8200 System
- 2 Recorder Unit (HR-800)
- 3 Connector
- 4 Unit Connection Cable (CJO-09SSxx)



### **⚠ CAUTION**

- When connecting the connection cable, make sure to secure the connector with screws. If the connection is not secure, contact failure may occur.
- Do not connect unspecified equipment to the U-LINK connector.
- Make sure that the power of DS-8200 system is turned OFF when connecting/disconnecting the unit connection cable.

Model Type	Length
CJO-09SS0.3	0.3m
CJO-09SS1.5	1.5m
CJO-09SS5	5m

## Connecting the Gas Unit I/F (HPD-800/810), CO<sub>2</sub> Gas Unit (HCP-800/810)

### **⚠ WARNING**

- When lifting this equipment with the Base Unit and HS Adapter attached, hold the bottom part of the Base Unit.

### **NOTE**

- To connect the gas unit, Gas Unit/External Output Box Mounting Bracket (OAO-72A) is required. For details of the connection procedure, refer to the OAO-72A Assembly Instruction.

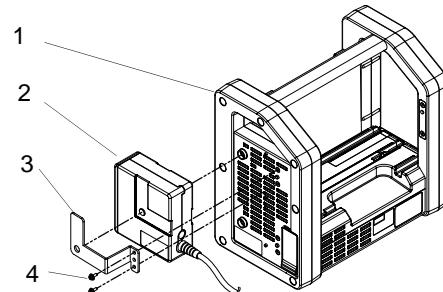
### 1 Connect the Gas Unit I/F or CO<sub>2</sub> Gas Unit to the HS Adapter.

#### **NOTE**

- Make sure that the power of DS-8200 system is turned OFF when connecting/disconnecting the cable.
- To connect the HPD-810 and HCP-810, use the AUX connection cable (CJO-15RR0.65). If the connection is not secure, contact failure may occur.

- Attach the OAO-72A to the groove on the side of the gas unit (or the external output box) and fix it to the HS Adapter (HSB-80) using the screws (2 locations).

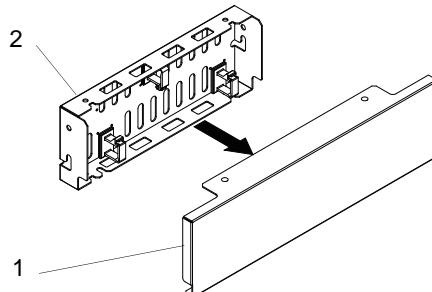
- 1 HS Adapter (HSB-80)
- 2 Gas Unit (HPD-800/810, HCP-800/810)
- 3 Gas Unit / External Output Box Mounting Bracket (OAO-72A)
- 4 Screw



### 2 Attach the cable cover.

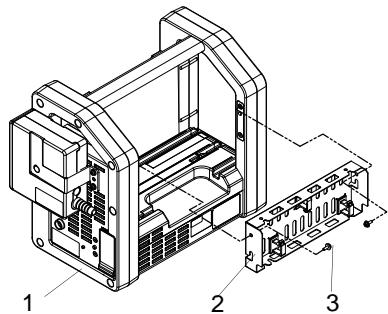
#### 1 Disassemble the cable cover.

- 1 Cable Cover (Front)
- 2 Cable Cover (Back)



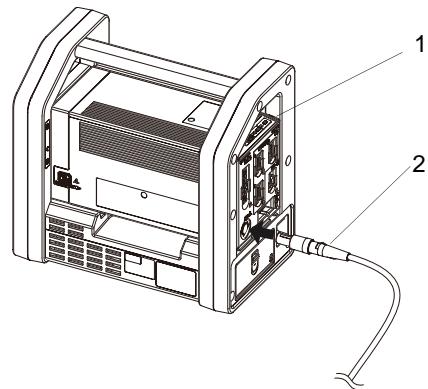
- 2** Attach the cable cover (rear) to the HS Adapter (HSB-80) using the screws (2 locations).

- 1 HS Adapter (HSB-80)
- 2 Cable Cover (Back)
- 3 Screw



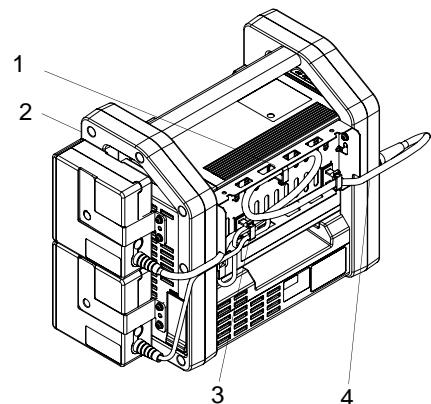
- 3** Connect the cable of Gas Unit I/F or CO<sub>2</sub> Gas Unit to the Super Unit (HS-8000).

- 1 Super Unit (HS-8000)
- 2 Cables



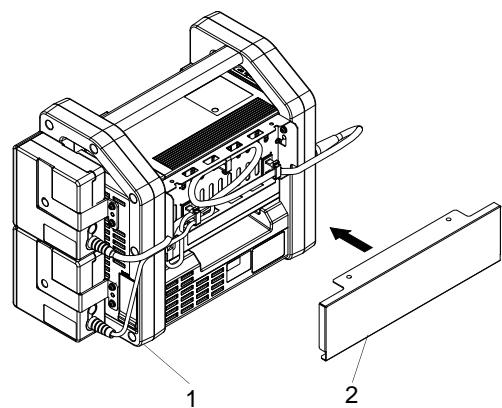
- 4** Secure the cable(s) with the cable clamps (3 locations) in the cable cover (rear).

- 1 Cable Cover (Back)
- 2 HS Adapter (HSB-80)
- 3 Cable Clamp
- 4 Cables



- 5** Attach the cable cover (front).

- 1 Gas Unit (HPD-800/810, HCP-800/810)
- 2 Cable Cover (Front)



## Connecting the External Output Box (CJO-C01Q-SJ0.3)

### **⚠ WARNING**

- When lifting this equipment with the Base Unit and HS Adapter attached, hold the bottom part of the Base Unit.

### **NOTE**

- To connect the external output box, Gas Unit/External Output Box Mounting Bracket (OAO-72A) is required. For details of the connection procedure, refer to the OAO-72A Assembly Instruction.

**1** Connect the external output box (CJO-C01Q-SJ0.3).

### **NOTE**

- Make sure that the power of DS-8200 system is turned OFF when connecting/disconnecting the cable.
- When using the gas unit and the external output box simultaneously while the telemetry transmitter module (HLX-801) is attached to the display unit (LC-8210), attach the gas unit above the external output box.
- If the connection is not secure, contact failure may occur.

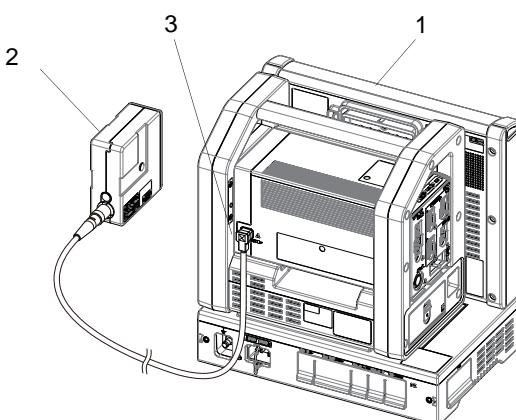
♦Refer to the section on Gas Unit I/F (HPD-800/810), CO<sub>2</sub> Gas Unit (HCP-800/810).

**2** Attach the cable cover.

♦Refer to the section on Gas Unit I/F (HPD-800/810), CO<sub>2</sub> Gas Unit (HCP-800/810).

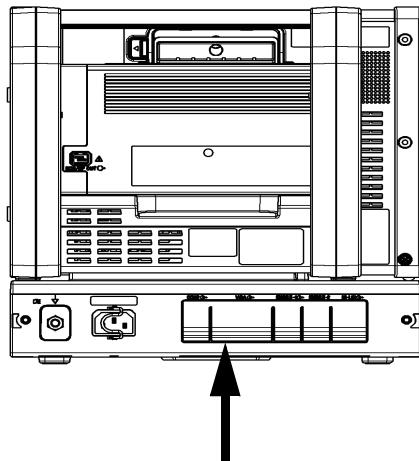
**3** Connect the cable.

- 1 DS-8200 system
- 2 External Output Box (CJO-C01Q-SJ0.3)
- 3 Analog Output Connector



## Connecting the External Monitor

The Base Unit (BS-8210) is equipped with analog output connector for external monitor which allows connection of commercially available display unit by analog RGB connection. For details, refer to your nearest service representative.



### **⚠️ WARNING**

- The external monitor output of the Base Unit (BS-8210) is not isolated. If connecting a commercially available display unit, it should comply with IEC 60601-1.

A commercially available monitor satisfying the following condition should be used.

#### *Specification for External Monitor*

Resolution : WSVGA size (1024dot x 600dot)

Horizontal Frequency : 37.5kHz

Vertical Frequency : 60Hz

Cable Length : 10m (max)\*

\*: If using a cable longer than 3m, use low-loss cable to maintain the performance.

## Power Source and Ground Connection

This section explains about the power connection.

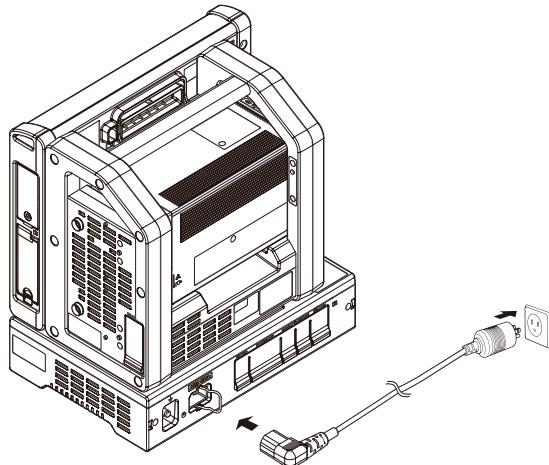
### Power Connection of the Main Unit

**1** Connect the power cable (CS-34) to the rear side of the Base Unit (BS-8210).

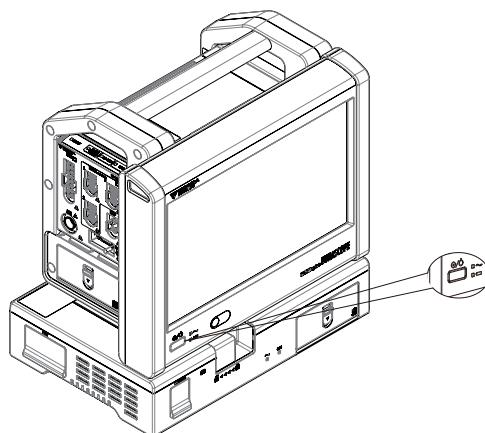
**2** Connect the other end of the power cable to the 3-way outlet with ground terminal.

**NOTE**

- Securely connect the power cable with the cable retainer clip inside the connector.



**3** AC power will be supplied and the power supply LED on the front side of the display unit will light.



- 1 Power Supply LED  
Green: In normal operation  
Orange: Standby Mode  
Light Off: Battery Operation
- 2 Battery Charging LED  
Green: Charging is complete  
Orange: Charging is in process

Light Off: During battery operation, or when battery is not installed, or when battery charging is ceased  
(due to temperature, etc.)

Flash: Battery charging error

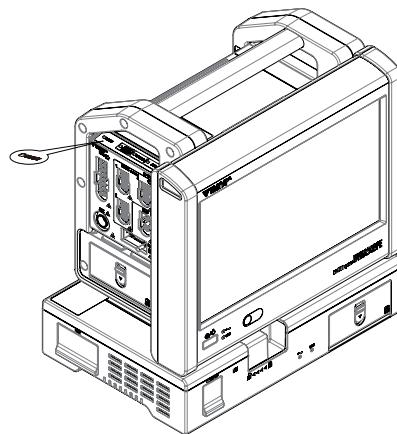
**NOTE**

- If the battery charging LED flashes, battery charging error is occurring. Remove the battery and install it again. If the error persists, contact your nearest service representative.

## Power Connection of the Super Unit

When the standby switch on the display unit is turned ON, AC power will be supplied to the Super Unit and power supply LED on the front side will light.

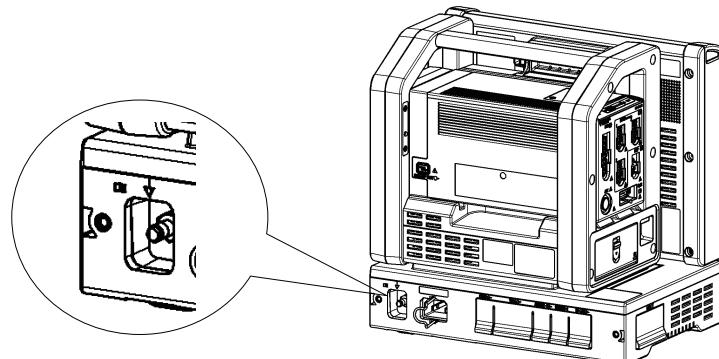
- Green: Standby switch is ON and the power is supplied from AC power or battery pack.
- Orange: Not in operation, or the power is not supplied.



## Equipotential Grounding

When connecting multiple equipments, electrical potential difference may be generated between the equipments. This may result in electric shock to the patient connected to these equipments. Pay special attention for use in Operating Room, ICU, CCU, Cardiac Catheter Laboratory, and Cardiovascular X-ray room. To avoid such electrical potential difference, use the ground cable to connect each equipment's potential equalization terminal to the same ground terminal. This is called equipotential grounding.

The ground cable is a connector which can be connected/disconnected manually without using tools.



## Installing the Lithium-Ion Battery Pack (BTO-008)

### **⚠️ WARNING**

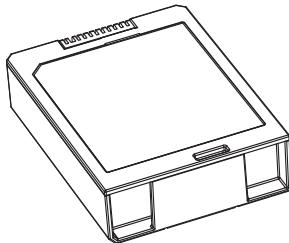
- When lifting this equipment with the Base Unit and HS Adapter attached, hold the bottom part of the Base Unit.
- When replacing the battery while monitoring, make sure to supply power by connecting the power cable.

**1**

Place the HSB-80 or BS-8210 where the battery cover can be opened completely. When replacing the battery while monitoring, make sure to supply power by connecting the power cable.

#### NOTE

- Secure sufficient workspace for installation.



Lithium-Ion Battery Pack (BTO-008)

**2**

Open the battery cover on the HSB-80 or BS-8210, if the battery is already installed, lift up the battery lever and remove the battery.

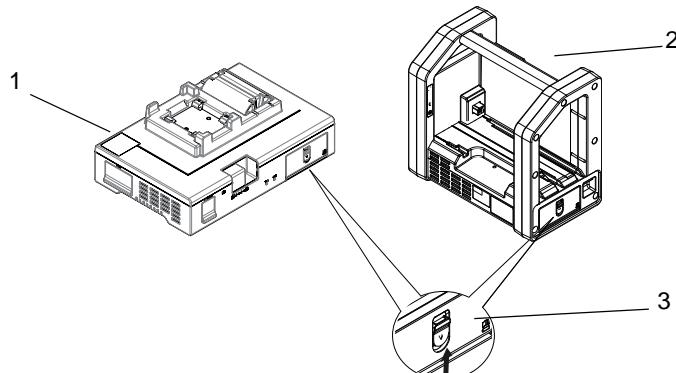
#### NOTE

- Do not apply excessive force when lifting up the lever.

1 BS-8210

2 HSB-80

3 Battery Lever



**3**

Insert the lithium-ion battery pack, and close the battery cover.

#### NOTE

- If the battery does not fit properly, make sure that the positive and negative ends are facing correctly.

- ♦ If the battery is installed shortly after it was removed, the system may not start properly.
  - ♦ After removing the battery, wait for 3 to 4 seconds before installing the battery.
-



# Chapter 2 Network System Construction

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Channel ID and Telemetry Wave Setup .....	2-8



# Chapter 2 Network System Construction

## Wired Network System

In this section, connection and setup procedure for wired network is explained.

A wired network system can be constructed by using the LAN cable. Maximum of 48 beds for the DS-LANII network, maximum of 100 beds for the DS-LANIII network can be connected. The central monitor corresponded to each wired network is required and the central monitor with the central ID "1" will function as the network administrator.

### DS-LANII Connection

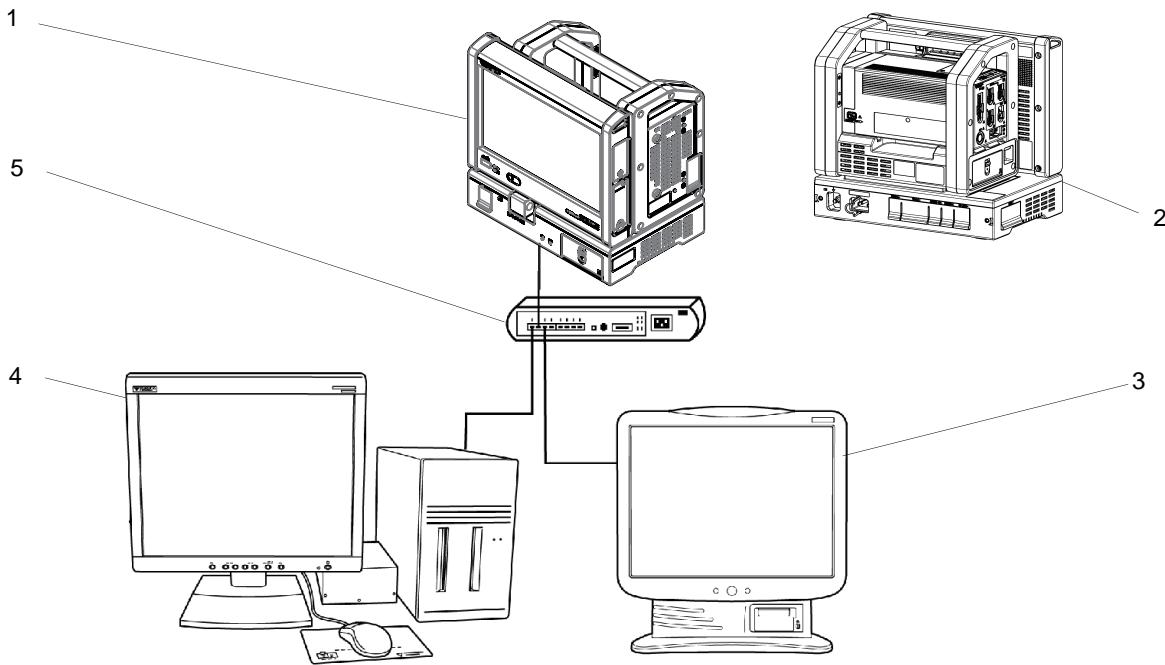
#### **WARNING**

- Do not connect unspecified equipment to the wired network.
- Do not mix devices with DS-LANII and DS-LANIII setting in the same wired network. The network may cease and proper monitoring may not be possible.

#### **CAUTION**

- On a wired network, the alarm generated on the bedside monitor will be output to the network with a maximum delay of 1 second, and to the central monitor with a total delay of 2.5 seconds.
- When connecting to the DS-LAN network, perform "DS-LAN Setup" under [Initial Settings]>[System]>[DS-LAN] and restart the system before connecting the LAN cable.
- Use a repeater HUB for DS-LANII network and a switching HUB for DS-LANIII network.
- The Bed ID is factory set to 000. If connected to the wired network with the ID unchanged, monitoring on the central monitor will not be possible.
- When connected to the wired network, make sure that there are no other bedside monitors with the same Bed ID. If there are more than one bedside monitors with the same Bed ID, the duplicated bedside monitors cannot be monitored on the central monitor.
- When connecting to the DS-LANII network, set the ID in the range from 001 to 048. When connecting to the DS-LANIII network, set the ID in the range from 001 to 100.
- If the measurement unit of CO<sub>2</sub> concentration is mmHg and [99mmHg] is selected for "Upper Limit of CO<sub>2</sub> (mmHg) Transmission" ([Initial Settings]>[System]>[DS-LAN] or [Telemeter]), the CO<sub>2</sub> value of 100mmHg or above will be transmitted as 99mmHg.

By connecting a Ethernet branch cable to the DS-LAN connector on the Base Unit (BS-8210), a wired network system can be constructed.



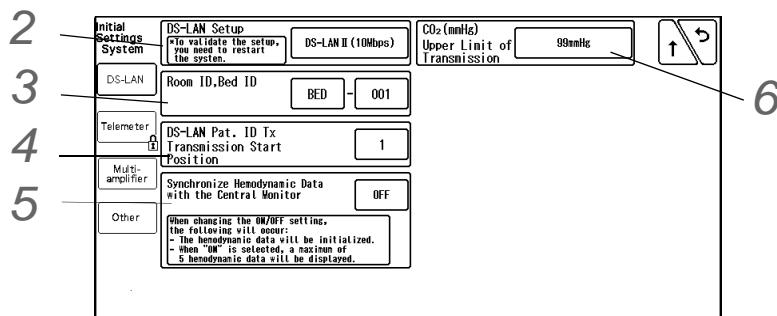
- 1 Bedside Monitor: DS-8200 System
- 2 Connector (For Ethernet Branch Cable (CJ-522) connection)
- 3 DS-7600 System Central Monitor
- 4 DS-5700 Central Monitor (For DS-LANII connection)
- 5 HUB

## DS-LAN Setup

To connect to the central monitor using the wired network, DS-LAN, Room/Bed ID setup is necessary.

- 1** Press the [Menu], [Initial Settings], [System], [DS-LAN] keys.

► The DS-LAN setup screen will be displayed.



- 2** Set the DS-LAN.

### **CAUTION**

- ♦ When the DS-LAN setup is changed, make sure that the same setting is made on the central monitor. If the setting is different, proper communication cannot be performed. The following central monitors can connect to DS-LANII network only. When connecting

these central monitors, make sure all monitors in the same wired network is set to DS-LANII.

DS-5700, DS-5800N/NX/NX<sup>MB</sup>, DS-7600/7600W (software version of V05 and prior)

- To validate the DS-LAN setting, it is necessary to restart the system. Make sure to restart the system when the setting is changed.

#### REFERENCE

- Select the DS-LAN network type.

**1** Press the key for "DS-LAN Setup".

► The dropdown list will be displayed.

**2** Select from [DS-LANII (10Mbps)] / [DS-LANIII (100Mbps)].

**3** Set the Room ID/Bed ID.



#### CAUTION

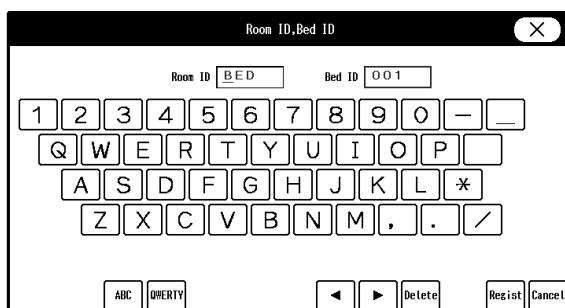
- The Bed ID is factory set to 000. If connected to the wired network with the ID unchanged, monitoring on the central monitor will not be possible.
- When connected to the wired network, make sure that there are no other bedside monitors with the same Bed ID. If the Bed ID is duplicated, monitoring on the central monitor is not possible.
- When connecting to the DS-LANII network, set the ID in the range from 001 to 048. When connecting to the DS-LANIII network, set the ID in the range from 001 to 100.

#### NOTE

- Make sure to set the Room ID/Bed ID when connecting to the wired network. The set Room ID/Bed ID will be stored even after the power is turned OFF.

**1** Press the key for "Room ID, Bed ID".

► The "Room ID, Bed ID" window will be displayed.



**2** Enter the Room ID using the alphanumeric keypad, and press the [Regist] key.

► The entered ID will be displayed on the upper left of the screen.

**3** Press the input area for the Bed ID.

► The keypad will change to allow entering the Bed ID.

**4** Enter the Bed ID using the numeric keypad.

**REFERENCE**

- ♦ To display the keypad for Room ID again, press the input area for the Room ID.

**5** Press the [Regist] key.

- ▶ The entered ID will be displayed on the upper left of the screen.

**4** Set the "DS-LAN Pat. ID Transmission Start Position".**REFERENCE**

- ♦ On the DS-8200 System, patient ID of up to 20 digits can be set, but only 10 digits can be transmitted on a DS-LANII network. This setup will set the starting digit from the 20 digits to be transmitted on the DS-LANII network.

On the DS-LANIII network, if [Central] is selected for the printer and printing is started on the bedside monitor, the central monitor printer can print only up to 10 digits. This setup allows to set the starting digit of the 10 digits to be printed. 20 digits can be transmitted on the DS-LAN III network.

**1** Press the key for "DS-LAN Pat. ID Transmission Start Position".

- ▶ The "DS-LAN Pat. ID Transmission Start Position" window will be displayed.

**2** Enter the starting position in the range from 1 to 20.**5** Set the "Synchronize Hemodynamic Data with the Central Monitor".**1** Press the key for "Synchronize Hemodynamic Data with the Central Monitor".

- ▶ The dropdown list will be displayed.

**2** Select from [ON] or [OFF].

- ▶ [ON]: 5 latest hemodynamic data will be synchronized between this monitor and the central monitor. Other hemodynamic data will be deleted.

When the hemodynamic data is edited on this monitor, the result will be also reflected on the central monitor, and vice versa.

- ▶ [OFF]: 5 latest data will be transmitted to the central monitor, but the data will not be synchronized between this monitor and the central monitor. The hemodynamic data edited on the central monitor will be deleted. The hemodynamic data edited on this monitor will be transmitted to the central monitor.

**6** Set the "CO<sub>2</sub>(mmHg) Upper Limit of Transmission".**REFERENCE**

- ♦ If the CO<sub>2</sub> measurement unit is "mmHg", and the CO<sub>2</sub> value is 100mmHg or above, whether or not to limit the value for transmission to the central monitor can be set.

**1** Press the key for "CO<sub>2</sub> (mmHg) Upper Limit of Transmission".

- ▶ The dropdown list will be displayed.

**2** Select from [No limit]/[99mmHg].

- ▶ [No limit]: Actual CO<sub>2</sub> value will be transmitted to the central monitor even if the value is 100mmHg or above.

- ▶ [99mmHg]: 99mmHg will be transmitted as the CO<sub>2</sub> value if the value is 100mmHg or above.

## Precautions about Printing/Display



### CAUTION

- When using the wired network (DS-LANII), the BP measurement unit should be set to "mmHg".
- There are following restrictions when connecting this system to the wired network.
  - The data cannot be output to the AU-5500N.
  - If the BP measurement unit is kPa, BP waveform, BP numeric data, NIBP numeric data, NIBP list will not be transmitted. They will be treated as not measured data, and will not be displayed on the central monitor. Also, the alarm limit setup from the central monitor cannot be performed.
  - Arrhythmia alarm of Tachy, Brady, Couplet, Pause, Trigeminy will not be transmitted.
  - Arrhythmia alarm of "Slow\_VT" will be transmitted as "VT".
  - For the wired network, waveform, numeric data, and alarm of TEMP3to 6 will not be transmitted. Also, the displayable waveform, numeric data, and alarm will differ depending on the central monitor model type. Refer also to the operation manual for the respective central monitor.
  - The numeric data and alarm of PR\_IBP will not be transmitted to the central monitor. Even if the PR\_IBP alarm is generated on the DS-8200 System, this alarm will not be generated on the central monitor.
  - If the "RR/APNEA alarm source" setting is other than [Impedance] (or, if [Auto] selects a setting other than [Impedance]), the RESP waveform will not be transmitted on a wired network.
  - If the "RR/APNEA Alarm Source" setting is other than [CO<sub>2</sub>] (Or, if [Auto] selects a setting other than [CO<sub>2</sub>]), the CO<sub>2</sub> waveform will not be transmitted on a wired network.
  - For the numeric data displayed as "xxx", maximum or minimum value of measurable range will be transmitted.
  - The numeric data displayed as "---" will be treated as not measured data.
  - If the measurement unit of CO<sub>2</sub> concentration is mmHg and [99mmHg] is selected for "Upper Limit of CO<sub>2</sub> (mmHg) Transmission" ([Initial Settings]>[System]>[DS-LAN] or [Telemeter]), the CO<sub>2</sub> value of 100mmHg or above will be transmitted as 99mmHg.
- When the DS-5800N/NX/NX<sup>MB</sup> is used as a central monitor, recall, graphic trend, and tabular trend will not be displayed, and Σ recording cannot be performed. For the ST display, overlap waveform will not be displayed on the DS-5800N/NX/NX<sup>MB</sup> until 15 minutes have passed since the reference waveform is set on this monitor.
- As this monitor do not have the arrhythmia template display and 12-lead ST display function, these display on the central monitor will not be corresponded.
- When connected to the wired network, time/date will be synchronized with the central monitor. In this case, the time/date cannot be changed on this monitor.
- The ST display on the central monitor will be distorted when the ECG lead (ECG1 or ECG 2) is changed on this monitor. Redrawing the ST display will return the display to normal.
- On the central monitor, the respiration waveform and RR value based on the RR/APNEA alarm source selected on this monitor will be displayed. The RR and APNEA monitored on the central monitor and this monitor will be the same.

### NOTE

- If the numeric data is displayed as "xxx" (out of measurement range) on this monitor,

maximum or minimum value of measurable range will be transmitted to the central monitor.

	Value Outside the Measurement Range	Central Monitor Display
HR	301bpm and above	300bpm
Respiration Rate	151Bpm and above	150Bpm
BP	-51mmHg and below 301mmhg and above	-50mmHg 300mmHg
TEMP	-0.1°C and below 45.1°C and above	0°C 45.0°C
Pulse Rate (Masimo Unit)	240bpm and above 25bpm and below	239bpm 26bpm
Pulse Rate (Nellcor™ Unit)	301bpm and above	300bpm

## Wireless Network

In this section, connection and setup procedure for wireless (telemetry) network is explained.

By constructing a wireless network using the telemetry transmitter module (HLX-801), the data on this bedside monitor can be transmitted to the central monitor.

### **⚠ WARNING**

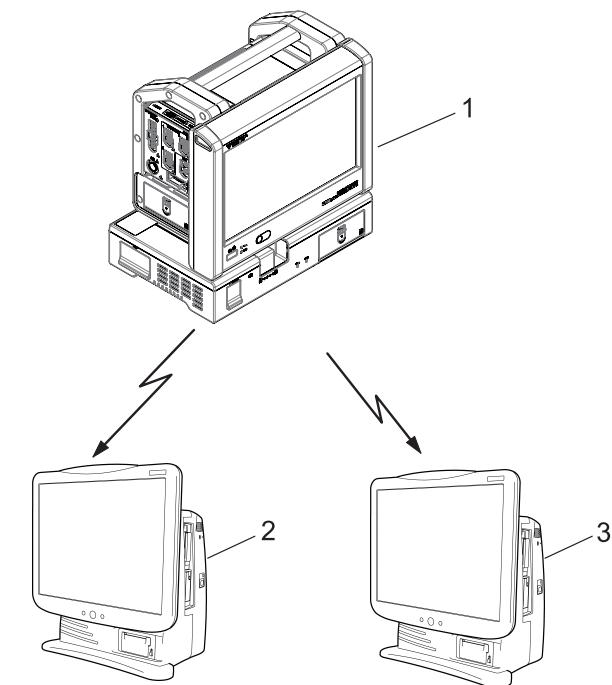
- Some wireless combinations of telemetry transmitters may generate interference with other devices.
- Before selecting the channel, verify it will not interfere with other channels.
- Make sure the telemetry manager of your system is aware of any changes to the telemetry channels.
- If transmitters are used in a neighboring medical facility, your facility and the neighboring facility must make agreements on the setting of the telemetry channels to prevent telemetry interference.

## Example of Wireless Network Construction

### **⚠ CAUTION**

- The setup of channel ID and group ID should be performed only by our service representative. Users should not perform this procedure as malfunction may occur.

- 1 Bedside Monitor DS-8200 System
- 2 Central Monitor  
DS-7600 Series
- 3 Central Monitor  
DS-7700 Series



## Connecting the Telemetry Transmitter Module (HLX-801)



### WARNING

- When lifting this equipment with the Base Unit and HS Adapter attached, hold the bottom part of the Base Unit.

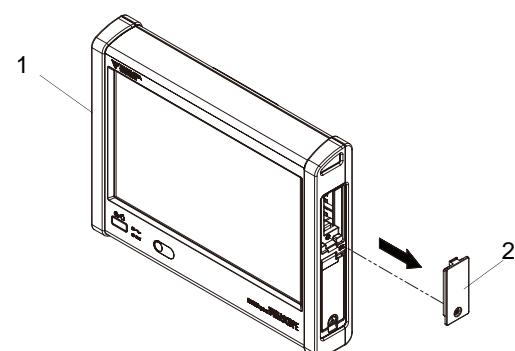
### NOTE

- To connect the Telemetry Transmitter Module (HLX-801), HLX-801 Installation Cover (OAT-02A) is required. For details of the connection procedure, refer to the OAT-02A Assembly Instruction.

**1**

Loosen the screw, and remove the HLX cover. Store the removed HLX cover for future use.

- 1 Display Unit (LC-8210)
- 2 HLX Storage Cover



**NOTE**

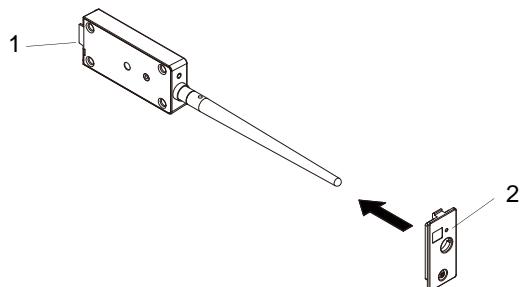
- ◆ Make sure that the power of DS-8200 system is turned OFF when connecting/disconnecting the cable.
- ◆ Do not remove the screw from the HLX cover. It may damage the cover.
- ◆ If the connection is not secure, contact failure may occur.
- ◆ Store the removed HLX cover for future use.

**2**

Insert the antenna of the Telemetry Transmitter Module (HLX-801) through the hole on the OAT-02A.

1 Telemetry Transmitter Module (HLX-801)

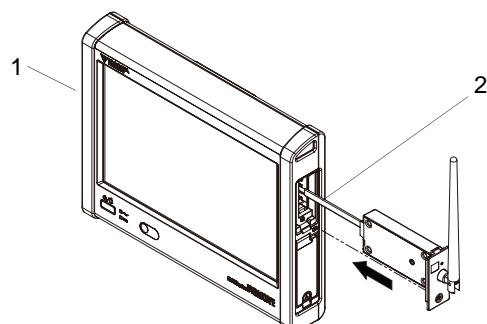
2 OAT-02A

**3**

Pull out the cable from the Display Unit (LC-8210) and connect it to the HLX-801.

1 Display Unit (LC-8210)

2 Cables

**4**

Store the cable, hook the convex part (tab) of the OAT-02A, and secure it with the screw (1 location).

## Channel ID and Telemetry Wave Setup

In this section, channel ID and telemetry wave setup when using the HLX-801 is explained.

Once the transmitting channel ID and group ID are set, these will be retained even after the main power is turned OFF.

** WARNING**

- ◆ A password can be set to access the channel ID setup menu to allow only the telemetry channel administrator to change the channel ID.
- ◆ Some combinations of channels may generate interference with other telemetry transmitters.
- ◆ Before selecting a channel, verify it will not interfere with other channels.
- ◆ Make sure the telemetry manager of your system is aware of any changes to the telemetry

channels.

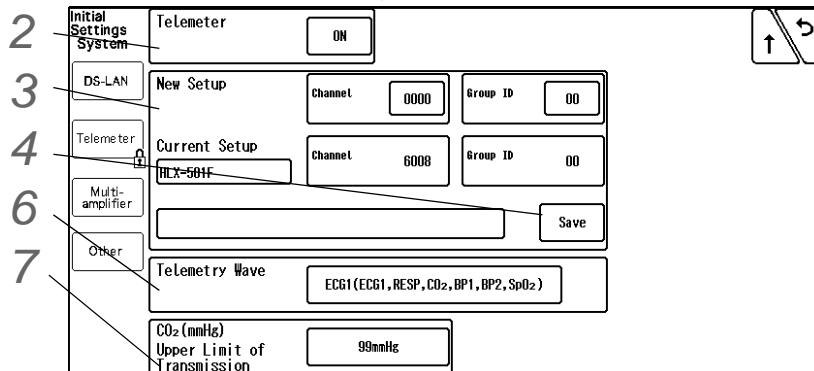
- If transmitters are used in a neighboring medical facility, your facility and the neighboring facility must make agreements on the setting of the telemetry channels to prevent telemetry interference.

**NOTE**

- To change the setting, enter the password.  
(☞ "Administrator Setup" P5-2)

## 1 Press the [Menu], [Initial Settings], [System], [Telemeter] keys.

► The Telemeter Setup window will be displayed.



## 2 Perform setup for the telemetry transmission .

### 1 Press the key for "Telemeter".

► The dropdown list will be displayed.

### 2 Select from [ON]/[OFF].

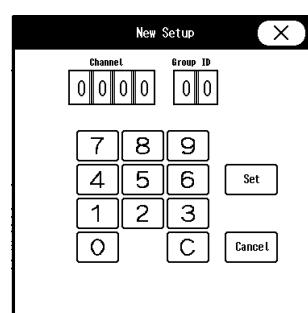
► [ON]: Telemetry transmission will be performed.

► [OFF]: Telemetry transmission will not be performed. In this case, channel ID will not be displayed on the home display.

## 3 Set the channel ID and group ID.

### 1 Press the key for "Channel" or "Group ID".

► The "New Setup" window will be displayed.



### 2 Use the numeric keypad to enter the 4-digit medical telemetry channel ID.

### 3 Press the input area for the Group ID.

### 4 Use the numeric keypad to enter the group ID in the range of 00 to 63.

- 5** Press the [Set] key.
- 4** Save the channel ID and group ID.

- 1** Press the [Save] key.
- ▶ The channel ID and group ID will be saved.
  - ▶ The <Complete> message will be displayed.
  - ▶ The set channel ID will be displayed on the upper left of the home display.

#### REFERENCE

- ♦ If an error is found on the password, channel ID, or group ID, <Invalid Data> message will be displayed. (Ex. The entered channel ID or group ID is outside the allowable range.)
- Enter the ID within the range and press the [Save] key.

- 5** Check the stored channel ID and group ID.



#### NOTE

- ♦ If the numeric data is displayed as "xxx" (out of measurement range) on this monitor, maximum or minimum value of measurable range will be transmitted to the central monitor.

	Value Outside the Measurement Range	Central Monitor Display
HR	301bpm and above	Calculated on the central monitor based on ECG waveform.
Respiration Rate	151Bpm and above	150Bpm In case of impedance respiration, calculated on the central monitor.
BP	-51mmHg and below	-50mmHg
	301mmhg and above	300mmHg
Temperature	-0.1°C and below	0°C
	45.1°C and above	45.0°C
PR (Masimo Unit)	240bpm and above 25bpm and below	239bpm 26bpm
PR (Nellcor™ Unit)	301bpm and above	254bpm

- 6** Select the telemetry wave.

- 1** Press the key for "Telemetry Wave".
- ▶ The dropdown list will be displayed.
- 2** Select from [ECG1] / [ECG2].
- ▶ [ECG1]: ECG1, RESP, CO<sub>2</sub>, BP1, BP2, SpO<sub>2</sub> will be transmitted. However, RESP waveform will not be transmitted if APNEA source is CO<sub>2</sub>.
  - ▶ [ECG2]: ECG1, ECG2, RESP/CO<sub>2</sub>, BP1, SpO<sub>2</sub> will be transmitted. One of either CO<sub>2</sub> or RESP waveform will be transmitted in accordance with the APNEA source setting.

- 7** Set the "CO<sub>2</sub>(mmHg) Upper Limit of Transmission".  
(☞ "DS-LAN Setup" P2-2)

**⚠ CAUTION**

- When the measurement unit of BP is "kPa", corresponding waveform and numeric data will not be transmitted. When using a wireless network, use "mmHg" for the BP measurement unit.
- BP waveform with a scale above the set scale can not be properly transmitted. When transmitting the BP waveform, pay attention to the displayed BP scale.
- If the measurement unit of CO<sub>2</sub> concentration is mmHg and [99mmHg] is selected for "Upper Limit of CO<sub>2</sub> (mmHg) Transmission" ([Initial Settings]>[System]>[DS-LAN] or [Telemeter]), the CO<sub>2</sub> value of 100mmHg or above will be transmitted as 99mmHg.
- When using the Nellcor<sup>TM</sup> unit, the PR value of 255bpm or above will be transmitted to the central monitor as 254bpm.

**REFERENCE**

- The waveform not displayed on the home display can not be transmitted.



# Chapter 3 Using the CF card

Inserting the CF card .....	3-1
Data Backup/Copy Using the CF Card .....	3-1
Formatting the CF Card.....	3-4
Formatting the SD Card (HS-8000) .....	3-5



# Chapter 3 Using the CF card

By using the optional CF card (FCF-128: 128MB, FCF-1000: 1GB) or SD card (SD-1G: 1GB, SD-8G: 8GB), backup/copy of the patient data and setup data can be performed.

By using the optional CF card (FCF-16GA:16GB), full disclosure waveform data can be stored.

## Inserting the CF card

### CAUTION

- When using the CF card for data transfer, make sure that the power of the main unit is turned ON before inserting the CF card into the CF card slot.

- 1** Insert the specified CF card into the CF card slot.

## Data Backup/Copy Using the CF Card

This section explains about the backup and copy procedure of the setup data using the optional CF card.

Setting all the monitors in the same ward to the same alarm settings and display configuration may take large amount of time.

However this process can be simplified by performing the setup on one monitor, and copying the data to all the other monitors using the CF card.

The backup/copy of data can also be performed using the optional SD card, but the procedure using the CF card will be explained in this section.

### CAUTION

- Turn ON the power of the main unit before inserting the CF card into the CF card slot.
- Use only the specified CF card.
- The CF card formatted for the central monitor full disclosure waveform data cannot be used on the DS-8200 System.

### NOTE

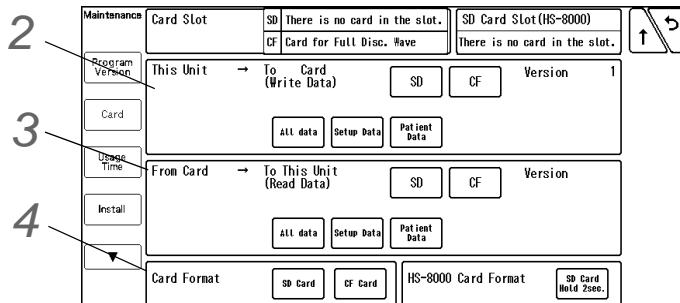
- When using the CF card with write-protect function, cancel the write-protect before usage.

### REFERENCE

- For details of the data which can be backed up, refer to "Data that can be Backed Up/Copied".

- 1** Press the [Menu], [Maint.], [Card] keys.

- The CF card setup screen will be displayed.



- Format the CF card.

**NOTE**

- If the card is unformatted, it is necessary to first format the CF card.

**1** Verify the CF card is inserted in the CF card slot.

**2** Press the [CF Card] key to display the "CF Card Format" screen.

**3** Select the data type.

► [Full Disc. Wave]: The CF card will be formatted for the full disclosure waveform data.

► [Data Transfer]: The CF card will be formatted for data transfer.

**4** Press the [Format] key and start the format process.

**2** Write the data to the CF card.

**1** Verify the CF card is inserted in the CF card slot.

**2** Select the data type to write to the CF card.

► [All Data]: Both setup data and patient data will be written to the CF card.

► [Setup Data]: Setup data will be written to the CF card.

► [Patient Data]: Patient data will be written to the CF card.

**3** Press the [Yes] key if OK to write the data to the CF card.

**3** Read the data from the CF card.

**1** Verify the CF card is inserted in the CF card slot.

**2** Select the data type to read from the CF card.

► [All Data]: Both setup data and patient data will be read from the CF card.

► [Setup Data]: Setup data will be read from the CF card.

► [Patient Data]: Patient data will be read from the CF card.

**3** Press the [Yes] key if OK to read the data from the CF card.

**⚠ CAUTION**

- During access to the CF card, all keys will become inoperative until the process is complete.
- The trend data and recall data during access to the CF card will not be recorded on the CF card as updating of the data base is suspended during the access.
- The CF card access duration will depend on the amount of data (number of trend types, recall data) to write/read.

- Make sure to turn the power OFF and ON again after the setup data is read from the CF card.  
The read setup data will become effective after the power is turned OFF and ON again.
- Reading the patient data from the CF card will erase all previous patient data stored in the patient monitor. The erased patient data cannot be restored.
- When reading the patient data from the CF card, make sure that the time/date setting on the patient monitor is correct. Otherwise, the time/date of the trend data and recall data will not be correctly reflected.  
The time/date can be verified on the RTC Setup ([Menu]>[Maint.]>[Test Menu]>[RTC Setup]) screen.

**NOTE**

- If Read/Write is incorrectly selected, the data on the CF card may be unintentionally overwritten with the data on the patient monitor. Make sure to check that the selection is correct before pressing the [Yes] key.
- When the data reading procedure is complete, the display will return to the home display.
- When the backup/copy process is complete, and the data is no longer necessary, format the CF card to erase the data.

**□ Data that can be Backed Up/Copied**

The setup data such as monitoring condition, alarm setting, and patient data such as graphic trend and tabular trend can be backed up/copied.

By selecting [All Data], setup data and patient data can be both backed up/copied.

***Setup Data***

Data		Details
Parameter Setup		Stores the monitoring condition (size, lead, etc.) for all the monitoring parameters.
Alarm		Stores the alarm threshold level.
Setup Data	Basic Setup	Stores the current setup.
	Alarm	Stores the alarm ON/OFF and alarm limit settings.
	Parameter Setup	Stores the monitoring condition (size, lead, etc.) for the parameter.
	Data Review/Waveform Review/Calculation	Stores the settings for each review data.
	Initial Settings	Stores the current setup.

***Patient Data***

Data		Details
Patient Information		Stores the patient information such as name, ID, age, sex, pacemaker usage, patient classification.
Graphic Trend Data		Stores 24 hours of graphic trend data.
Tabular Trend Data		Stores 24 hours of tabular trend data.
Recall		Stores 200 recall data.
Hemodynamic Data		Stores 10 measurement data.
Lung Function Data		Stores 256 measurement data.

The following items will not be backed up/copied.

- ♦ Setup Data
  - ♦ Time/Date
  - ♦ Telemeter Setup  
(The settings will be stored in the connected telemetry transmitter module.)
  - ♦ Room ID/Bed ID  
(If the Bed ID is duplicated, wired network connection will not be possible.)
  - ♦ Port/Multiamplifier Setup for the External Device Connection  
(After reading the setup data, make sure to restart the monitor and check the equipment configuration.)
  - ♦ Network Setup for the External Device Connection  
(If the setting of IP address, sub-network mask, default gateway are not unique, TCP/IP connected laser printer will not function.)
  - ♦ Room ID/Bed ID on the Remote Control Setup  
(If the Room ID/Bed ID is not unique, incorrect remote control signal transmission may occur.)
- ♦ Patient Data
  - ♦ OCRG Data
  - ♦ CO Measurement Result

## Formatting the CF Card

In this section, formatting of CF card to be used for storing the full disclosure waveform is explained.

By inserting the formatted CF card, storing of the full disclosure waveform data will automatically start, and the full disclosure waveform review function will become available.

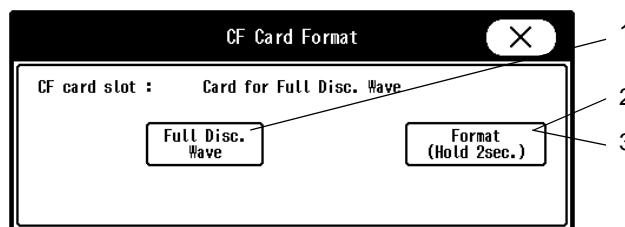
### CAUTION

- ♦ The full disclosure waveform card formatted on other bedside monitors and central monitors cannot be used on this equipment.
- ♦ The full disclosure waveform card formatted on this equipment cannot be used on other bedside monitors and central monitors.
- ♦ During data loading to the full disclosure waveform card, do not remove/insert the card.
- ♦ It will take about 5 minutes to format the full disclosure waveform card. Do not format the card during monitoring as all operation will not be possible during the format process.
- ♦ During the format process, do not turn OFF the power, or enter into standby condition, or remove the CF card. It may damage the CF card.

1

Press the [Menu], [Maintenance], [Card] ("Card Format": [CF Card]) keys.

The "CF Card Format" screen will be displayed.



2

Format the CF card.

- 1 Make sure that the card is inserted, and that the card is unformatted or is for the full disclosure waveform

data.

- 2** Select [Full Disc. Wave] and press [Format (Hold 2 sec.)] for 2 seconds.
- 3** Wait until the format completes.  
It will take about 5 minutes. During the format process, do not remove the CF card or turn OFF the power.
- 4** When the format process is completed, the "CF Card Format" window will close and storing of the full disclosure waveform will automatically start.

## Formatting the SD Card (HS-8000)

In this section, formatting of SD card to be used for HS-8000 data transfer is explained.

By using the specified SD card, recall data can be transferred.

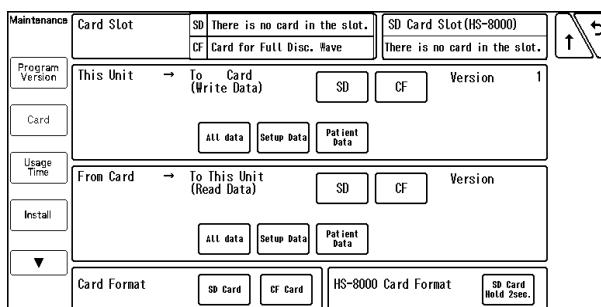
### **CAUTION**

- It will take about 1 minute to format the SD card. Do not format the card during monitoring as all operation will not be possible during the format process.
- During the format process, do not turn OFF the power, enter into standby condition, remove the HS-8000, or remove the SD card. It may damage the SD card.
- The SD card formatted on the HS-8000 composing other monitoring system cannot be used on the DS-8200 system. Also, the SD card formatted on the display unit (LC-8210) cannot be used on the HS-8000. Make sure to format the SD card on the HS-8000 composing the DS-8200 system.

**1** Make sure that the SD card is inserted to HS-8000, and that the card is unformatted and is the specified card for data transfer.

**2** Press the [Menu], [Maintenence], [Card] keys.

The "CF Card SD Card" screen will be displayed.



**3** Format the SD card.

- 1 Press the [SD Card Hold 2sec.] key on "HS-8000 Card Format" for 2 seconds.
- 2 <Format in progress> will be displayed for "SD Card Slot". Wait until <Card for Data Transfer> is displayed. The format process will take about 1 minute. During the process, do not remove the SD card, remove the HS-8000, or turn OFF the power.
- 3 When <Card for Data Transfer> is displayed, the format process is complete.



# Chapter 4 Connection to the External Devices

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# Chapter 4 Connection to the External Devices

## Ventilator Measurement and Alarm Input

Ventilator can be connected to the DS-8200 System using the STATUS II port on the Base Unit (BS-8210). By connecting a ventilator, ventilator measurement data and alarm can be monitored on the patient monitor. Also, ventilator alarm can be notified to the central monitor via wireless and wired network.

This section describes the procedure to connect the DS-8200 System and ventilator, and to input the ventilator measurement and alarm.

Ventilator	Connection Cable
	For Connection to Base Unit (BS-8210) STATUS II
Servo Ventilator 300/300A	CJ-401RI-70SV3 (x1)
Servo-i / Servo-s Ventilator	CJ-402RI-70SVi (x1)
PURITAN-BENNETT Ventilator 740/760	CJ-403RI-70PB (x1)
PURITAN-BENNETT Ventilator 840	CJ-403RI-70PB (x1)
Drager Medical Ventilator Evita 2dura / Evita 4 /Evita XL	CJ-402RI-70SVi (x1)

\* For the SV-900 series, only alarm can be input.

When connecting a ventilator, check the corresponded software version of the ventilator.

Ventilator	Corresponding Software Version
Servo Ventilator 900C/900D/900E	Not specified
Servo Ventilator 300/300A	Not specified
Servo Ventilator Servo-i	v1.5 / v2.0 / v3.0
Servo Ventilator Servo-s	v2.0 / v3.0
PB740	M
PB760	H
PB840	K
Evita 2 dura	04.14
Evita 4	04.14
Evita XL	05.10

### WARNING

- If the DS-8200 System does not generate an alarm even though the ventilator is generating an alarm, or if any other malfunction occurs, immediately check the ventilator, this system, cable, and replace the cable if necessary.
- The alarm generation on this system is not guaranteed if the alarm other than the following generates at the ventilator.
  - ♦SV-900:  
gas supply alarm, power failure alarm, expiratory minute volume alarm, airway pressure upper limit alarm, apnea alarm, O<sub>2</sub> concentration alarm
  - ♦SV-300:  
airway pressure upper limit alarm, high continuous pressure alarm, O<sub>2</sub> concentration

lower limit alarm, expiratory minute volume upper/lower limit alarm, apnea alarm, gas supply alarm, air supply alarm, O<sub>2</sub> supply alarm, battery alarm, limited battery alarm, no battery alarm, overrange alarm

♦Servo-i:

airway pressure upper limit alarm, high continuous pressure alarm, O<sub>2</sub> concentration lower limit alarm, expiratory minute volume upper/lower limit alarm, apnea alarm, gas supply alarm, O<sub>2</sub> supply alarm, battery alarm, no battery alarm, limited battery alarm, overrange alarm, expiratory cassette disconnected alarm, backup ventilation alarm, regulation pressure limited alarm, respiratory rate alarm, PEEP low alarm, EtCO<sub>2</sub> upper limit alarm, EtCO<sub>2</sub> lower limit alarm

♦Servo-s:

airway pressure upper limit alarm, high continuous pressure alarm, O<sub>2</sub> concentration lower limit alarm, expiratory minute volume upper/lower limit alarm, apnea alarm, gas supply alarm, air supply alarm, O<sub>2</sub> supply alarm, backup ventilation alarm, respiratory rate alarm, PEEP low alarm

♦PB740 /PB760 /PB840:

The PB740/PB760/PB840 acquires alarm information from the nurse call port. The ventilator alarm that cannot be acquired from the nurse call port is not guaranteed. For corresponding alarm, refer to the service representative of the ventilator manufacturer.

- ♦ This equipment is not compatible to the following alarms generated on the Evita 4/Evita XL/Evita 2 dura.
    - ♦ O<sub>2</sub> monitoring disabled alarm, CO<sub>2</sub> alarm disabled alarm, Oximeter alarm disabled alarm, Neo. volume measurement inoperable alarm, Minute volume alarm disabled alarm, Minute volume alarm low off alarm, Tidal volume alarm high off alarm, Apnea alarm off alarm, Nebulizer active alarm
    - ♦ There is a communication delay of 3 seconds between the DS-8200 System and the Evita ventilator. Therefore, if the alarm generated at the ventilator is resolved within 3 seconds, the ventilator alarm may not be generated at the DS-8200 System.
- 

 **CAUTION**

---

- ♦ The ventilator operation should be performed by well-trained and authorized personnel.
  - ♦ When connecting DS-8200 System and a ventilator, use only the specified connection cable.
  - ♦ Make sure that the ventilator is connected to the specified connector on the DS-8200 System.
  - ♦ When connecting the cable, make sure that the main power of this system and the ventilator is OFF.
-

## Ventilator Connection

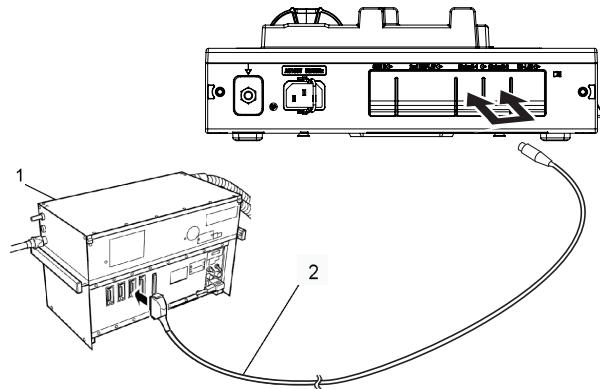
**CAUTION**

- Only one ventilator can be connected to each DS-8200 System. Do not connect more than one ventilators.

### □ Connection of SV-900

- 1 Connect the SV-900 to Status II-1 or Status II-2 connector on the Base Unit (BS-8210) of the DS-8200 System.

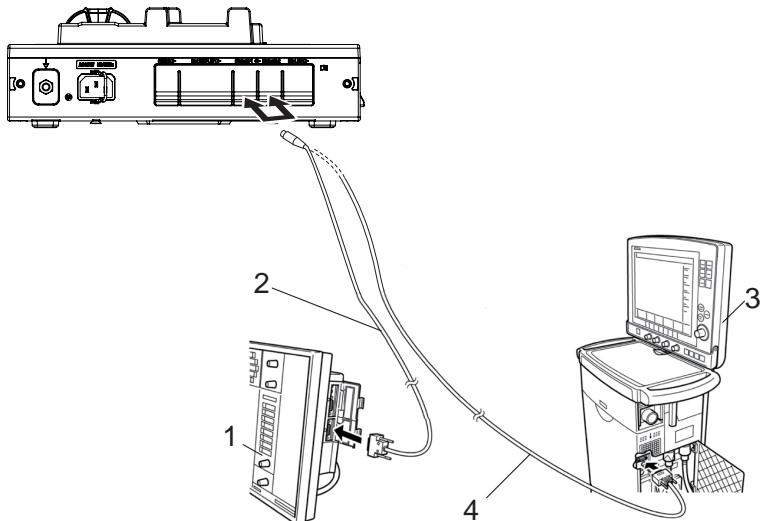
- 1 SV-900  
2 Cable



### □ Connection of SV-300, Servo-i/s

- 1 Connect the SV-300 or Servo-i/s to Status II-1 or Status II-2 connector on the Base Unit (BS-8210) of the DS-8200 System.

- 1 SV-300  
2 CJ-401RI-70SV3  
3 Servo-i/s  
4 CJ-402RI-70SVi

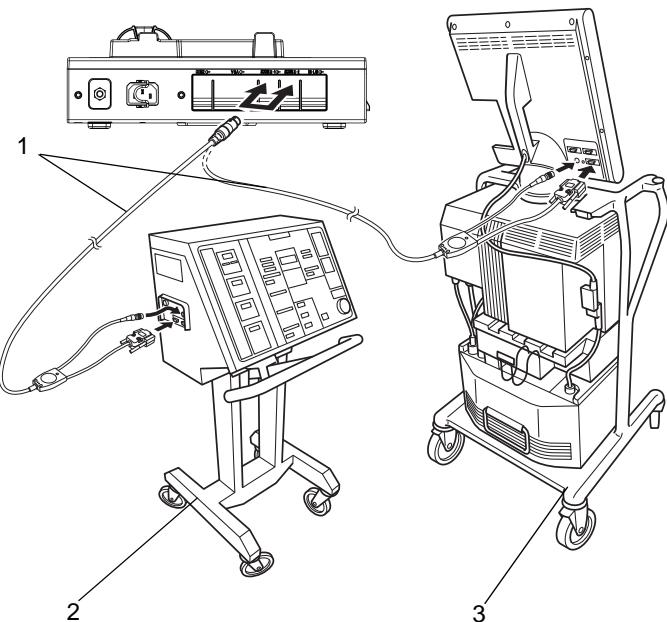


## □ Connection of PB740/760/840

**1**

Connect the PB740/760/840 to Status II-1 or Status II-2 connector on the Base Unit (BS-8210).

- 1 CJ-403RI-70PB
- 2 PB740/760
- 3 PB840

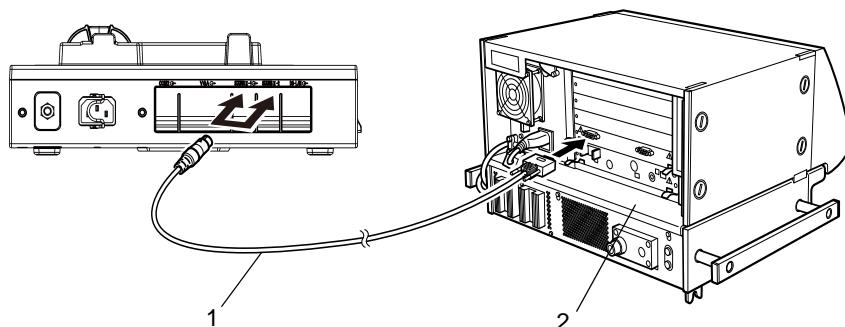


## □ Connection of Evita

**1**

Connect the Evita 2 dura/Evita 4/Evita XL to Status II-1 or Status II-2 connector on the Base Unit (BS-8210).

- 1 CJ-402RI-70SVi
- 2 Evita 2 dura

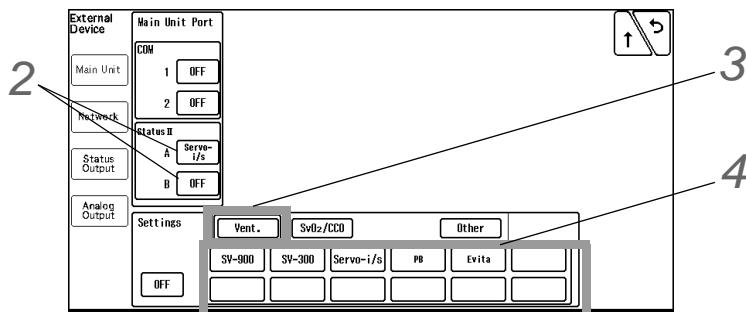


## External Device Setup

To monitor the ventilator alarm, it is necessary to select the ventilator type to be connected.

- 1** Press the [Menu], [Initial Settings], [External Device], [Main Unit] keys.

► The screen to set the connecting device type for each port will be displayed.



- 2** Select the port to connect the ventilator.

- 3** Press the [Ventilator] key.

- 4** Select from [SV-900]/[SV-300]/[Servo-i/s]/[PB]/[Evita].

**NOTE**

- If communication with ventilator is already established through the corresponding port, it is necessary to disconnect the communication in order to change the selection on this menu.
- The same ventilator cannot be set to multiple ports. If a ventilator is set to one of the ports, the other port which ventilator was set will be automatically set to [OFF].

## SvO<sub>2</sub>/CCO Monitor Connection

This section describes the procedure on how to connect the DS-8200 System to the oximeter (manufactured by Edwards Lifescience) and the CCO measurement device (Vigilance, Vigilance CEDV, Vigilance II, Vigileo).

Oximeter and CCO measurement device can be connected to the DS-8200 System using the COM1 to 2 on the Base Unit (BS-8210).

By connecting the oximeter and CCO measurement device, Vigilance data can be monitored on the patient monitor.

Oximeter, CCO measurement Device	Connection Cable	
	For STATUS II Connector	For Serial Connector
Vigilance	CJ-406RI-70VIGI (x1)	CJO-04RS4 (x1)
Vigilance CEDV	CJ-406RI-70VIGI (x1)	CJO-04RS4 (x1)
Vigilance II	CJ-402RI-70SVi (x1)	CJ-502 (x1)
Vigileo	CJ-402RI-70SVi (x1)	CJ-502 (x1)



**CAUTION**

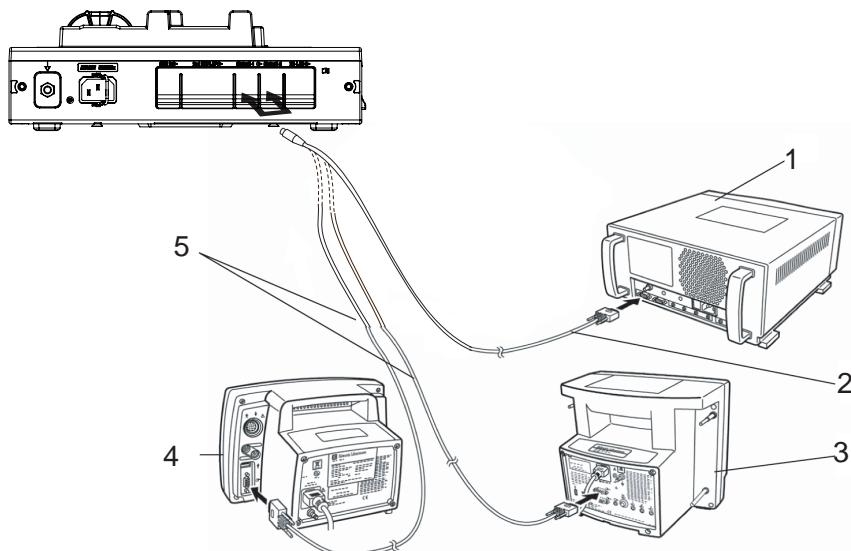
- When connecting this system and the oximeter or CCO measurement device, use only the specified connection cable.
- Make sure that the oximeter and CCO measurement device is connected to the specified

connector on this system. When connecting the cable, verify that the main power of this system and the oximeter are OFF.

## SvO<sub>2</sub>/CCO Monitor Connection

- 1** Connect the Oximeter/CCO measurement Device to COM 1, Status II-1, or Status II-2 connector on the Base Unit (BS-8210).

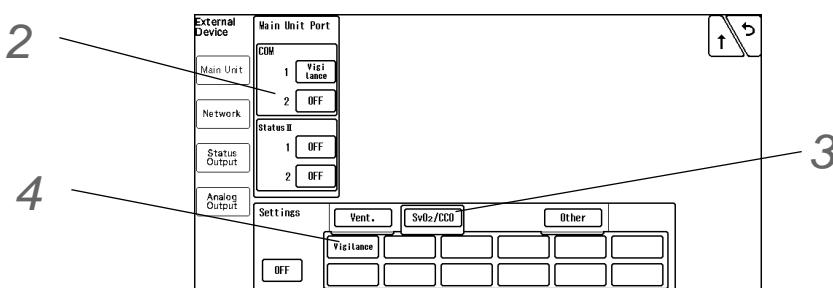
- 1 Vigilance
- 2 CJ-406RI-70VIGI
- 3 Vigilance II
- 4 Vigileo
- 5 CJ-402RI-70SVi



## External Device Setup

To display the Vigilance data, the connecting oximeter or CCO measurement device type needs to be set.

- 1** Press the [Menu], [Initial Settings], [External Device], [Main Unit] keys.  
 ▶ The screen to set the connecting device type for each port will be displayed.



- 2** Select the port to connect the oximeter.  
**3** Press the [SvO<sub>2</sub>/CCO] key.  
**4** Press the [Vigilance] key.

**NOTE**

- The same oximeter cannot be set to multiple ports. If an oximeter is set to one of the ports, the other port which oximeter was set will be automatically set to [OFF].

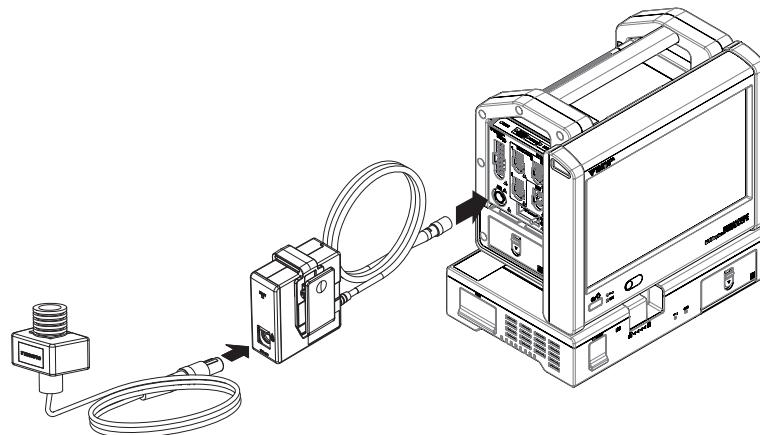
## CO<sub>2</sub> Concentration Data Input

By connecting the Gas Unit I/F (HPD-800/HPD-810), or CO<sub>2</sub> Gas Unit (HCP-800/HCP-810), waveform and numeric data of CO<sub>2</sub> concentration can be monitored on the DS-8200 System.

### Connecting the Capnostat 5

By connecting the Capnostat 5 via HPD-800/HPD-810 Gas Unit I/F, CO<sub>2</sub> concentration measured by mainstream method can be monitored.

HPD-800/HPD-810 is used by connecting it to the AUX connector of the HS-8000.

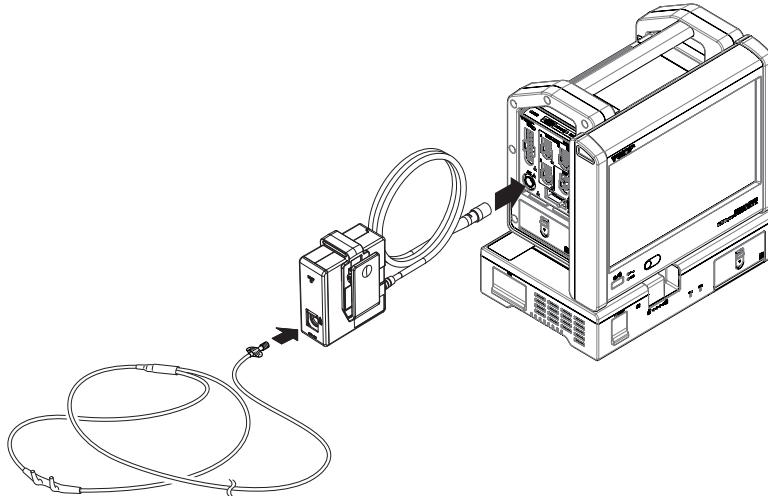


*Mainstream Method  
Capnostat 5 manufactured by Respiromics Novametrix*

## Connecting the Sampling Line (Covidien)

By connecting the FilterLine CO<sub>2</sub> sampling line series, CO<sub>2</sub> concentration measured by intubation or non-intubation can be monitored.

HCP-800/HCP-810 is used by connecting to the AUX connector of the HS-8000.



*Sidestream Method  
(Incorporates Covidien's Microstream® technology)*

## BIS Data Input

By connecting the A-2000/A-3000 BIS monitor (Covidien), the patient's recovery from anesthesia can be verified by BIS (Bispectral Index) value.

BIS Monitor	Connection Cable	
	For STATUS II Connector	For Serial Connector
A-2000	CJ-407RI-70BIS	
A-3000		CJO-03RS4

### CAUTION

- Refer to the BIS monitor operation manual and set the SQI value above 15.
- ASCII should be set to communicate with this system. Make sure that ASCII is set on the BIS monitor communication setting. Refer to the BIS monitor operation manual for procedures.
- Securely connect the cable to the serial or status connector of the Base Unit (BS-8210) and the connector of the BIS monitor.

## Connecting the A-2000/A-3000 (Covidien)

**CAUTION**

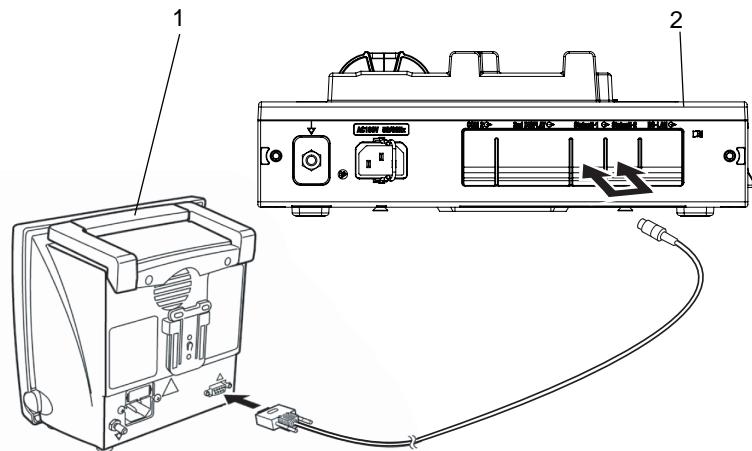
- When connecting this system and the BIS monitor, use only the specified connection cable.
- Make sure that the BIS monitor is connected to the specified connector on this system. When connecting the cable, make sure that the main power of this system and the BIS monitor is OFF.

### Connecting to the Base Unit (BS-8210)

- 1 Use the BIS connection cable (CJ0-03RS4) to connect the COM 1, Status II-1, or Status II-2 connector on the Base Unit (BS-8210) and serial connector on the BIS monitor.

1 CJ-407RI-70BIS

2 Base Unit (BS-8210)

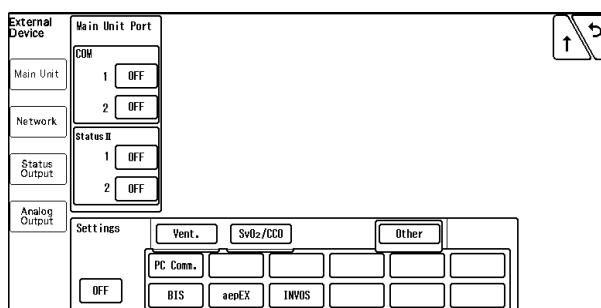


### External Device Setup

To display the BIS monitor data, external device setup is required.

- 1 Press the [Menu], [Initial Settings], [External Device], [Main Unit] keys.

► The screen to set the connecting device type for each port will be displayed.



- 2 Select the port to connect the BIS monitor.

- 3 Press the [Other] key.

**4** Press the [BIS] key.

**NOTE**

- The BIS monitor cannot be set to multiple ports. If BIS monitor is set to one of the ports, the other port which BIS monitor was set will be automatically set to [OFF].

## INVOS Data Input

By connecting the INVOS 5100C Cerebral Oximeter (Covidien), regional cerebral oxygen saturation data can be monitored.

Non-Invasive Cerebral Oximeter	Connection Cable	
INVOS 5100C	For STATUS II Connector	For Serial Connector
	CJ-406RI-70Vigi	CJO-04RS4

**! CAUTION**

- When connecting this system and the INVOS 5100C, use only the specified connection cable.
- Make sure that the INVOS 5100C is connected to the specified connector on this system. When connecting the cable, verify that the main power of this system and the INVOS 5100C are OFF.

## Connecting to the INVOS

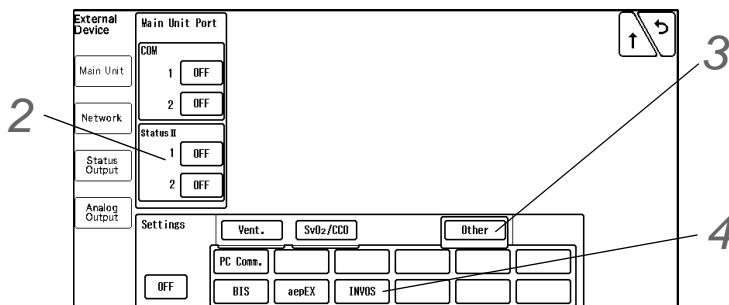
**1** Connect the INVOS 5100C to the serial connector or StatusII connector on the Base Unit (BS-8210) using the connection cable.

## External Device Setup

To display the INVOS 5100C data, external device setup is required.

**1** Press the [Menu], [Initial Settings], [External Device], [Main Unit Port] keys.

- The screen to set the connecting device type for each port will be displayed.



**2** Select the port to connect the INVOS.

**3** Press the [Other] key.

**4** Press the [INVOS] key.

**NOTE**

- INVOS cannot be set to multiple ports. If INVOS is set to one of the ports, the other port which INVOS was set will be automatically set to [OFF].

## Setup for the External Device Connection

This section explains about the external device connection setup.

### External Device Setup

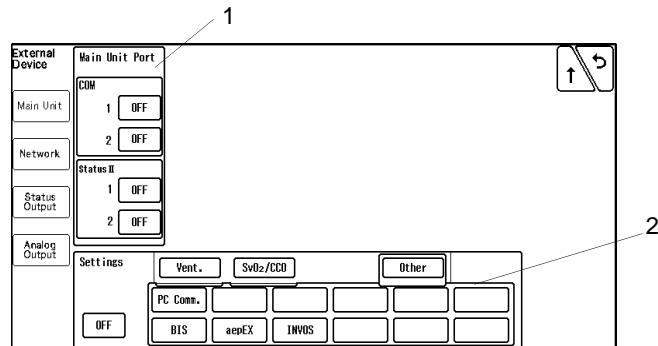
**1** Press the [Menu], [Initial Settings], [External Device] keys.

► The external device connection setup menu will be displayed.

1 Select the connecting port from the "Main Unit Port".

2 Select the connecting equipment from the displayed selection.

By selecting [Vent.], [SvO<sub>2</sub>/CCO], [Other] from the upper area, the corresponding selection will be displayed at the lower area.



#### Selectable External Device for Each Port

Port	Selectable External Device
COM1	Vigilance, PC Comm., BIS, INVOS
Status II	SV-900, SV-300, Servo i/s, PB, Evita, Vigilance, BIS, INVOS

**NOTE**

- The same function cannot be set to multiple ports.

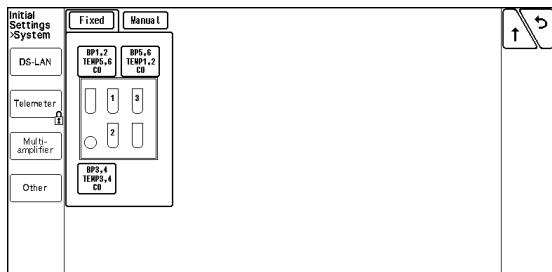
## Unit Module Setup

### □ Multiparameter Connector Setup

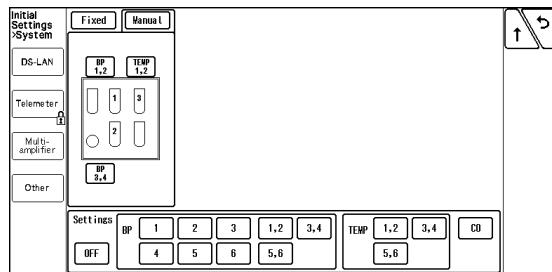
On the multiamplifier setup screen, the parameter to measure on each multiparameter connector can be set.

**1** Press the [Menu], [Initial Settings], [System], [Multiamplifier] keys.

- ▶ The multiamplifier setup screen will be displayed.



When [Fixed] is selected



When [Manual] is selected

**2** Select from [Fixed]/[Manual].

- ▶ [Fixed]: The parameter will be automatically fixed according to the actual cable connection.
- ▶ [Manual]: BP and TEMP channels can be assigned to any connectors.

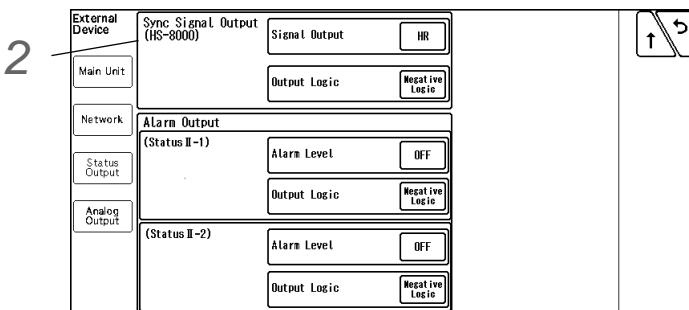
( Operation Manual "Multiparameter Connector Setup for BP, TEMP, CO Measurement" P7-88)

## Synchronized Signal Output

The Super Unit (HS-8000) is capable to output the HR or RR synchronized signal.

**1** Press the [Menu], [Initial Settings], [External Device], [Status Output] keys.

- ▶ The status output setup screen will be displayed.



**2** Set the synchronized signal output.

**1** Press the key for "Signal Output".

**2** Select from [HR]/[RR].

- ▶ [HR]: HR synchronized signal will be output.

- ▶ [RR]: Synchronized signal according to the selected RR source (impedance, CO<sub>2</sub>) will be output.

**3** Press the key for "Output Logic".

► The dropdown list will be displayed.

**4** Select from [Positive Logic]/[Negative Logic].

► [Positive Logic]: Positive synchronized signal will be output.

► [Negative Logic]: Negative synchronized signal will be output.

**REFERENCE**

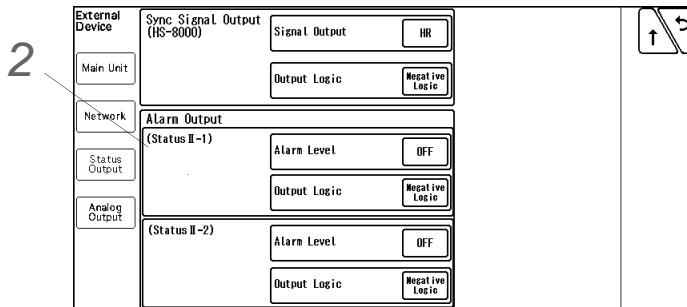
- ♦ Refer to the "HS-8000 Super Unit Operation Manual" for connector pin assignments of the output signal.

## Alarm Output Setup

The alarm can be output from the status input/output connector or I/O connector (optional) on the Base Unit (BS-8210).

**1** Press the [Menu], [Initial Settings], [External Device], [Status Output] keys.

► The status output setup screen will be displayed.



**2** Select the alarm to output.

**1** Press the key for "Alarm Output".

► The dropdown list will be displayed.

**2** Select from [OFF], [APNEA], [Level H] / [Level H,M] / [Level H,M,L].

► [Level H]: Level H alarm will be output.

► [Level H,M]: Level H, M alarm will be output.

► [Level H,M,L]: Level H, M, L alarm will be output.

► [APNEA]: Apnea alarm will be output.

► [OFF]: Alarm will not be output.

**3** Press the key for "Output Logic".

► The dropdown list will be displayed.

**4** Select from [Positive Logic]/[Negative Logic]/[Pulse].

► [Positive Logic]: Positive synchronized signal will be output.

► [Negative Logic]: Negative synchronized signal will be output.

► [Pulse]: A square wave of 440ms cycle will be output.

**NOTE**

- ♦ Refer to "Status I/O Signal (Status II Connector 1)" P6-19 for connector pin

assignments of the alarm output.

- ◆ The equipment status alarm will be output as Level L. To output the equipment status alarm, select [Level H,M,L].

## Analog Output Setup

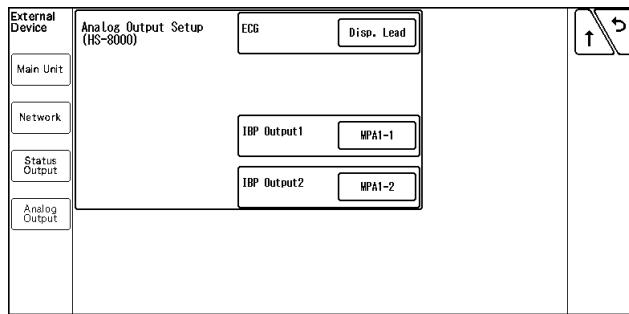
DS-8200 is capable to output the analog HR and BP waveform.

The BP waveform for analog output can be selected from the measured waveforms on the HS-8000 multiamplifier connector.

On the analog output setup screen, initial settings for display/printing can be performed.

- 1 Press the [Menu], [Initial Settings], [External Device], [Analog Output] keys.

► The analog output setup screen will be displayed.



- 2 Set the ECG waveform lead.

- 1 Press the key for "ECG".

► The dropdown list will be displayed.

- 2 Select from [Disp. Lead]/[Selected Lead].

- 3 When [Selected Lead] is selected, press the key for "Output Lead Sel.".

► The subwindow will be displayed.

- 4 Select from [I] / [II] / [III] / [aVR] / [aVL] / [aVF] / [V].

- 3 Select the IBP waveform to output from the DS-8200.

- 1 Press the key for "IBP Analog/Sychronized Signal Output".

► The dropdown list will be displayed.

## PC Communication

This section explains about the PC communication setup procedure.

By using the PC communication function, vital data measured on the bedside monitor can be transmitted to PC.

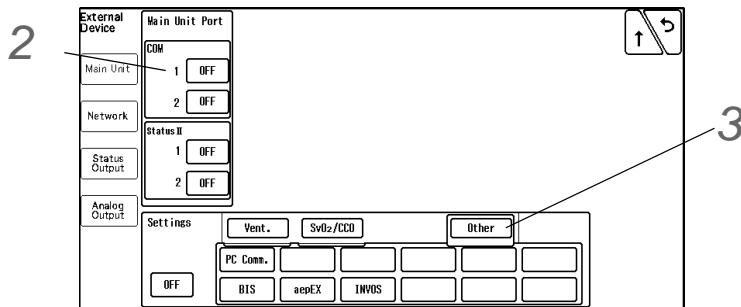
### Connection with the System

- 1** Connect the accessory cable for system connection to the serial connector (COM1) on the Base Unit (BS-8210).

### External Device Setup

To transmit the data to PC, external device setup is required.

- 1** Press the [Menu], [Initial Settings], [External Device], [Main Unit] keys.  
▶ The screen to set the connecting device type for each port will be displayed.



- 2** Select the port (COM1) to connect the PC.
- 3** Press the [Other] key.
- 4** Press the [PC Comm.] key.

#### NOTE

- ♦ If PC communication is cut, "Check System Conn." message will be displayed.

## Connection with the Laser Printer

This section explains about the laser printer setup procedure.

There are two ways to output on the laser printer.

- ◆ Output on the laser printer connected to the TCP/IP network
- ◆ Output on the laser printer connected to the DS-7700 system central monitor  
(Only when connected to DS-LAN III network)

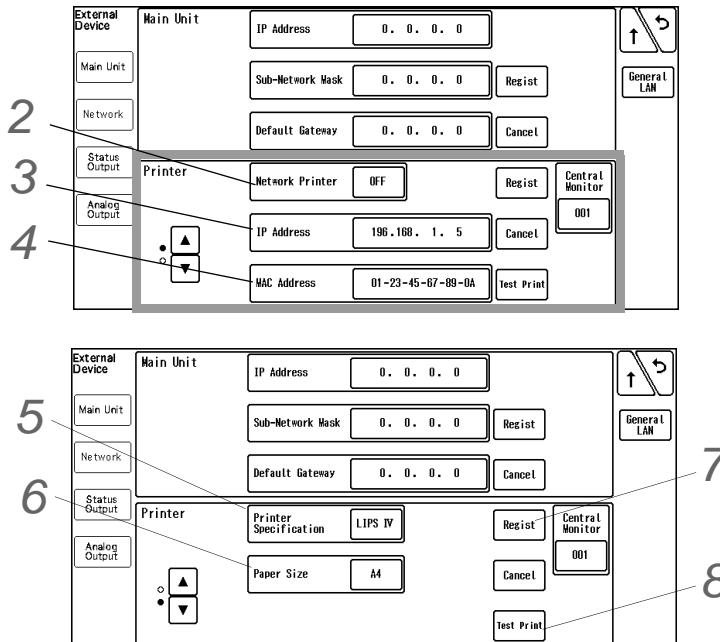
### Laser Printer Setup

#### □ To Output on the TCP/IP Network Printer

Set the IP address, MAC address, and printer specification for the laser printer.

- 1** Press the [Menu], [Initial Settings], [External Device], [Network] keys.

► The laser printer setup screen will be displayed.



- 2** Select ON/OFF for "Network Printer".

► [ON]: Laser printer will be enabled.  
► [OFF]: Laser printer will be disabled.

#### REFERENCE

- ◆ Select [DS-LAN] to output on the laser printer of DS-7700 system central monitor connected to the DS-LANIII network.

- 3** Enter the IP address of the printer.

- 4** Enter the MAC address of the printer.

**NOTE**

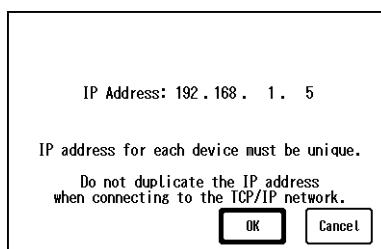
- MAC (Media Access Control) address is an address assigned for each network equipment. Refer to the operation manual of the printer or printer network board.

**5** Select the printer specification.

- ▶ [LIPS IV]: Select when LIPS IV laser printer is used.
- ▶ [ESC/page]: Select when ESC/page laser printer is used.
- ▶ [PCL5]: Select when PCL5 laser printer is used.

**6** Select the paper size.

- ▶ [A4]:Select when using A4 size paper.
- ▶ [Letter]:Select when using letter size paper.

**7** When [Regist] is pressed, a confirmation message will be displayed.

- ▶ [OK]:To register the setting, press this key.
- ▶ [Cancel]: To cancel registering, press this key.

**8** Perform test printing.

Verify that the printing is properly performed.

**CAUTION**

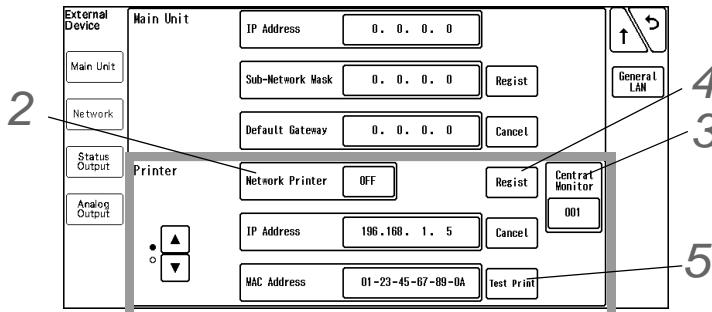
- If the output characters are garbled, printer specification may be incorrectly set on the central monitor. Refer to the operation manual of the printer and check the printer specification.

**To Output on the DS-LAN Printer**

Set the central ID of the central monitor which is connected to the laser printer.

**1** Press the [Menu], [Initial Settings], [External Device], [Network] keys.

- The laser printer setup screen will be displayed.

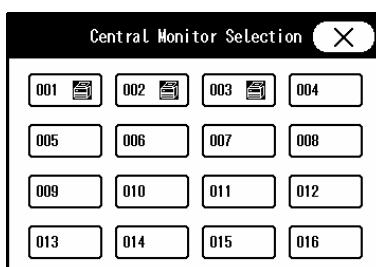


**2** Select [DS-LAN] for "Network Printer".

**3** Specify the central ID of the central monitor to perform the printing.

1 Press the key for "Central Monitor".

- The "Central Monitor Selection" window will be displayed.  
► The central ID with the printer icon displayed can be selected.



**2** Select the central ID.

**4** Press the [Regist] key, then [OK] key.

- It is necessary to press the [OK] key to validate the setting.

**5** Perform test printing.

Verify that the printing is properly performed.

### CAUTION

- ♦ If the output characters are garbled, printer specification may be incorrectly set on the central monitor. Refer to the operation manual of the printer and check the printer specification.
- ♦ On the central monitor, built-in printer output will be prioritized over the laser printer output. If the built-in printer output is started during the laser printer output, the laser printer output will resume after the built-in printer output.
- ♦ [DS-LAN] can be selected only when [DS-LANIII] is set for "DS-LAN Setup". If the "DS-LAN Setup" setting is changed to [DS-LANII], the "Network Printer" setting will change from [DS-LAN] to [OFF].

# Chapter 5 Initial Settings

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# Chapter 5    Initial Settings

## Initial Settings

This section explains about the "Initial Settings" menu.

Under "Initial Settings" menu, there are 7 setup categories which are Alarm, Measurement, User I/F, External Device, System, User Mode Registration, and Administrator Setup.

### Description for Each Category

Category	Subcategory	Description
Alarm	-	Alarm-related settings, alarm indicator settings, etc.
Meas.	User Label	User label settings for BP and TEMP
	Unit	Measurement unit settings for CO <sub>2</sub> , BP, ST
	Other	Other settings such as arrhythmia analysis filter, etc.
User I/F	Display/Print	Display and print settings such as date format, BP alarm setting increment, etc.
	Power ON/ Discharge	Settings such as backup status at "Power ON" and "Discharge", etc.
	Menu	Key display settings for Menu screen
	Key Mask	Key mask settings for unnecessary keys
	Remote Control	Settings for remote control
	Operation	Settings for hiding or minimizing the window
External Device	Main Unit Port	Settings for external device connectors such as serial port and Status II connector
	Network	Network settings for laser printer.
	Status Output	Settings for synchronized signal and alarm output.
	Analog Output	Settings for analog waveform output.
System	DS-LAN	Wired network settings such as Room ID, Bed ID.
	Telemeter	Telemetry settings such as telemetry channel, transmitting waveform, etc.
	Multiamplifier	Multiamplifier Connector Setup
	Other	AC Filter, HS-8000 Data Transfer
User Mode Registration	-	Registration of 9 modes according to the monitoring purpose
Administrator Setup	Key Lock	Settings of key lock level for display and setting.
	Password Setup	Settings for password and administrator.

## Administrator Setup

This section explains about the "Administrator Setup" menu.

The "Administrator Setup" is composed of [Key Lock] and [Password Setup].

### NOTE

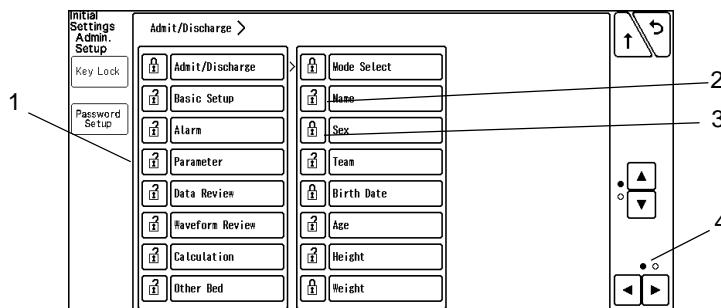
- ♦ To display the administrator setup menu, a password is required. There are 3 levels of password with different operation authorization. With higher level password, the lower level settings can be changed.
- ♦ For details of the password, contact Fukuda Denshi service representative.

## Key Lock

**1** Press the [Menu], [Initial Settings], [Admin. Setup] keys.

**2** Enter the password.

► The key lock setup screen will be displayed.



1 The lower level items will be displayed.

2 This indicates unlocked item. It is displayed in white.

3 This indicates locked item. To change the setting, an authorized password is required.

There are 3 levels of password which are distinguished by the color of the icon.

The level is in the order of red>yellow>green. For example, the following operation is possible.

Red: Manager > Yellow: Administrator > Green: User

4 The page will switch.

### REFERENCE

- ♦ Maximum of 3 types of password can be set for the administrator which can individually lock the setting with each password.
- ♦ The items protected by password will be displayed in a tree format.

## Password Setup

This section explains how to change the password and how to enter the administrator name.

### CAUTION

- ♦ Do not forget the password.

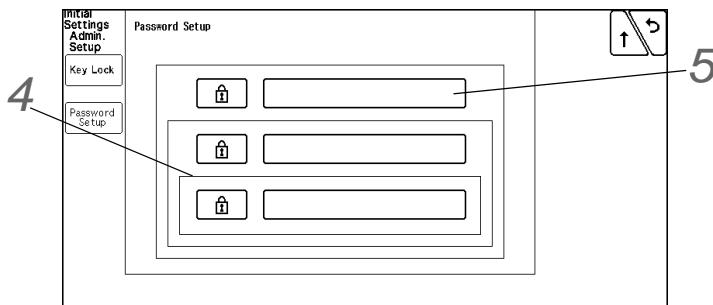
- The password should be strictly controlled.

**NOTE**

- The default passwords are set as follows.  
Red Key: 11111111  
Yellow Key: 22222222  
Green Key: 33333333
- Before using the equipment, make sure to change the password.
- For details of the password, contact Fukuda Denshi service representative.

- 1 Press the [Menu], [Initial Settings], [Admin. Setup] keys.
- 2 Enter the password.
- 3 Press the [Password Setup] key.

► The password setup screen will be displayed.

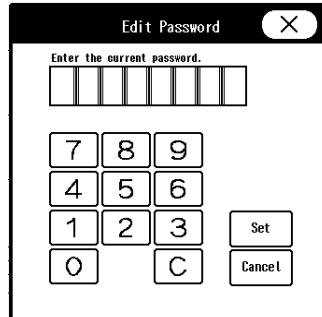


- 4 Enter the password.

**REFERENCE**

- Depending on the password, the operation authorization will differ. With higher level password, the lower level settings can be changed.

- 1 Press the key for the level to change the password.
- The "Edit Password" window will be displayed.



- 2 Enter the current password using the numeric keys.
- 3 Press the [Input] key.
- 4 Enter the new password using the numeric keys.

**NOTE**

- As the authorization level is distinguished by the password, the password cannot be duplicated.

**REFERENCE**

- Maximum of 8 digits can be set for the password.

**5** For confirmation, enter the new password again.

**REFERENCE**

- There are 3 levels of password which are distinguished by the color of the icon. The level is in the order of red>yellow>green and are distinguished by the entered password to display the administrator setup menu.

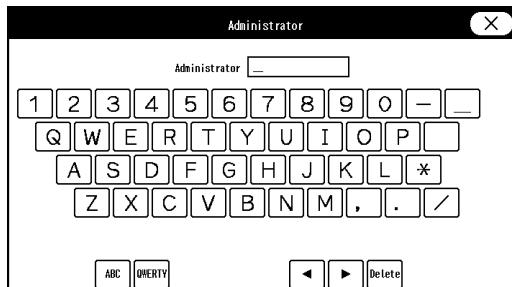
**5** Set the administrator name.

**REFERENCE**

- Depending on the password, the operation authorization will differ. With higher level password, the lower level settings can be changed.

**1** Press the key for the level to change the administrator name.

► The "Administrator" window will be displayed.



**2** Enter the administrator name using the alphanumeric keys.

**REFERENCE**

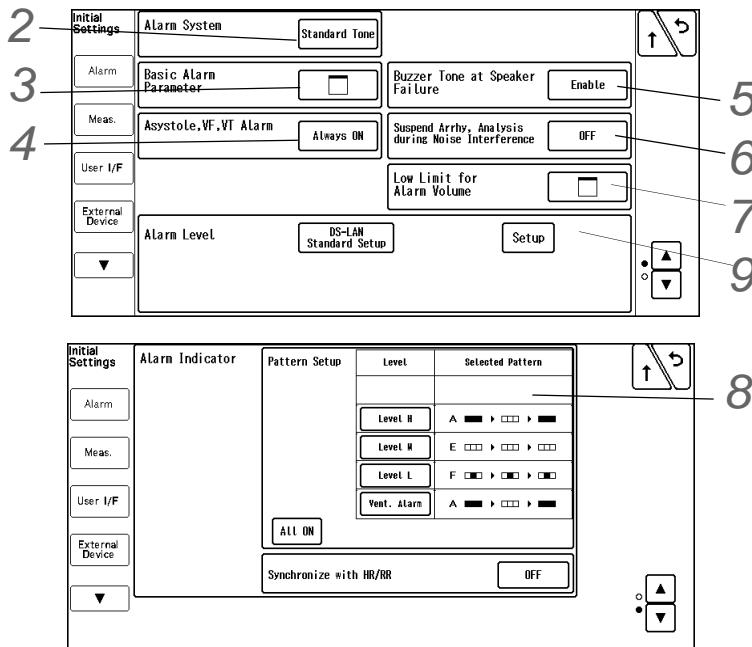
- Maximum of 8 characters can be set for the administrator name.

## Alarm Related Setup

On the alarm setup menu, alarm related setup can be performed.

- 1** Press the [Menu], [Initial Settings], [Alarm] keys.

► The alarm setup screen will be displayed.



- 2** Set the "Alarm System".

### **⚠ WARNING**

- Changing the setting for "Alarm System" (Initial Settings > Alarm) will also change the alarm volume and tone setting. Make sure to check the volume and tone when the setting is changed.

- 1** Press the key for "Alarm System".

► The dropdown list will be displayed.

- 2** Select from [Fukuda Tone] / [Melodic Tone] / [Standard Tone].

► [Fukuda Tone]: The alarm tone common to DS-7000 series bedside monitor will be set.

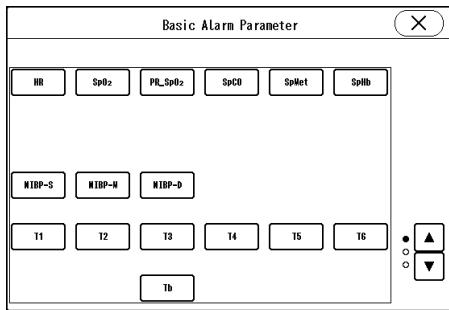
► [Melodic Tone]: The alarm tone which the rhythm is the same with [Standard Tone] with different melody will be set.

► [Standard Tone]: The alarm tone complied to the IEC standard will be set.

- 3** Set the "Basic Alarm Parameter".

- 1** Press the key for "Basic Alarm Parameter".

- ▶ The "Basic Alarm Parameter" window will be displayed.



- 2 Select the item to perform the setting.
  - ▶ The selected key will be displayed in blue.
  - ▶ By pressing the selected key again, the selection will be cancelled.
- 3 Press  .
  - ▶ The "Basic Alarm Parameter" window will close.
- 4 Set the "Asystole, VF, VT Alarm".
  - 1 Press the key for "Asystole, VF, VT Alarm Setup".
    - ▶ The dropdown list will be displayed.
  - 2 Select from [Always ON] / [ON/OFF] / [Check when OFF].
    - ▶ [Always ON]: The alarms for asystole, VF, VT, Slow\_VT will be always ON and cannot be turned OFF.  
( Operation Manual "To Set the Arrhythmia Alarm" P6-1)
    - ▶ [ON/OFF]: The alarms for asystole, VF, VT, Slow\_VT can be turned ON or OFF.
    - ▶ [Check when OFF]: When turning OFF the asystole, VF, VT, Slow\_VT alarms, a confirmation screen will be displayed.
- 5 Set the "Buzzer Tone at Speaker Failure".
  - 1 Press the key for "Buzzer Tone at Speaker Failure".
    - ▶ The dropdown list will be displayed.
  - 2 Select from [Enable] or [Disable].
    - ▶ [Enable]: A buzzer tone will be generated instead of an alarm sound under the following condition.
      - ♦ Speaker failure
      - ♦ Alarm volume is not set to minimum.
      - ♦ Night mode volume is not set to [Silence].
      - ♦ Vital alarm (level S, H, M, L) or ventilator alarm is generating.
    - ▶ [Disable]: A buzzer tone will not be generated even during speaker failure.

  - ♦ A buzzer tone can be silenced by pressing the [Alarm Silence] key.
- 6 Set the "Suspend Arrhy. Analysis during Noise Interference".
  - 1 Press the key for "Suspend Arrhy. Analysis during Noise Interference" .
    - ▶ The dropdown list will be displayed.

**2** Select from [ON] or [OFF].

- ▶ [ON]: Arrhythmia analysis will be suspended for fixed duration (5sec.) when a noise is continuously interfering.
- ▶ [OFF]: Arrhythmia analysis will not be suspended even when a noise is continuously interfering.

**CAUTION**

- ◆ When "Suspend Arrhy. Analysis during Noise Interference" is set to [ON], and the suspended duration continues for more than 30 seconds, "Cannot analyze" message will generate.

**7** Set the "Low Limit for Alarm Volume".

**WARNING**

- ◆ Changing the setting for "Alarm System" will also change the alarm volume and tone setting. As the "Low Limit for Alarm Volume" may also change, make sure to check the volume and tone on the tone/volume setup screen.

**1** Press the key for "Low Limit for Alarm Volume".

- ▶ The "Low Limit for Alarm Volume" window will be displayed.

**2** Set the lower limit of alarm volume for "Vital Alarm", "Ventilator Alarm", "Status Alarm".

- ▶ The lower limit of adjustable alarm volume range on the "Tone/Volume" setup screen will be set. The lower limit level can be set according to the alarm level priority, Urgent>Caution>Status.
- ▶ [Test]: The test sound will be generated with the set volume.

**8** Set the operation for the alarm indicator located at the upper part of the Display Unit.

**NOTE**

- ◆ The alarm indicator setting is to be performed for each alarm level.

**REFERENCE**

- ◆ The alarm indicator flashing pattern can be set according to the alarm level. The patient's condition can be checked from far distance by the difference of flashing pattern.

*Alarm Indicator Flashing Pattern*

Pattern	Flashing Pattern
Pattern A	(Red, Red, Red), (xxx), (Red, Red, Red), (xxx), (Red, Red, Red)
Pattern B	(Red, Orange, Red), (xxx), (Red, Orange, Red), (xxx), (Red, Orange, Red)
Pattern C	(Red, Green, Red), (xxx), (Red, Green, Red), (xxx), (Red, Green, Red)
Pattern D	(x, Red, x), (xxx), (x, Red, x), (xxx), (x, Red, x)
Pattern E	(x, Orange, x), (xxx), (x, Orange, x), (xxx), (x, Orange, x)
Pattern F	(x, Blue, x),
Pattern G	(Red, Red, x), (xxx), (x, Red, Red), (xxx), (Red, Red, x)
Pattern H	(Red, Orange, x), (xxx), (x, Orange, Red), (xxx), (Red, Orange, x)
Pattern I	(Red, Green, x), (xxx), (x, Green, Red), (xxx), (Red, Green, x)
Pattern J	(Red, x, x), (x, Red, x), (x, x, Red), (Red, x, x), (x, Red, x)

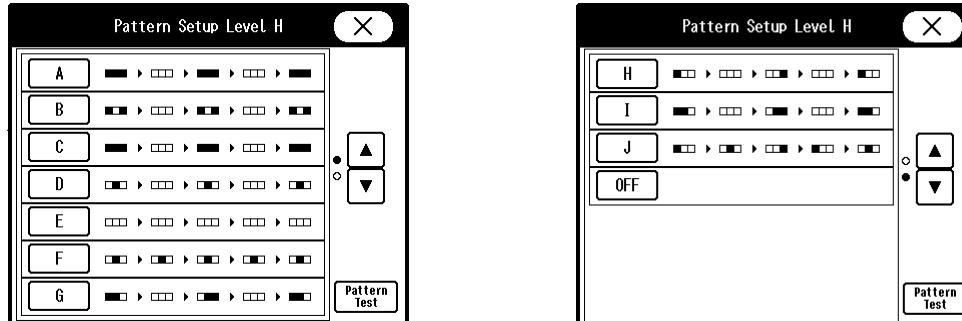
*Alarm Indicator Flashing Pattern*

Pattern	Flashing Pattern
---------	------------------

\* (xxx) indicates that the alarm indicator is not lit.

- 1** Press the key for the level to set the flash pattern.

► The pattern setup window will be displayed.



Display Example for Level H

- 2** Select from [A] to [J].

**NOTE**

- When not using the alarm indicator function, select [OFF].

- 3** Press the [Pattern Test] key to test the flash pattern.

- 4** Press .

- 5** Select from [All ON] or [All OFF].

► [All OFF]: Alarm indicator function will be turned OFF for all levels.

► [All ON]: Alarm indicator function will be turned ON for all levels with the current settings.

- 6** Press the key for "Synchronize with HR/RR".

► The dropdown list will be displayed.

- 7** Select from [Sync. to HR]/[Sync. to RR]/[OFF].

► [Sync. to HR]: The green LED at the center of alarm indicator will flash synchronizing to HR.

► [Sync. to RR]: The green LED at the center of alarm indicator will flash synchronizing to RR.

► [OFF]: The alarm indicator will not light.

**NOTE**

- If ASYSTOLE alarm generates while [Sync. to HR] is selected, the green LED at the center of alarm indicator will remain lit. When PR synchronized mark is displayed, the LED on the alarm indicator will not flash.
- When [Sync. to RR] is selected and RR synchronized mark other than impedance is displayed, the LED on the alarm indicator will not flash.
- To turn OFF the alarm indicator operation all at once, press the [All OFF] key.

**9**

Set the "Alarm Level".

Select the alarm level from [DS-LAN Standard Setup] or [User Setup].

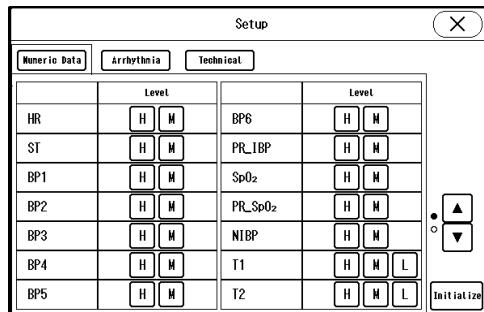
Press the [Setup] key to display the alarm level setup window.

**REFERENCE**

- The alarm level for numeric data alarm, arrhythmia alarm, technical alarm can be set.
- The alarm level can be selected from S, H, M, L according to the priority. ("S" is the highest priority alarm.)

**1** Press the [Setup] key.

- The "Setup" window will be displayed.



**2** Press one of the [Numeric Data], [Arrhythmia], [Technical] key.

- The window will change according to the selected alarm group.

**3** Press the **▲/▼** keys.

- The page will switch.

**4** Select the alarm level from [S]/[H]/[M]/[L]/[N] for each parameter.

**NOTE**

- Only the displayed alarm level can be selected.
- Press the [Initialize] key to initialize the alarm level setting.

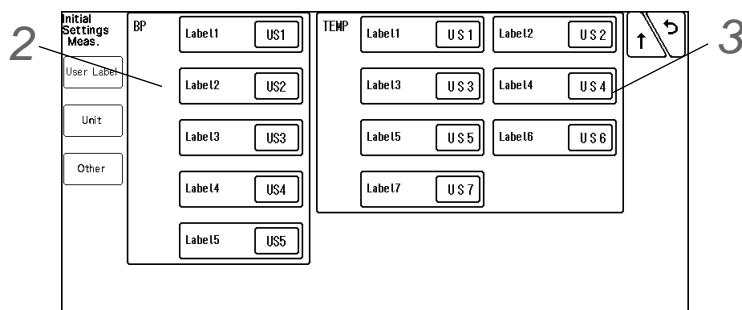
## Measurement Related Setup

### User Label Setup

On the user label setup screen, BP and TEMP user labels can be set.

**1** Press the [Menu], [Initial Settings], [Meas.] keys.

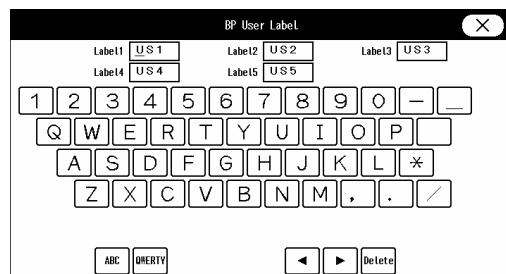
- The user label setup screen will be displayed.



**2** Set the BP user label.

**1** For "BP", select from [US1] to [US5].

► The "BP User Label" window will be displayed.



**2** Use the alphanumeric keys to enter the user label up to 3 characters.

► The cursor position will be indicated by a red underline.

#### REFERENCE

- Press the display area for the user label to perform the setting.
- The key arrangement can be selected from [ABC] or [QWERTY].

#### CAUTION

- When the system is connected to DS-LAN, BP label of US3 to US5, TEMP label of US3 to US7 cannot be selected.

**3** Set the TEMP label using the same procedure with Step 2.

## Measurement Unit

The measurement unit can be set on the unit setup screen.

**1** Press the [Menu], [Initial Settings], [Meas.], [Unit] keys.

► The "Unit" setup screen will be displayed.

1 Select the CO<sub>2</sub> measurement unit from [mmHg]/[kPa]/[%].

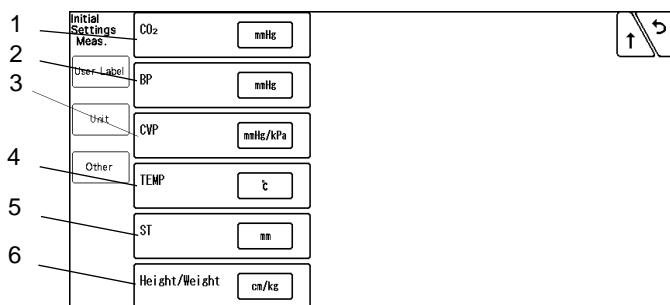
2 BP  
Select the BP and NIBP measurement unit from [mmHg]/[kPa].

3 CVP  
When the BP label is CVP (Central Venous Pressure), select the measurement unit from [mmHg/kPa]/[cmH<sub>2</sub>O].

4 TEMP  
Select the measurement unit from [°C] / [°F].

5 ST  
Select the ST measurement unit from [mV]/[mm].

6 Height/Weight  
Select the measurement unit from [cm/kg]/[in/lb].



## 2 Select the unit for each parameter.

### NOTE

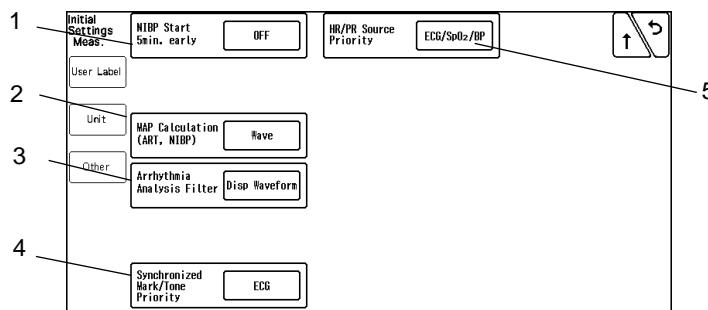
- When the BP, CVP unit is changed, the tabular/graphic trend data with the previous measurement unit will be deleted. Also, when the unit is changed, it is necessary to perform the alarm setup for the new measurement unit.

## Other Setup

On the "Other" setup screen, other measurement related setup can be performed.

### 1 Press the [Menu], [Initial Settings], [Meas.], [Other] keys.

► "Other" setup screen will be displayed.

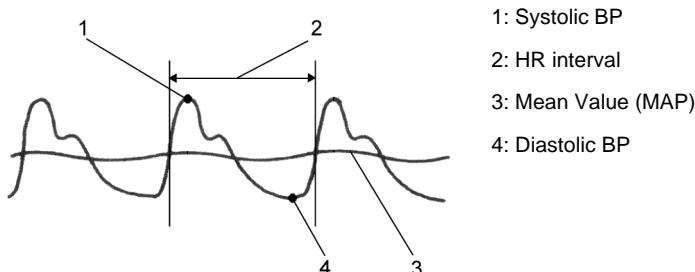


- [ON]: When [60min]/[120min] is selected for the measurement interval, the measurement will start 5 minutes before the set time.

If outputting the data to PC or other external device using the PC communication function of this system, an error may be generated to the NIBP measurement time depending on the input interval of the external device. As this system outputs the data at completion of NIBP measurement, if the external device inputs the data at 60 minutes interval, 60 minutes time lag will occur. By starting the measurement 5 minutes early, this time lag between the external device can be minimized.

- The mean blood pressure (MAP) value of BP and NIBP can be selected to be measured from the waveform or from calculation.

[Calc.]: Calculates the MAP value from the following calculation.  $MAP = (\text{Systolic BP} + \text{Diastolic BP} \times 2) / 3$   
 [Wave]: The following measurement will be performed.



- Sets the "Arrhythmia Analysis Filter".

[Disp. Waveform]: The filter selected on admit/discharge screen or ECG setup screen will be set.  
 [Fixed]: The filter will be fixed to 0.5 to 40Hz.

### NOTE

- When [Disp. Waveform] is selected, the filter will be set according to the selection on [Menu>Parameter>ECG]. If [Diag.] is selected, the filter will be 0.5 to 40Hz which is the same with [Fixed].

4 Set the "Synchronized Mark/Tone".

When [Auto] is selected for "Synchronized Mark/Tone", the priority of the synchronizing parameter can be set.

[ECG]: The synchronizing priority will be set in the order of ECG>SpO<sub>2</sub>>BP. The synchronized tone will be set to [ON].

[SpO<sub>2</sub>]: The synchronizing priority will be set in the order of SpO<sub>2</sub>>ECG>BP. The synchronized tone will be set to [ON].

5 Set the display priority of the parameter to be displayed inside the HR/PR numeric data box.

This priority setting will be applied when [Auto] is selected for "HR/PR", or when [HR/PR] user key is used to switch the HR/PR source.

Select the priority order from the dropdown list.

For example, if [ECG/SpO<sub>2</sub>/BP] is selected, HR/PR source will be set in the priority of ECG>SpO<sub>2</sub>>BP.

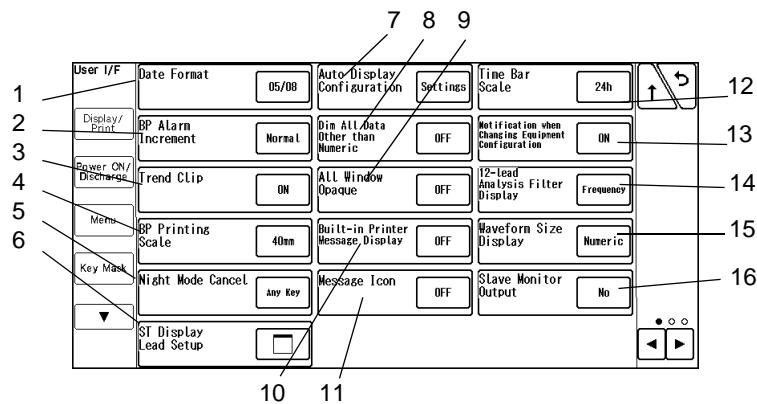
## User I/F

### Display/Print Setup

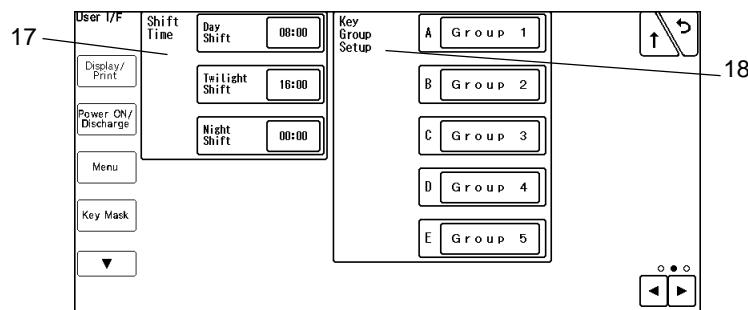
On the display/print setup screen, initial settings for display/printing can be performed.

- 1 Press the [Menu], [Initial Settings], [User I/F] keys.

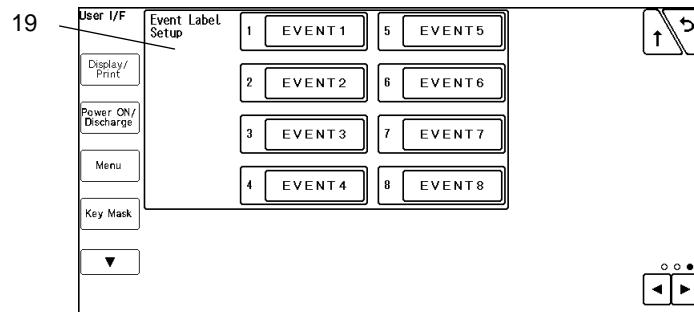
► The "Display/Print" setup screen will be displayed.



First Page



Second Page



Third Page

1 The selected format will be applied to display and printing.

2 [Normal]/[Small] can be selected.

	[Normal]	[Small]
0 to 50mmHg	2mmHg increment	
55 to 300mmHg	5mmHg increment	1mmHg increment
0 to 7.0kPa	0.2kPa increment	
7.5 to 40.0kPa	0.5kPa increment	0.1kPa increment

3 If the measurement on the graphic trend display exceeds the vertical axis scale, whether or not to display the exceeded portion can be selected.

[ON]: The exceeded portion will be displayed in straight line at the upper or lower limit.

[OFF]: The exceeded portion will not be displayed.

4 Select the printing scale height for the BP1 to 6 waveform.

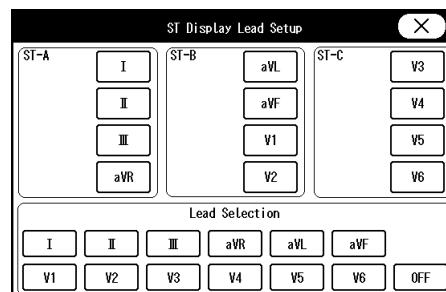
5 Select the procedure to cancel the night mode when [No Change]/[Darker]/[Dark] is set.

[Any Key]: The night mode can be cancelled by pressing any key on the screen.

[Night Mode Key]: The night mode can be cancelled by pressing the [Night Mode] key on the user key or on the menu screen.

6 The ST lead to be displayed for ST-A to ST-C can be set.

Set the lead from the selection below to the key displayed in blue.



7 The BP display format ([Overlap]/[Separate]) and layout ([Standard/Right]/[Standard/Left]) for automatic display configuration can be set.



8 [ON]: The display brightness of unit, alarm limit, etc. displayed inside the numeric data box will be dimmed.  
[OFF]: The display brightness will not be dimmed.

9 [OFF]: The window will become translucent allowing to view the waveform displayed behind the window.  
[ON]: The window will not become translucent.

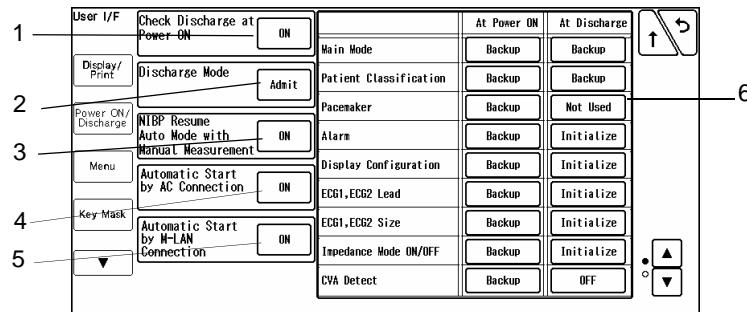
- 10 [OFF]: The built-in printer status message will be displayed on the home display.  
[ON]: The built-in printer status message will not be displayed.
- 11 Select [ON]/[OFF] for "Message Icon".  
When there are many numeric data display, the parameter key size will be reduced which may disable the message to be displayed inside the parameter key.  
A message icon will be displayed instead to notify that a message is present.
- 12 The scale of the time bar can be set.  
[24h]: The time bar will be displayed in 24 hours scale.  
[48h]: The time bar will be displayed in 48 hours scale.
- 13 Select [ON]/[OFF] for "Notification when Changing Equipment Configuration".  
[ON]: A confirmation message will be displayed when equipment configuration is changed. (Connector ON/OFF, etc.)  
[OFF]: A confirmation message will not be displayed even when equipment configuration is changed.
- 14 The display type for the 12-lead analysis filter can be selected.  
The filter indication on the 12-lead analysis display and printing will change with this selection.  
[Frequency]: The set frequency (ex. [25Hz]) will be displayed.  
[Filter Type]: The filter type (ex. [MF\_ST], [DF\_WK]) will be displayed.
- 15 The waveform size display on the home display can be selected from [Numeric]/[Bar].  
[Numeric]: The waveform size for the ECG, RESP, SpO<sub>2</sub> will be displayed in numerics.  
[Bar]: The waveform size will be indicated by a bar.
- 16 Whether or not to output to slave monitor can be selected.  
[Yes]: The display will be output to the slave monitor.  
[No]: Even if the slave monitor is connected, the display will not be output to the slave monitor.
- 17 By setting the time for "Day Shift", "Twilight Shift", "Night Shift", the time bar displayed at the upper part on the data/waveform review screen will be displayed in different colors by each shift time.  
Day Shift: Yellow  
Twilight Shift: Green  
Night Shift: Blue
- 18 8 user keys can be registered for each group. The label for the key group can be also set.
- 19 8 event labels (Surgery, etc.) can be registered. By setting [Event] on the user key, the registered event label can be printed at any time.

## Power ON/Discharge

On this menu, monitoring operation when the power is turned ON or when a patient is discharged can be performed.

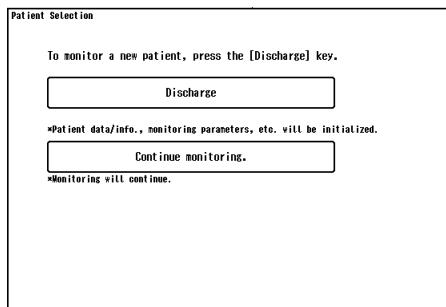
- 1** Press the [Menu], [Initial Settings], [User I/F], [Power ON/Discharge] keys.

► The following screen will be displayed.



- 1 The trend data will be stored even after the power is turned OFF. To start monitoring a new patient, it is necessary to perform discharge procedure on the "Admit/Discharge" menu, and clear the data of previous patient. If previous data remains at power ON, whether or not to display the discharge confirmation window can be selected.

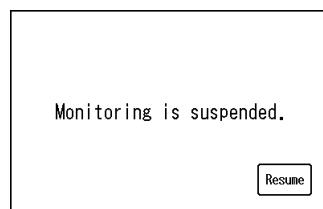
[OFF]: The discharge confirmation window will not be displayed and monitoring will be immediately started.  
 [ON]: The discharge confirmation window will be displayed if previous data remains when the power is turned ON.



- 2 Monitoring condition after the patient has discharged can be selected.

[Admit]: Monitoring will continue even after the discharge operation has been performed.

[Monitor Suspend]: Monitoring will be suspended after the discharge operation. The numeric data display will be cleared, and alarm generation, NIBP periodic measurement, periodic printing will not be performed.



*Display during monitoring is suspended*

- 3 [OFF]: At power ON, NIBP auto mode will resume even when the previous patient is discharged.

[ON]: At power ON, NIBP auto mode will resume by starting a manual measurement for the newly admitted patient.

Until the NIBP auto mode is resumed or the interval is changed, "Standby" will be displayed inside the NIBP numeric data box.

- 4 Whether or not to automatically turn ON the patient monitor at AC cable connection can be selected.

[ON]: Patient monitor will automatically start when the AC cable is connected.

Standby switch does not have to be pressed to start the monitor. However, it will not automatically start if the battery is installed.

[OFF]: Patient monitor will not automatically start when the AC cable is connected.

Press the standby switch to start the monitor.

- 5 Whether or not to automatically turn ON the patient monitor at module cable connection can be selected. This function can be used when connected with other system.

- 6 The backup status when the power is turned ON and when the patient is discharged can be set for each item.

[Backup]: The setting will be backed up.

[Initialize]: The setting will be initialized. The initialized settings are as follows.

#### *Selection other than Backup*

Item	Setup	Power ON/Discharge
Main Mode	Current Mode Main Mode 1 to 9	The setting will be initialized to the selected mode.
Patient Classification	Adult, Child, Neonate	The setting will be initialized to the selected patient classification.
Pacemaker	Not Used	"Not Used" will be set for "Pacemaker".

*Selection other than Backup*

Item	Setup	Power ON/Discharge
Alarm	Initialize	The setting will be initialized with the currently selected mode.
Display Configuration	Initialize	The setting will be initialized with the currently selected mode.
ECG1, ECG2 Lead	Initialize	The setting will be initialized with the currently selected mode.
ECG1 ECG2 Size	Initialize	The setting will be initialized with the currently selected mode.
Impedance Mode ON/OFF	Initialize	The setting will be initialized with the currently selected mode.
CVA Detect	OFF	CVA detection will be set to OFF.
NIBP Auto Mode	OFF	NIBP auto mode will be turned OFF.
	OFF, 2.5 min	If NIBP Auto Mode is OFF, 2.5 min. interval will be set.
	OFF, 5 min	If NIBP Auto Mode is OFF, 5 min. interval will be set.
BP Scale	Initialize	The setting will be initialized with the currently selected mode.
SpO <sub>2</sub> Averaging	Initialize	The setting will be initialized with the currently selected mode.
CO <sub>2</sub> Scale	Initialize	The setting will be initialized with the currently selected mode.
EtCO <sub>2</sub> Peak Duration	10 sec.	EtCO <sub>2</sub> peak picking duration will be set to 10 sec.

**⚠ CAUTION**

- When the discharge procedure is performed, patient data such as recall and trend will be initialized. The parameter and alarm will be reset according to the setting on [Menu]>[Initial Settings]>[User I/F]>[Power ON/Discharge].

**NOTE**

- The operation after the power is turned ON will be according to the setting made on [Initial Settings] > [User I/F] > [Power ON/Discharge]. However, if the power was turned OFF for less than 30 seconds, the setting before the power was turned OFF will remain.
- If the "Main Mode" setting is other than [Backup], the following cannot be set.  
Patient Classification, Alarm, Display Configuration, ECG1, ECG2 Lead, ECG1, ECG2 Size, Impedance Mode ON/OFF, CVA Detect, NIBP Auto Mode, BP Scale, SpO<sub>2</sub> Averaging, CO<sub>2</sub> Scale, EtCO<sub>2</sub> Peak Duration

## Menu Setup

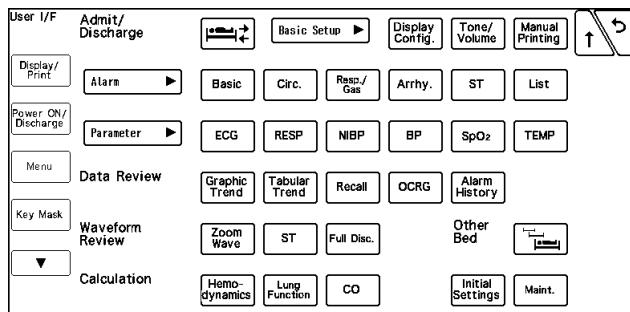
On the menu setup screen, the key displayed on the "Menu" screen can be customized.

The "Menu" screen is composed of 9 groups, which are "Admit/Discharge", "Basic Setup", "Alarm", "Parameter", "Data Review", "Waveform Review", "Calculation", "Initial Settings", "Maintenance".

The keys displayed for each group except "Initial Settings" and "Maintenance" can be customized.

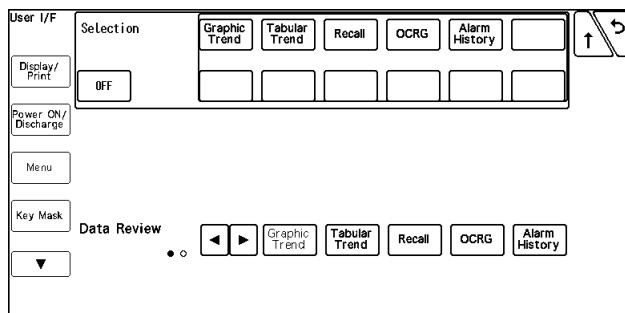
- 1** Press the [Menu], [Initial Settings], [User I/F], [Menu] keys.

► The menu setup screen will be displayed.



- 2** Press the group area to customize the keys.

► The key selection for the selected group will be displayed.



- 3** Select the key position from the lower area.

► The selected key position will be displayed in blue.

- 4** Select the key from the upper area to be assigned to the selected key position.

### REFERENCE

- The set key position will be automatically updated, but it can be also changed by pressing the key.

## Key Mask

On the key mask setup screen, unnecessary keys and tabs can be masked.

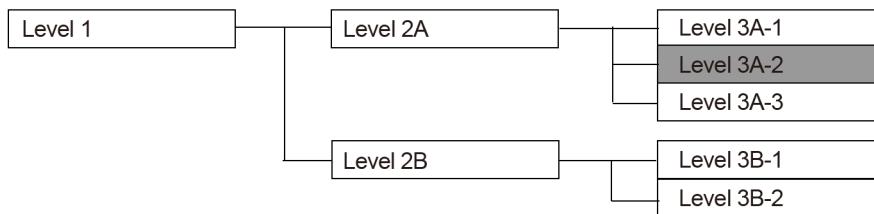
**NOTE**

- The masked key function will be disabled on this system, but it will not affect the central monitor operation.

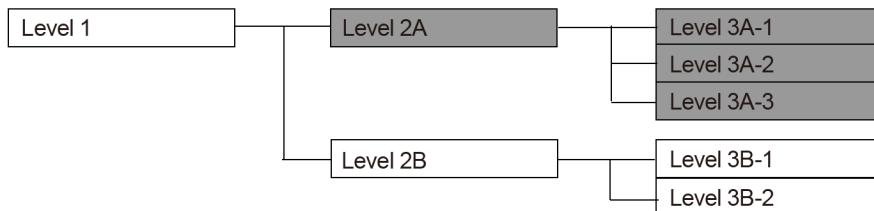
The setup items are in tree structure.

If a upper level key is masked, the lower level key will be also masked.

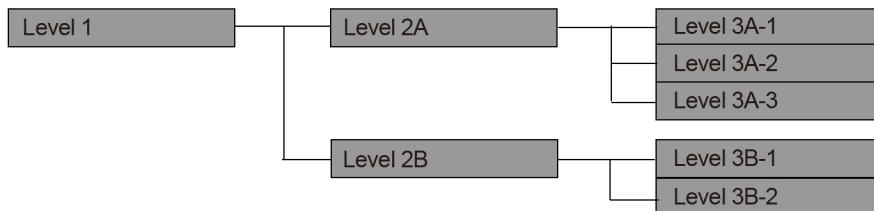
For the following tree structure, if "Level 3A-2" is masked, only this item will be masked.



If "Level 2A" is masked, the masked items will be as follows.

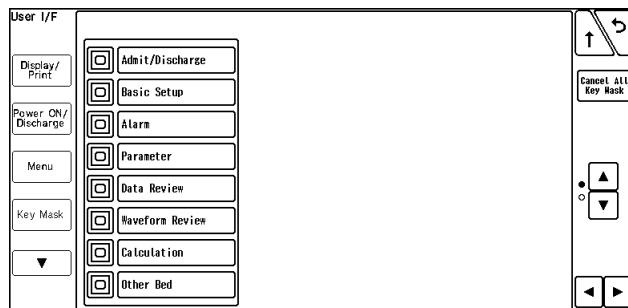


If "Level 1" is masked, the masked items will be as follows.



**1** Press the [Menu], [Initial Settings], [User I/F], [Key Mask] keys.

► The key mask setup screen will be displayed.

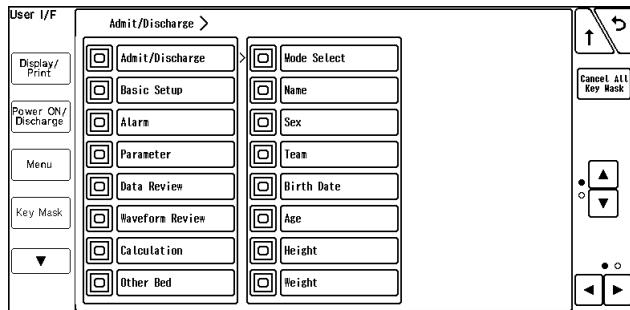


**2** Select the item to perform the setting.

**NOTE**

- If there are no lower level items for the selected item, the display will not change.

- The lower level items will be displayed.



**3** Press for the item to mask.

**NOTE**

- Only the items with displayed with blue frame can be masked. For the items with white frame, display the lower items to perform the mask setting.
- Even if the key mask setting is performed for the "Initial Setting", the [Key Mask] key cannot be masked.

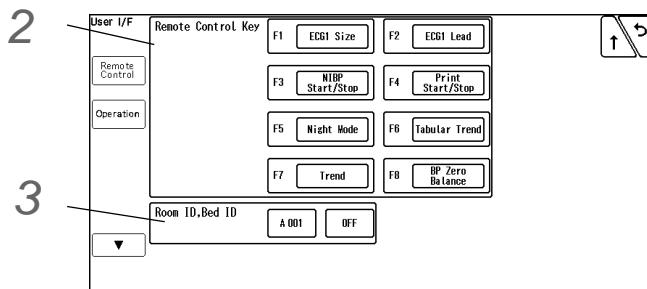
**4** Press for the item to display.

## Remote Control Setup

The initial settings for the remote control can be performed.

**1** Press the [Menu], [Initial Settings], [User I/F], [Remote Control] keys.

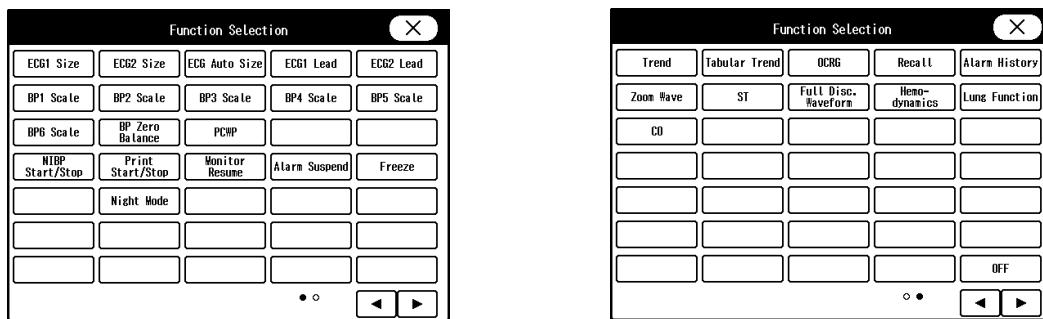
- The remote control setup screen will be displayed.



**2** Set the remote control function.

**1** Press the key for F1 to F8 to change the remote control function.

- The function selection window will be displayed.



**2** Press the key for the assigning function.

**3** Press .

#### Functions that can be assigned to the User Keys

Function	Key Operation
ECG1 Size ECG2 Size	Switches the ECG1 (ECG2) size each time the key is pressed. x1/4, x1/2, x1, x2, x4, x1/4
ECG1 Lead ECG2 Lead	Switches the ECG1 (ECG2) lead each time the key is pressed. 3-electrode: I, II, III, I 4-electrode: I, II, III, aVR, aVL, aVF, I 5-electrode: I, II, III, aVR, aVL, aVF, V, I
ECG Auto Size	Automatically adjusts the ECG size to 10mm. The automatic adjustment is effective only when the key is pressed.
BP1 (to BP6) Scale	Switches the BP1 (to 6) scale each time the key is pressed. The scales will differ depending on the label. ( Operation Manual "BP Parameter Setup" P7-29)
BP Zero Balance	Starts zeroing for all BP. It will not function unless the transducers for all BP is opened to air.
PCWP	If the BP label is PAP, PCWP input screen will be displayed.
NIBP Start/Stop	Starts/stops the NIBP measurement. Pressing this key will display a message on the monitor to press the "Check" key. When the "Check" key is pressed, the measurement will start. Pressing this key during the measurement will stop the measurement.
Print Start/Stop	Starts/stops the manual printing. The printing duration set on the manual printing setup screen will be applied.
Monitor Resume	Resumes monitoring when the monitoring is suspended.
Alarm Suspend	Suspends the alarm for fixed amount of time. The alarm function will resume after the set duration.
Freeze	The waveform trace will cease at the point when the key is pressed. By pressing the key again, the waveform trace will resume.
Night Mode	Turns ON/OFF the Night Mode.
Graphic Trend	The graphic trend will be displayed.
Tabular Trend	The tabular trend will be displayed.
OCRG	OCRG screen will be displayed.
Recall	Recall screen will be displayed.
Zoom Wave	The "Zoom Wave" window will be displayed.
ST	ST screen will be displayed.
Full Disc. Wave	Full disclosure waveform will be displayed.
Hemodynamics	Hemodynamics screen will be displayed.

*Functions that can be assigned to the User Keys*

Function	Key Operation
Lung Function	Lung Function screen will be displayed.
CO	CO measurement screen will be displayed. CO measurement will not be started.
Alarm History	The alarm history screen will be displayed.
OFF	Turns OFF the key operation.

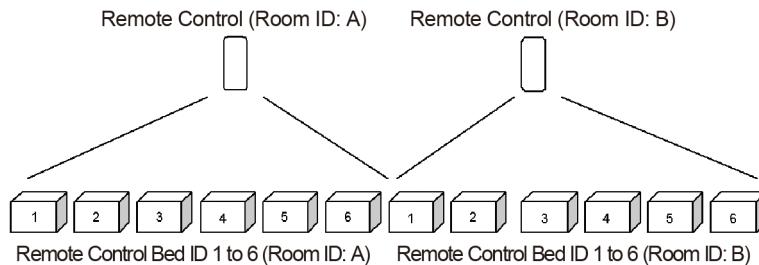
**3** Set the Room ID/Bed ID.

**CAUTION**

- Do not set the same remote control bed ID to more than one monitors on the same floor. Otherwise, it may cause to remote control more than one monitor at the same time.
- After the remote control setup, check that the remote control unit is properly operating.

**REFERENCE**

- For the CF-820 IR Remote Control Unit, if [P] is set for Room ID, the ID will be linked with the Room/Bed ID used on the DS-LAN (ID displayed on the upper left of the home display). If [A] to [H] is set, it will be a different ID for the remote control unit.
- One remote control unit can control maximum of 100 monitors for the Room ID [P], and maximum of 32 monitors for Room ID [A] to [H].
- For procedure to set the Room/Bed ID on the remote control unit, refer to the operation manual of the remote control unit.



**1** Press the key for "Room ID, Bed ID".

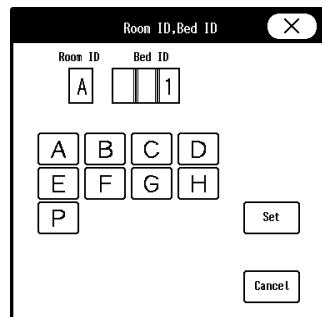
- ▶ The dropdown list will be displayed.

**2** Select from [ON] or [OFF].

- ▶ [ON]: The Room ID/Bed ID setup will be enabled.
- ▶ [OFF]: The Room ID/Bed ID setup will be disabled.

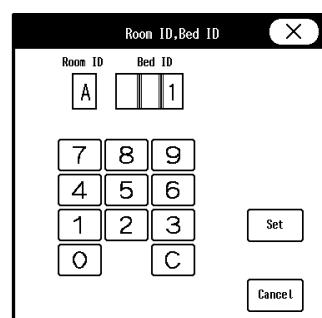
**3** Press the [A 001] key.

- ▶ The "Room ID, Bed ID" window will be displayed.



**4** Select from [A] to [H] / [P].

- ▶ [A] to [H]: The keys to input the Bed ID will be displayed.
- ▶ [P]: DS-LAN setting will be applied for the Bed ID.



**5** Use the numeric keys to enter the Bed ID.

**NOTE**

- Set the Bed ID in the range from 1 to 32.

**6** Press the [Set] / [Cancel] key.

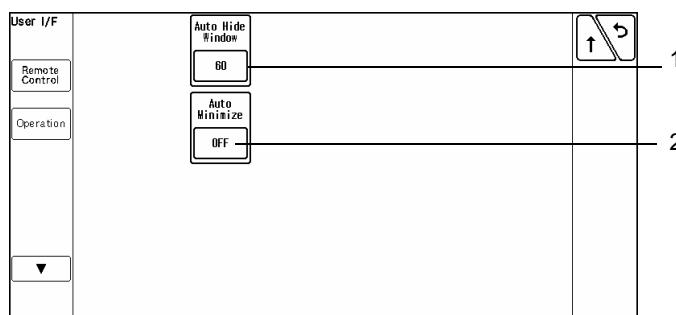
- ▶ [Set]: The entered Room ID/Bed ID will be set.
- ▶ [Cancel]: The entered Room ID/Bed ID will be cancelled.

## Operation Related Setup

The initial settings for the operation can be performed.

**1** Press the [Menu], [Initial Settings], [User I/F], [Operation] keys.

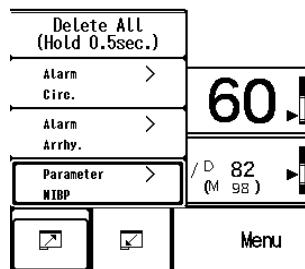
- ▶ The operation setup screen will be displayed.



- 1 The window can be automatically closed after fixed duration.  
 [OFF]: The window will not automatically close.  
 [5] to [60]: If no operation was performed for the set duration, the window will automatically close. However, the windows for "Data Review", "Waveform Review", "Calculation", "Initial Settings" will not automatically close.
- 2 When "Auto Hide Window" is enabled, whether or not to minimize the window instead of closing the window can be selected.  
 [ON]: The window will be minimized after the set duration for "Auto Hide Window".  
 [OFF]: The window will not be minimized.  
 The minimized window will be stored at the left end of the user key area.



To restore the minimized window, press this key and select the window to restore.



#### NOTE

- Maximum of 9 windows can be minimized. If exceeded, the minimized condition from the oldest window will be deleted respectively.

## System Setup

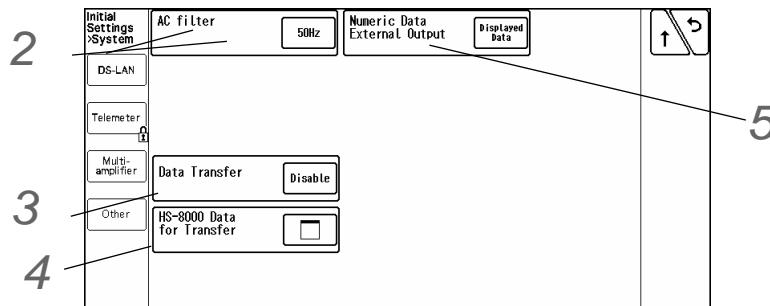
On the system setup menu, system related setup can be performed.

#### REFERENCE

- For setup of DS-LAN, Telemeter, Unit Module, refer to the corresponding chapter.  
 (☞ "Network System Construction" P2-1)  
 (☞ "Connection to the External Devices" P4-1)

- 1 Press the [Menu], [Initial Settings], [System], [Other] keys.

► The system setup screen will be displayed.



- 2 Set the AC filter frequency.

- 1 Press the key for "AC filter".  
▶ The dropdown list will be displayed.
- 2 Select from [50Hz]/[60Hz].

### 3 Set the "Data Transfer".

- 1 Press the key for "Data Transfer".  
▶ The dropdown list will be displayed.
- 2 Select from [Enable] or [Disable].
  - ▶ [Enable]: The data transfer function will be enabled.
  - ▶ [Disable]: The data transfer function will be disabled.

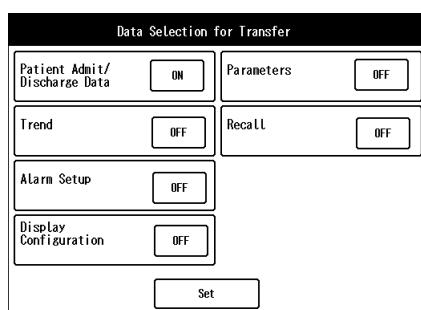
**⚠ CAUTION**

- ♦ If the data transfer function is enabled and alarm sound suspend function is ON, the alarm sound will be automatically suspended for 5 minutes when the Super Unit is connected.

### 4 Set the "HS-8000 Data for Transfer".

The data to be transferred can be changed on the patient selection screen which will be displayed when connected to the Super Unit.

- 1 Press the key for "HS-8000 Data for Transfer".  
▶ The "HS-8000 Data Selection for Transfer" screen will be displayed.



- 2 Select [ON]/[OFF] for each item.
  - ▶ [ON]: Data will be transferred when connected to the Super Unit.
  - ▶ [OFF]: Data will not be transferred.
- 3 Press the [Set] key to finalize the setup.

**⚠ CAUTION**

- ♦ To transfer the recall data, a specified SD card (SD-8G) which has been formatted on this system needs to be inserted to the Super Unit.  
(☞ "Formatting the SD Card (HS-8000)" P3-5)

### 5 Set the "Numeric Data External Output".

The numeric data to be output during DS-LAN, HLX, PC communication can be selected. This selection will be also applied to trend data storage.

- 1 Press the key for "Numeric Data External Output".

- ▶ The dropdown list will be displayed.
- 2** Select from [Displayed Data]/[All Data].
- ▶ [Displayed Data]: Only the displayed data on the home display will be output.
  - ▶ [All Data]: All data will be output.

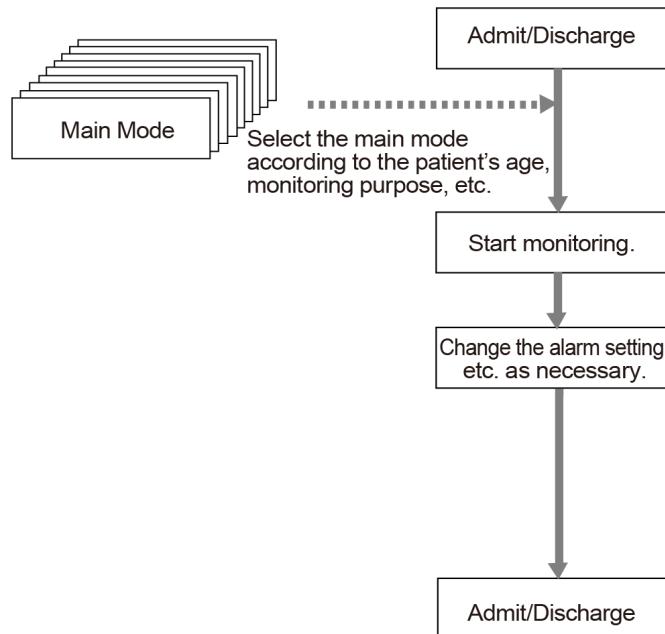
## User Mode Registration

This section explains about the user mode registration.

### About the User Mode

For the user mode, up to 9 main modes of display configuration and alarm settings can be registered according to the patient's age and monitoring purpose.

By programming the main mode, the alarm setups and display configuration setups at admittance of patient can be simplified by just selecting one of the modes. It is recommended to program the mode in rough classification such as patient's age, monitoring purpose (ICU or surgery), and if necessary, perform unique setup for each patient.



#### □ Items that can be registered for the Main Mode

The following items can be registered for the main mode.

- ♦ Mode Name
- ♦ Patient Classification
- ♦ Alarm
- ♦ Display Configuration
- ♦ Manual Printing
- ♦ Auto Printing
- ♦ Sound
- ♦ Color
- ♦ Brightness
- ♦ Night Mode Setup

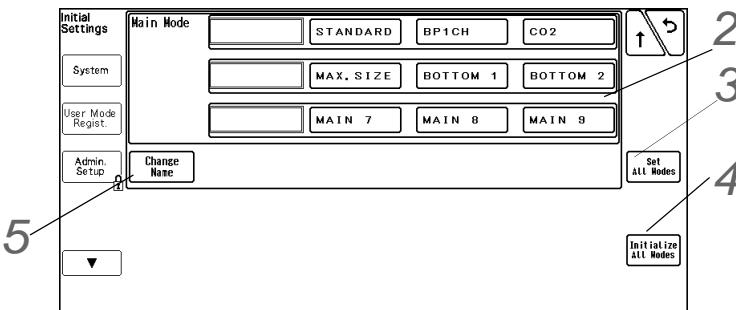
- ♦ Parameter Setup
- ♦ Graphic/Tabular Trend Display
- ♦ Synchronized Mark/Tone
- ♦ RR/APNEA Alarm Source

## To Program the User Mode

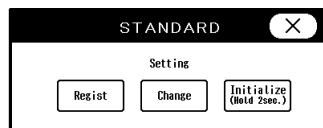
This section explains how to register/change the user mode.

- 1** Press the [Menu], [Initial Settings], [User Mode Regist.] keys.

► User mode registration screen will be displayed.



- 2** By pressing the key for each user mode, the operation selection window will be displayed.



- [Regist]: The current monitoring settings will be registered to the selected key.  
 ► [Change]: User mode settings can be changed.  
 The user mode setting window background will be displayed in pink.  
 ► [Initialize]: The settings for the selected key will be initialized.

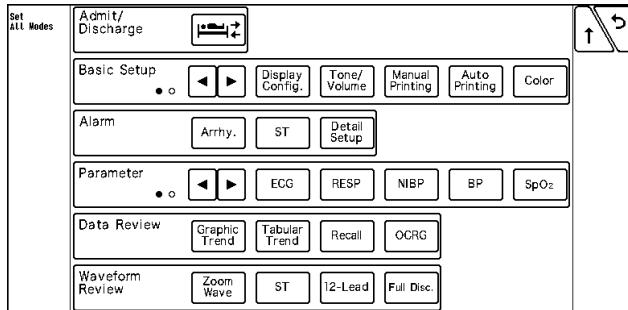
### NOTE

- ♦ When a user mode is registered, changed, or initialized, the monitoring mode will change to the selected user mode. The alarm settings of the selected alarm system will be applied.

- 3** The item to set the same settings for all modes can be selected.

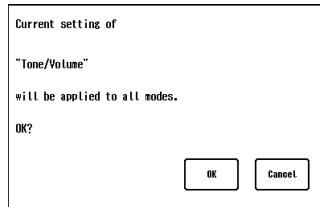
- 1** Press the [Set All Modes] key.

► The screen to select the setting item will be displayed.



**2** Press the key for the setting item.

► The confirmation window to apply the current setting to all modes will be displayed.



**3** Press [OK] to apply the current setting to all modes.

**4** All user modes will be initialized.

**5** To change the name of user mode, press the [Change Mode Name] key and then select the key for the user mode to change the name.



# Chapter 6 Setup Item/Default Value

Setup Item .....	6-1
Initial Settings .....	6-1
External Connection (Pin Assignments) .....	6-19
RS-232C Connector Output Signal .....	6-19
Status I/O Signal (Status II Connector 1) .....	6-19
Status I/O Signal (Status II Connector 2) .....	6-20



# Chapter 6 Setup Item/Default Value

## Setup Item

This section lists selection, default setting, and backup status for each setup item.

The following indicates the selection, default setting and backup status for each setup item.

### Initial Settings

#### Initial Settings (Alarm)

Item	Details	Default	Backup
Alarm System	Fukuda Tone, Melodic Tone, Standard Tone	Standard Tone	Yes
Basic Alarm Parameter	Each Parameter (S, D, M can be specified for BP)	HR, SpO <sub>2</sub> , NIBP-S, CO <sub>2</sub> Et	Yes
Asystole, VF, VT Alarm	Always ON, ON/OFF	Always ON	Yes
Buzzer Tone at Speaker Failure	Enable, Disable	Enable	Yes
Suspend Arrhy. Analysis during Noise Interference	ON, OFF	OFF	Yes
Low Limit for Alarm Volume	Vital Alarm: Urgent Vital Alarm: Caution Vital Alarm: Status Ventilator Alarm Status Alarm: Urgent Status Alarm: Caution Status Alarm: Status Other Bed Alarm	11 levels	0 0 0 0 0 0 0 0
Alarm Indicator Setup	Level S <sup>*1</sup> Level H Level M Level L Ventilator Alarm Synchronize with HR/RR	Pattern A to J, OFF	Pattern A Pattern A Pattern E Pattern F Pattern A OFF
Alarm Level <sup>*2</sup>	DS-LAN Standard Setup, User Setup	DS-LAN Standard Setup	Yes
Numeric Data	HR ST BP1 to 6 PR_IBP SpO <sub>2</sub> PR_SpO <sub>2</sub> NIBP TEMP1 to 6 Tb	S, H, M H, M H, M H, M H, M H, M H, M H, M, L H, M, L	M M M M M M M L L

Item	Details	Default	Backup
RR APNEA CO <sub>2</sub> In CO <sub>2</sub> Et SpCO SpMet SpHb	H, M, L	M	Yes
	H, M, L	H	Yes
	H, M	M	Yes
	H, M	M	Yes
	H, M, L	L	Yes
	H, M, L	L	Yes
	H, M, L	L	Yes
Arrhythmia	Asystole	S, H	H
	VF	S, H	H
	VT	S, H	H
	Slow VT	H	H
	Tachy	S, H	H
	Brady	S, H	H
	Run	H, M	M
	Bigeminy	H, M, L	L
	Trigeminy	H, M, L	L
	Pause	H, M	M
	Couplet	H, M, L	L
	Frequent	H, M, L	L
Technical	SpO <sub>2</sub> Low Perfusion	L, N	L
	Check NIBP cuff, hose	M, L, N	L
	NIBP meas. failed. (**-**)	M, L, N	M

\*1: This setting is selectable only when [Fukuda Tone] is set for "Alarm System".

\*2: Set the Alarm Level to [User Setting] before setting the alarm level for each parameter.

**Initial Settings (Measurement)**

Item		Details	Default	Backup
NIBP Start 5 min. early		ON, OFF	OFF	Yes
MAP Calculation (ART, NIBP)		Waveform, Calculation	Waveform	Yes
Arrhythmia Analysis Filter		Disp Waveform, Fixed	Disp. Waveform	Yes
Synchronized Mark/Tone		ECG, SpO <sub>2</sub>	ECG	Yes
HR/PR Source Priority		ECG/SpO <sub>2</sub> /BP, ECG/BP/SpO <sub>2</sub> , SpO <sub>2</sub> /ECG/BP, SpO <sub>2</sub> /BP/ECG, BP/ECG/SpO <sub>2</sub> , BP/SpO <sub>2</sub> /ECG	ECG/SpO <sub>2</sub> /BP	Yes
BP User Label	Label 1	3 alphanumeric characters	US1	Yes
	Label 2		US2	
	Label 3		US3	
	Label 4		US4	
	Label 5		US5	
TEMP User Label	Label 1	3 alphanumeric characters	US1	Yes
	Label 2		US2	
	Label 3		US3	
	Label 4		US4	
	Label 5		US5	
	Label 6		US6	
	Label 7		US7	
Measurement Unit	CO <sub>2</sub>	mmHg, kPa, %	mmHg	Yes
	BP	mmHg, kPa	mmHg	Yes
	CVP	mmHg/kPa, cmH <sub>2</sub> O	mmHg/kPa	Yes
	TEMP	°C, °F	°C	Yes
	ST	mm, mV	mm	Yes
	Height/Weight	cm/kg, in/lb	in/lb	Yes
Catheter Manufacturer for CC Input	Manufacturer 1	8 alphanumeric characters	BIOSENS	Yes
	Manufacturer 2		ARGON	
	Manufacturer 3		EDWARDS	

**Initial Settings (User I/F)**

## Display/Print

Item		Details	Default	Backup
Date		07/19, Jul.19, 19 Jul.	07/19	Yes
BP Alarm Increment		Normal, Small	Normal	Yes
Trend Clip		ON, OFF	ON	Yes
BP Printing Scale		20, 40mm	40mm	Yes
Night Mode Cancel		Any Key, Night Mode Key	All Key	Yes
ST Display Lead Setup (A to C)		4 leads for each pattern of A to C I to V6, OFF	ST-A: I, II, III, aVR ST-B: aVL, aVF, V1, V2 ST-C: V3, V4, V5, V6	Yes

## Display/Print

Item		Details	Default	Backup
Auto Display Configuration	BP Format	Overlap, Separate	Overlap	Yes
	Automatic Setup	Standard/Right, Standard/Left	Standard/Right	Yes
Dim All Data Other than Numeric		ON, OFF	OFF	Yes
All Window Opaque		ON, OFF	OFF	Yes
Built-in Printer Message Display		ON, OFF	OFF	Yes
Message Icon		ON, OFF	OFF	Yes
Time Bar Scale		24h, 48h	24h	Yes
Notification when Changing Equipment Configuration		ON, OFF	ON	Yes
12-Lead Analysis Filter Display		Frequency, Filter Type	Frequency	Yes
Waveform Size Display		Numeric, Bar	Numeric	Yes
Slave Monitor Output		Yes, No	Yes	Yes
Shift Time	Day Shift	Selectable Time	08:00	Yes
	Twilight Shift		16:00	Yes
	Night Shift		00:00	Yes
Key Group Setup	Label A to E	8 alphanumeric characters	Blank*	Yes
	A to E	Up to 8 user keys can be registered to each group (Home, Key Lock, Menu, Mode Select, HR/PR, ECG Size (All Leads), Alarm History, NIBP Auto Mode, Alarm Setup (All) (Basic), Other Bed, Print (LBP) Cancel, Alarm Silence, Admit/Disch., Alarm Suspend, Rapid Discharge, NIBP Start/Stop, HR/PR Source, NIBP Cont., BP Zero, Print Start/Stop, Scale, Monitor Suspend, SpO <sub>2</sub> Display ON/OFF, Night Mode, CO <sub>2</sub> Display ON/OFF, Freeze, Auto Display Config., ST, Short Trend ON/OFF, PCWP, Transparent Window ON/OFF, Hemodynamics, Change Palette, Lung Function, Graphic Trend, Full Disc. Wave, Tabular Trend, Tone/Volume, NIBP List, Recall, OCRG, Manual Printing, Display Config., Time/Date, Stopwatch, Standard, BP1ch, CO <sub>2</sub> , Maximum, Bottom 1, Bottom 2, Main 7, Main 8, Main 9	None	Yes

## Display/Print

Item		Details	Default	Backup
Event Label Setup	Event 1	8 alphanumeric characters	Event 1	Yes
	Event 2		Event 2	Yes
	Event 3		Event 3	Yes
	Event 4		Event 4	Yes
	Event 5		Event 5	Yes
	Event 6		Event 6	Yes
	Event 7		Event 7	Yes
	Event 8		Event 8	Yes

## Power ON/ Discharge

Item		Details	Default	Backup
Check Discharge at Power ON		ON, OFF	ON	Yes
Discharge Mode		Admit, Monitor Suspend	Admit	Yes
NIBP Resume Auto Mode with Manual Measurement		ON, OFF	ON	Yes
Automatic Start by AC Connection		ON, OFF	ON	Yes
Automatic Start by M-LAN Connection		ON, OFF	ON	Yes
At Power ON Backup/Initialize	Patient Classification	Backup, Adult, Child, Neonate	Backup	Yes
	Main Mode	Backup, Current Mode, Standard, BP 1ch, CO <sub>2</sub> , Maximum, Bottom 1, Bottom 2, Main 7, Main 8, Main 9	Backup	Yes
	Pacemaker	Backup, Not Used	Backup	Yes
	Alarm	Backup, Initialize	Backup	Yes
	Display Configuration	Backup, Initialize	Backup	Yes
	ECG1, ECG2 Lead	Backup, Initialize	Backup	Yes
	ECG1/ECG2 Size	Backup, Initialize	Backup	Yes
	Impedance Mode ON/OFF	Backup, Initialize	Backup	Yes
	CVA Detect	Backup, OFF	Backup	Yes
	NIBP Auto Mode	Backup, OFF OFF->2.5 min. OFF->5 min.	Backup	Yes
	BP Scale	Backup, Initialize	Backup	Yes
	SpO <sub>2</sub> Averaging	Backup, Initialize	Backup	Yes
	CO <sub>2</sub> Scale	Backup, Initialize	Backup	Yes
	EtCO <sub>2</sub> Peak Duration	Backup, 10 sec.	Backup	Yes
At Discharge Backup/Initialize	Patient Classification	Backup, Adult, Child, Neonate	Backup	Yes
	Main Mode	Backup, Current Mode, Standard, BP 1ch, CO <sub>2</sub> , Maximum, Bottom 1, Bottom 2, Main 7, Main 8, Main 9	Backup	Yes
	Pacemaker	Backup, Not Used	Not Used	Yes
	Alarm	Backup, Initialize	Initialize	Yes
	Display Configuration	Backup, Initialize	Initialize	Yes

## Power ON/ Discharge

Item	Details	Default	Backup
ECG1, ECG2 Lead ECG1/ECG2 Size Impedance Mode ON/OFF CVA Detect NIBP Auto Mode BP Scale SpO <sub>2</sub> Averaging CO <sub>2</sub> Scale EtCO <sub>2</sub> Peak Duration	Backup, Initialize	Initialize	Yes
	Backup, Initialize	Initialize	Yes
	Backup, Initialize	Initialize	Yes
	Backup, OFF	OFF	Yes
	Backup, OFF	OFF	Yes
	Backup, Initialize	Initialize	Yes
	Backup, Initialize	Initialize	Yes
	Backup, Initialize	Initialize	Yes
	Backup, 10 sec.	10 sec.	Yes

\*When blank, "Group n" will be displayed.

## Menu

Item	Details	Default	Backup
Menu Setup Admit/Discharge Basic Setup Alarm Parameter Data Review Waveform Review Calculation Initial Settings Maintenance Other Bed	OFF, Admit/Discharge	Admit/Discharge	Yes
	OFF, Tone/Volume, Display Config., Manual Printing, Auto Printing, Color, Brightness, Night Mode, Time/Date	Display Config., Manual Printing, Auto Printing, Tone/Volume, Time/Date, Color, Brightness, Night Mode	Yes
	OFF, Basic, Circ., Resp/Gas, Arrhy., ST, List, Detail Setup	Basic, Circ., Resp/Gas, Arrhy., ST, List, Detail Setup	Yes
	OFF, ECG, RESP, NIBP, BP, SpO <sub>2</sub> , TEMP, CO <sub>2</sub> , Ext. Device, Sp*	ECG, RESP, NIBP, BP, SpO <sub>2</sub> , TEMP, CO <sub>2</sub> , Ext. Device, Sp*	Yes
	OFF, Trend, Tabular Trend, Recall, OCRG, Alarm History	Trend, Tabular Trend, Recall, OCRG, Alarm History	Yes
	OFF, Zoom Wave, ST, 12-Lead, Full Disc.	Zoom Wave, ST, 12-Lead, Full Disc.	Yes
	OFF, Hemodynamics, Lung Function, CO	Hemodynamics, Lung Function, CO	Yes
	Initial Settings	Initial Settings	Yes
	Maintenance	Maintenance	Yes
	OFF, Other Bed	Other Bed	Yes

## Key Mask

Item	Details	Default	Backup
Key Mask Admit/Discharge Items Basic Setup Alarm Parameter Data Review Waveform Review Calculation Other Bed	ON/OFF	All ON	Yes
	ON/OFF	All ON	Yes
	ON/OFF	All ON	Yes
	ON/OFF	All ON	Yes
	ON/OFF	All ON	Yes
	ON/OFF	All ON	Yes
	ON/OFF	All ON	Yes
	ON/OFF	All ON	Yes

## Remote Control

Item		Details	Default	Backup
Remote Control Setup	Remote Control Key	ECG1/ECG2 Size ECG1 Lead, ECG2 Lead ECG Auto Size BP1 to 6 scale, PCWP, BP Zero Balance, NIBP Start/Stop, Print Start/Stop, Monitor Resume, Alarm Suspend, Freeze, Trend, Tabular Trend, OCRG, Recall, Zoom Wave, ST, CO, Hemodynamics, Lung Function, Night Mode, Full Disc. Wave, Alarm History, OFF	F1: ECG1 Size F2: ECG1 Lead F3: NIBP Start/Stop F4: Print Start/Stop F5: Night Mode F6: Tabular Trend F7: Graphic Trend F8: BP Zero Balance	Yes
	Room ID/Bed ID*	Room ID: A,B,C,D,E,F,G,H Bed ID: 1 to 32	A001, OFF	Yes

\*: Select [ON] for "Room ID, Bed ID" before entering the ID.

## Operation (Touch Panel, etc.)

Item		Details	Default	Backup
Window	Auto Hide Window	OFF, 5, 10, 20, 30, 60 sec.	60 sec.	Yes
	Auto Minimize	ON, OFF	OFF	Yes

Initial Settings (External Device)

Item		Details	Default	Backup
Main Unit Port	COM1	OFF, SV-900, SV-300, Servo-i/s, PB, Evita, Vigilance, PC Comm., BIS, INVOS*	OFF *	Yes
	COM2		OFF *	Yes
	Status II-1		OFF *	Yes
	Status II-2		OFF *	Yes
Network	Main Unit	IP Address	Numeric (0 to 9)	0.0.0.0
		Sub-Network Mask		0.0.0.0
		Default Gateway		0.0.0.0
	Printer	Network Printer	ON, OFF, DS-LAN	Not Used
		IP Address	Numeric (0 to 9)	0.0.0.0
		MAC Address	Alphanumeric (0 to 9, A to F)	00.00.00.00.00.00
		Printer Spec.	LIPS IV, ESC/page, PCL 5	LIPS IV
		Paper Size	A4, Letter	Letter
		Central Monitor	001 to 016	001
Status Output Setup	Sync. Signal Output	HR, RR	OFF *	Yes
	Output Logic	Positive Logic, Negative Logic	Negative Logic*	Yes
	Alarm Output Setup	OFF, APNEA, Level H, Level H,M, Level H,M,L	Level H*	Yes
Analog Output Setup	ECG	Disp. Lead, Selected Lead	Disp. Lead	Yes
	IBP Output 1	MPA1-1, MPA1-2, MPA2-1, MPA2-2, MPA3-1, MPA3-2	MPA1-1	Yes
	IBP Output 2		MPA1-2	Yes

\*: The external device that can be connected differs depending on the port.

**NOTE**

- For the item with \*mark, the setting is backed up. Performing F-start (turning the power ON with the rotary switch set to F) will not initialize the setting.

**Initial Settings (System)**

Item	Details	Default	Backup
DS-LAN	DS-LAN Setup	DS-LAN (10Mbps), DS-LAN (100Mbps)	DS-LANII (10Mbps)*
	Room ID	3 alphanumeric characters	BED-
	Bed ID	3 numerics	000
	DS-LAN Pat. ID Transmission Start Position	1st to 20th character	1st character
	Synchronize Hemodynamic Data with the Central Monitor	ON, OFF	OFF
	CO <sub>2</sub> (mmHg) Upper Limit of Transmission	No limit, 99mmHg	99mmHg
Telemeter	Function	ON, OFF	ON
	Channel	1001 to 1080, 2001 to 2120 3001 to 3040, 4001 to 4080 5001 to 5080, 6001 to 6080	Telemetry Depends on the telemetry transmitter module
	Group	00 to 63	00 *
	Transmitting Waveform	ECG1(ECG1, RESP, CO <sub>2</sub> , BP1, BP2, SpO <sub>2</sub> ), ECG2 (ECG1, ECG2, RESP/CO <sub>2</sub> , BP1, SpO <sub>2</sub> )	ECG1(ECG1, RESP, CO <sub>2</sub> , BP1, BP2, SpO <sub>2</sub> )
	CO <sub>2</sub> (mmHg) Upper Limit of Transmission	No limit, 99mmHg	99mmHg
Other	AC Frequency	50Hz, 60Hz	60Hz
	Data Transfer	Enable, Disable	Disable
	HS-8000 Data for Transfer Default Setting	Patient Admit/Discharge Data (ON, OFF)	ON
		Trend (ON, OFF)	ON
		Alarm Setup (ON, OFF)	OFF
		Display Configuration (ON, OFF)	OFF
		Parameters (ON, OFF)	OFF
		Recall (ON, OFF)	OFF
	Numeric Data External Output	Displayed Data All Data	Displayed Data

**NOTE**

- For the item with \*mark, the setting is backed up. Performing F-start (turning the power ON with the rotary switch set to F) will not initialize the setting.

**Initial Settings (User Mode Registration)**

Item	Details	Default	Backup
Main Mode* <sup>1</sup>	Mode Name 8 characters	Standard BP 1ch CO <sub>2</sub> Maximum Bottom 1 Bottom 2 Main 7 Main 8 Main 9	Yes

\* 1: The following settings can be registered for the main mode. Other than display configuration setting, the default setting will be applied to all modes.

- ♦ Patient Classification
- ♦ Display Configuration
- ♦ Manual Printing
- ♦ Auto Printing
- ♦ Time/Date
- ♦ Brightness
- ♦ Tone/Volume
- ♦ Color Setup
- ♦ Night Mode Setup
- ♦ Alarm
- ♦ Settings for Each Parameter
- ♦ Settings for Review Data (Graphic Trend, Tabular Trend, Recall, OCRG, ST, Zoom Wave, 12-Lead, Full Disc. Wave)

## Main Mode (Mode 1)

Item	Default	Backup
Item	Standard	Yes
Layout	Standard/Right(Large)	
Numeric Data	HR, SpO <sub>2</sub> , NIBP, RR_IMP	
Waveform	ECG1, SpO <sub>2</sub> , RESP	
User Key	User Key Down 1/2 User Key Down 2/2	Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, Home
Short Trend		OFF 15 min.
Detail Setup (Numeric Data)	Alarm Limit Display	Graph
	At Alarm Occurrence	Reversed
Detail Setup (Waveform)	Grid	ON
	Scale	ON
	Thickness	Regular
	Clip	ON
	Fill CO <sub>2</sub> Waveform	ON
	ST/VPC/Arrhy. Alarm Display	ON
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2
	BP Overlap	BP Overlap 1: BP1, BP2, BP3, BP4 BP Overlap 2: OFF BP Overlap 3: OFF
	ST Short Trend	Fill
	ST Wave	Ref.

## Main Mode (Mode 2)

Item		Default	Backup
Item	BP 1ch	Yes	
Layout	Standard/Right(Large)		
Numeric Data	HR, SpO <sub>2</sub> , NIBP, BP1, RR_IMP		
Waveform	ECG1, SpO <sub>2</sub> , RESP		
User Key	User Key Down 1/2	Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home	
	User Key Down 2/2	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, Home	
Short Trend		OFF	
		15 min.	
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	Reversed	
Detail Setup (Waveform)	Grid	ON	
	Scale	ON	
	Thickness	Regular	
	Clip	ON	
	Fill CO <sub>2</sub> Waveform	ON	
	ST/VPC/Arrhy. Alarm Display	ON	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	
	BP Overlap	BP Overlap 1: BP1, BP2, BP3, BP4 BP Overlap 2: OFF BP Overlap 3: OFF	
	ST Short Trend	Fill	
	ST Wave	Ref.	

## Main Mode (Mode 3)

Item	Default	Backup
Item	CO <sub>2</sub>	Yes
Layout	Standard/Right	
Numeric Data	HR, SpO <sub>2</sub> , NIBP, BP1, CO <sub>2</sub> , RR_IMP	
Waveform	ECG1, SpO <sub>2</sub> , BP1, CO <sub>2</sub>	
User Key	User Key Down 1/2 User Key Down 2/2	
	Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, Home	
Short Trend	OFF	
	15 min.	
Detail Setup (Numeric Data)	Alarm Limit Display At Alarm Occurrence	
Detail Setup (Waveform)	Grid Scale Thickness Clip Fill CO <sub>2</sub> Waveform ST/VPC/Arrhy. Alarm Display Block Cascade BP Overlap ST Short Trend ST Wave	

## Main Mode (Mode 4)

Item		Default	Backup
Item	Zoom	Yes	
Layout	Numeric/Max. Size		
Numeric Data	HR, SpO <sub>2</sub> , NIBP, NIBP List		
Waveform	ECG1		
User Key	User Key Down 1/2	Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home	
	User Key Down 2/2	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, Home	
Short Trend		OFF	
		15 min.	
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	3D	
Detail Setup (Waveform)	Grid	ON	
	Scale	ON	
	Thickness	Regular	
	Clip	ON	
	Fill CO <sub>2</sub> Waveform	ON	
	ST/VPC/Arrhy. Alarm Display	ON	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	
	BP Overlap	BP Overlap 1: BP1, BP2, BP3, BP4 BP Overlap 2: OFF BP Overlap 3: OFF	
	ST Short Trend	Fill	
	ST Wave	Ref.	

## Main Mode (Mode 5)

Item	Default	Backup
Item	Standard/Bottom	Yes
Layout	Standard/Bottom	
Numeric Data	HR, SpO <sub>2</sub> /PR, NIBP, RR_IMP	
Waveform	ECG1, SpO <sub>2</sub> , RESP	
User Key	User Key Down 1/2  User Key Down 2/2	
	Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home  Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, Home	
Short Trend	OFF	
	15 min.	
Detail Setup (Numeric Data)	Alarm Limit Display  At Alarm Occurrence	
	Graph  3D	
Detail Setup (Waveform)	Grid  Scale  Thickness  Clip  Fill CO <sub>2</sub> Waveform  ST/VPC/Arrhy. Alarm Display  Block Cascade  BP Overlap  ST Short Trend  ST Wave	ON  ON  Regular  ON  ON  Waveform Quantity: 2 Waveform: ECG1, ECG2  BP Overlap 1: BP1, BP2, BP3, BP4 BP Overlap 2: OFF BP Overlap 3: OFF  Fill  Ref.

## Main Mode (Mode 6)

Item		Default	Backup
Item		Standard/Bottom CO <sub>2</sub>	Yes
Layout		Standard/Bottom	
Numeric Data		HR, SpO <sub>2</sub> /PR, NIBP, BP1, RR(GAS), CO <sub>2</sub>	
Waveform		ECG1, SpO <sub>2</sub> , BP1, CO <sub>2</sub>	
User Key	User Key Down 1/2	Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home	
	User Key Down 2/2	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, Home	
Short Trend		OFF	
		15 min.	
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	3D	
Detail Setup (Waveform)	Grid	ON	
	Scale	ON	
	Thickness	Regular	
	Clip	ON	
	Fill CO <sub>2</sub> Waveform	ON	
	ST/VPC/Arrhy. Alarm Display	ON	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	
	BP Overlap	BP Overlap 1: BP1, BP2, BP3, BP4 BP Overlap 2: OFF BP Overlap 3: OFF	
	ST Short Trend	Fill	
	ST Wave	Ref.	

## Main Mode (Mode 7)

Item	Default	Backup
Item	Main Mode 7	Yes
Layout	Standard/Right(Large)	
Numeric Data	HR, SpO <sub>2</sub> , NIBP, RR_IMP	
Waveform	ECG1, SpO <sub>2</sub> , RESP	
User Key	User Key Down 1/2  User Key Down 2/2	
	Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home  Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, Home	
Short Trend	OFF	
	15 min.	
Detail Setup (Numeric Data)	Alarm Limit Display  At Alarm Occurrence	
Detail Setup (Waveform)	Graph  Reversed	
	Grid  Scale  Thickness  Clip  Fill CO <sub>2</sub> Waveform  ST/VPC/Arrhy. Alarm Display  Block Cascade  BP Overlap  ST Short Trend  ST Wave	ON  ON  Regular  ON  ON  Waveform Quantity: 2 Waveform: ECG1, ECG2  BP Overlap 1: BP1, BP2, BP3, BP4 BP Overlap 2: OFF BP Overlap 3: OFF  Fill  Ref.

## Main Mode (Mode 8)

Item		Default	Backup
Item	Main Mode 8	Yes	
Layout	Standard/Right(Large)		
Numeric Data	HR, SpO <sub>2</sub> , NIBP, RR_IMP		
Waveform	ECG1, SpO <sub>2</sub> , RESP		
User Key	User Key Down 1/2	Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home	
	User Key Down 2/2	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, Home	
Short Trend		OFF	
		15 min.	
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	Reversed	
Detail Setup (Waveform)	Grid	ON	
	Scale	ON	
	Thickness	Regular	
	Clip	ON	
	Fill CO <sub>2</sub> Waveform	ON	
	ST/VPC/Arrhy. Alarm Display	ON	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	
	BP Overlap	BP Overlap 1: BP1, BP2, BP3, BP4 BP Overlap 2: OFF BP Overlap 3: OFF	
	ST Short Trend	Fill	
	ST Wave	Ref.	

## Main Mode (Mode 9)

Item	Default	Backup
Item	Main Mode 9	Yes
Layout	Standard/Right(Large)	
Numeric Data	HR, SpO <sub>2</sub> , NIBP, RR_IMP	
Waveform	ECG1, SpO <sub>2</sub> , RESP	
User Key	User Key Down 1/2  User Key Down 2/2	
	Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home  Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, Home	
Short Trend	OFF	
	15 min.	
Detail Setup (Numeric Data)	Alarm Limit Display  At Alarm Occurrence	
Detail Setup (Waveform)	Graph  Reversed	
	Grid  Scale  Thickness  Clip  Fill CO <sub>2</sub> Waveform  ST/VPC/Arrhy. Alarm Display  Block Cascade  BP Overlap  ST Short Trend  ST Wave	ON  ON  Regular  ON  ON  Waveform Quantity: 2 Waveform: ECG1, ECG2  BP Overlap 1: BP1, BP2, BP3, BP4 BP Overlap 2: OFF BP Overlap 3: OFF  Fill  Ref.

## External Connection (Pin Assignments)

This section lists the connector pin assignments.

### RS-232C Connector Output Signal

#### COM1 Connector

No.	Signal Type	Note	Signal Level
1	RESET	Reset	Open Collector Output
2	EXT_IN+ (Logic)	External Input+	
3	TxD	Serial Transmission Data Output	RS232C
4	GND_ISO	Isolation Ground	
5	RxD	Serial Reception Data Input	RS232C
6	+5V	+5V Power Supply Input	+5V Power Supply (150mA)
7	EXT_IN-(Return)	External Input-	
8	NC	Not connected	

#### COM2 Connector

No.	Signal Type	Note	Signal Level
1	RESET	Reset	Open Collector Output
2	NC	Not connected	
3	TxD	Serial Transmission Data Output	RS232C
4	SG	GND	
5	RxD	Serial Reception Data Input	RS232C
6	+5V	+5V Power Supply Input	+5V Power Supply (150mA)
7	NC	Not connected	
8	NC	Not connected	

### Status I/O Signal (Status II Connector 1)

No.	Signal Type	Note	Signal Level
1	ALARM_QRS_OUT1	Alarm Output1	Logic TTL
2	ALARM_OUT2+	Alarm Output2+ (Isolation)	Photo MOS Relay Contact
3	TxD	Serial Transmission Data Output	RS232C*
4	RxD/ALARM1	Serial Reception Data Input /ALARM1 Input	RS232C* / Logic
5	ALARM2_IN+	Alarm Input 2 (Isolation)	Logic Input
6	ALARM2_IN-	Alarm Input 2 Return (Isolation)	
7	+5V	+5V Power Supply Input	+5V Power Supply (150mA)
8	ALARM_OUT2-	Alarm Output2- (Isolation)	Photo MOS Relay Contact
9	GND_ISO	Isolation Ground	

\*: If isolation is necessary for RS-232C and status connector, use alarm input 2 and output 2.

## Status I/O Signal (Status II Connector 2)

---

No.	Signal Type	Note	Signal Level
1	ALARM_QRS_OUT1	Alarm Output1	Logic TTL
2	ALARM_OUT2+	Alarm Output2+ (Isolation)	Photo MOS Relay Contact
3	TxD	Serial Transmission Data Output	RS232C*
4	RxD/ALARM1	Serial Reception Data Input /ALARM1 Input	RS232C* / Logic
5	ALARM2_IN+	Alarm Input 2 (Isolation)	Logic Input
6	ALARM2_IN-	Alarm Input 2 Return (Isolation)	
7	+5V	+5V Power Supply Input	+5V Power Supply (150mA)
8	ALARM_OUT2-	Alarm Output2- (Isolation)	Photo MOS Relay Contact
9	GND_ISO	Isolation Ground	

\*: If isolation is necessary for RS-232C and status connector, use alarm input 2 and output 2.

# Chapter 7 Replacement Parts

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# Chapter 7 Replacement Parts

## Periodic Replacement

To ensure reliability of safety, function, and performance of this equipment, the following parts must be replaced periodically.

When replacing, contact our service representative.



### CAUTION

- Replace the periodic replacement parts periodically as specified.

### NOTE

- The display unit utilizes LED for the backlight. Since this LED deteriorates by the life cycle, the display may become dark, scintillate, or may not light by the long term use. In such case, contact our service representative.

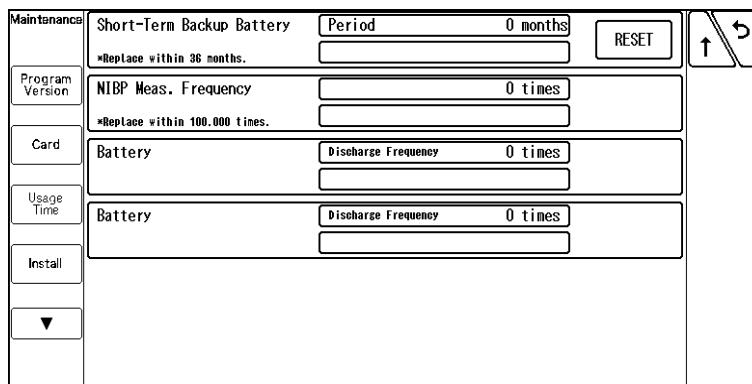
Periodic Replacement Parts	Periodic Replacement Period
DS-8200 system	
Short-Term Backup Battery (LC-8210)	3 years The usable life of the short-term backup battery will shorten if the power of the equipment is frequently turned ON and OFF. When the <LC-8210 Check Short-Term Battery> message is displayed, make sure to replace the short-term backup battery.
Lithium-Ion Battery Pack (BTO-008)	After 300 times of charge/discharge or 1 year of usage
HS-8000 series (Super Unit)	
NIBP Unit	100,000 times of measurement
HCP-800/810	
CO <sub>2</sub> Unit	30,000 hours

## To Check the Periodic Replacement Period

The usage hours for the part which requires periodic replacement can be displayed.  
It can be used as an indication of replacement period for each part.

- 1 Press the [Menu], [Maintenance], [Usage Time] keys.

► The Usage Time window will be displayed.



### REFERENCE

- The usage period or NIBP measurement frequency for each part will be displayed.

## Disposing the Equipment

### ⚠ CAUTION

- When disposing of this equipment, accessories, or components, use an industrial waste distributor. Do not dispose of as ordinary waste.

# Chapter 8 Cleaning/Disinfecting/Storing

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# Chapter 8 Cleaning/Disinfecting/Storing

## After Usage/Display Unit

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This section describes the handling of this equipment after usage and the display unit.

### After Usage

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- ♦ When unplugging the cables, make sure to pull from the connector part of the cable and avoid applying excessive force.
- ♦ Clean the unit, accessories, and cables, and keep them together in one place for next use.
- ♦ Always check for adequate supply of disposable accessories such as ECG electrodes, if any shortage, contact our service representative and supply as necessary.

### Display Unit

---

- ♦ The display unit utilizes LED for the backlight. Since this LED deteriorates by the life cycle, the display may become dark, scintillate, or may not light by the long term use. In such case, contact your nearest service representative.
- ♦ Although the LCD utilizes highly accurate picture elements, occasionally, there may be a few pixels which do not light or constantly light. However, this will not affect monitoring operation.
- ♦ Due to its material characteristic, the touch panel expands/contracts depending on the temperature/humidity. When the touch panel is left unused for a while, or when the ambient temperature is low, the surface film of the touch panel may expand, but this is not an abnormal condition.  
This expansion will be reduced in few hours or half a day after the power is turned ON.
- ♦ The surface of the touch panel is susceptible to scratches, therefore do not scratch or rub it using a hard item.

## Storing the Equipment and Recording Paper

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This section explains how to store the equipment and recording paper.

### Equipment

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- ♦ Store in a place where the equipment will not be exposed to splashing water.
- ♦ Store in a place where the equipment will not be adversely affected by atmospheric pressure, temperature, humidity, ventilation, sunlight, dust or atmosphere containing salt or sulfur.
- ♦ Store in a level area where the equipment is not exposed to vibration and shock (including during transportation).
- ♦ The following environmental conditions should be observed when storing the equipment.
  - ♦ Storage Temperature: -10 to 60°C
  - ♦ Storage Humidity: 10 to 95% (at 40°C) (non-condensing)
  - ♦ Atmospheric Pressure : 700 to 1060hPa

## Recording Paper

The recording paper is thermal type. Storage over an extended period of time at a high temperature may change the quality of the printed content, and make it illegible. When storing, follow the precautions below.

- ◆ Store in a place where light is shut off and avoid direct sunlight.
- ◆ Do not leave the paper in a high temperature (50 °C/122 °F and above).
- ◆ Do not store the paper in a polyvinyl chloride bag.
- ◆ Do not expose the paper to alcohol, hydrochloric acid, or ester ketone.
- ◆ Avoid using adhesive agents other than water based glue.

## Cleaning the Equipment and Sensors

This section explains how to clean the equipment and sensors.

### Touch Panel

Since the DS-8200 System incorporates a touch panel, finger prints and other stains are likely to appear on the touch panel. Follow the procedure below to clean the touch panel.

#### CAUTION

- ◆ Never use strong-acidic cleaning solution.
- ◆ A special coating is applied to the surface of the touch panel. Do not wipe the surface with a cloth or gauze with coarse texture. Wipe the surface with an eyeglass cleaning cloth.

**1** Press the [Key Lock] key on the Home Display for more than 2 seconds.

#### NOTE

- ◆ Assign the [Key Lock] key to the user key area in advance.  
( Operation Manual "To Configure the Display" P10-4)
- ◆ If the touch panel is not touched for 30 seconds, the key lock condition will be automatically cancelled. In such case, press the [Key Lock] key again.

- ▶ The "Key Locked" message is displayed.
- ▶ While this message is displayed, the touch panel key will be deactivated.
- ▶ If "LEAD OFF" or other message is displayed, the key lock message will not be displayed.



**2** Wipe the touch panel using a cleaning cloth.

**3** Press again the [Key Lock] key for more than 2 seconds.

- ▶ The message will disappear, and the key locked condition will be cancelled.

## Housing

Clean the housing using a tightly squeezed gauze or an absorbent cotton cloth dampened with alcohol or a neutral cleanser.

### CAUTION

- Clean the equipment frequently so stains can be removed easily.
- To prevent injury, it is recommended to wear gloves when cleaning the equipment.
- Do not allow liquids or cleaning solution to enter the equipment or connectors.
- Do not use organic solvents, thinner, toluene or benzene to avoid damaging the resin case.
- When sterilizing the entire room using a spray solution, pay close attention not to have liquids get into the equipment or connectors.
- Use only sterilizing alcohol or neutral detergent to clean the housing. The surface resin coating may be damaged, resulting in discoloration, scratches, and other problems.  
Ex.) chemical cloth, scrub brush, abrasive, polishing powder, hot water, volatile solvent and chemicals (cleanser, thinner, benzine, benzol, and synthetic detergent for house and furniture), or sharp-edged tools

## NIBP Cuff and Air Hose

Remove the rubber bag inside the cuff and wash it with neutral detergent. After drying it, place it back inside the cuff. For the CUF-8100 series cuff, wipe with disinfectant such as 70% alcohol. For other cuffs, refer to the manufacturer's guidelines.

## ECG Lead Cable/Relay Cable

Disinfect the ECG lead cable and relay cable according to the accompanying manual of the cables. Clean the ECG lead cable and relay cable using the procedure below.

**1** Wipe the cable using 70% isopropyl alcohol cotton.

**2** Dry it completely with air before reusing.

## BP Transducer

Disinfect the blood pressure transducers according to the manufacturer's guidelines. Do not reuse / re-sterilize the disposable type transducers.

## SpO<sub>2</sub> Sensor

---

Disinfect the SpO<sub>2</sub> sensor according to the manufacturer's guidelines. Do not reuse/sterilize the disposable SpO<sub>2</sub> sensor.

### Nellcor™ Sensor

- ♦ Do not soak the sensor in water or antiseptic solution.
- ♦ Wipe the DURASENSOR with disinfectant such as 70% alcohol. Do not disinfect by irradiation, steam, or ethylene oxide.
- ♦ OxiMax is a single-patient use type sensor. Do not reuse or resterilize.

### Masimo Sensor

- ♦ Do not immerse the sensor or patient cable in water or cleaning solution.  
(Sensors and connectors are not water-proof.)
- ♦ Do not disinfect the sensors and cables by irradiation, steam, or ethylene oxide.
- ♦ The Masimo disposable sensor can be reused on the same patient if the light emitting and receiving part is clean, and if it is still adhesive to the skin.  
The adhesiveness will return by completely drying the sensor after cleaning with alcohol.
- ♦ Disinfect the Masimo reusable sensor (LNOP® DCI) and patient cable according to the manufacturer's guidelines.
- ♦ When cleaning the Masimo reusable sensor (LNOP® DCI) and patient cable, disconnect them from the main unit, and follow the procedure below.

**1** Wipe the sensor and cable using 70% isopropyl alcohol cotton.

**2** Dry it completely with air before reusing.

## Temperature Probe

---

- ♦ Disinfect the temperature probe according to the manufacturer's guidelines.
- ♦ When cleaning the relay cable, follow the procedure below.

**1** Wipe the cable using 70% isopropyl alcohol cotton.

**2** Dry it completely with air before reusing.

## Cardiac Output Relay Cable

---

- ♦ Do not reuse / resterilize the cardiac output catheter.
- ♦ When cleaning, follow the procedure below.

**1** Wipe the cable using 70% isopropyl alcohol cotton.

**2** Dry it completely with air before reusing.

## Airway Adapter for Capnostat 5

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- ♦ Wash in lukewarm soapy water. Then dip it in antiseptic solution (ex. glutaraldehyde) for low-temperature sterilization. Dry after rinsing in sterile water.
- ♦ Use EOG (Ethylene Oxide Gas) to sterilize. Proper ventilation must be performed.
- ♦ Before re-using the airway adapter, make sure the window is dry and no residue is left. Check if the adapter is not damaged by the operation or cleaning / sterilization.



### CAUTION

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- ♦ Do not sterilize the airway adapter using autoclave methods.
  - ♦ Do not reuse / re-sterilize disposable airway adapter.
-



# Chapter 9 Maintenance Check

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# Chapter 9 Maintenance Check

## Daily and Periodic Check

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### Maintenance Check

---

Periodic check must be performed. When reusing the equipment which was left unused for a while, always check that the equipment operates properly and safely before use.

In this section, the maintenance check items that must be performed for this equipment are explained. To ensure safety, reliability, and high performance, a "Daily Check" and "Periodic Check" must be performed. Fukuda Denshi is not liable for any accidents arising from lack of maintenance.



#### CAUTION

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- Do not open the housing.
  - Do not allow alcohol or other liquids enter the equipment.
- 

### Periodic Check

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#### Daily Check

Perform the daily check according to the "Daily Check List".

(☞ Operation Manual "Daily Check" P4-1)

#### Periodic Check

Periodic inspection of medical electronic equipment is mandatory to prevent failures and accidents and to ensure safety and reliability.

Periodic inspection may be performed by each medical institution or by a third party by concluding a "Maintenance Contract".

For more details, contact your nearest service representative.

## Handling and Storage of Lithium-Ion Battery Pack (BTO-008)

This section describes the handling and storage of the BTO-008 battery pack. Refer also to the BTO-008 Operation Manual.

### □ Handling the Battery

- ♦ For uninterrupted monitoring, charge the battery when the battery level is low.
- ♦ When the battery operation time becomes short even after it is fully charged, the battery needs to be replaced.
- ♦ The battery should be charged at room temperature (10 to 30°C).
- ♦ The lithium-ion battery can only be charged in the specified operating temperatures of the equipment. Refer to the operation manual of the lithium-ion battery (BTO-008) for details.
- ♦ When using the battery for the first time, or using after leaving it for a while, make sure to charge the battery before use.

### □ Storing

To take advantage of the characteristic of the battery pack, pay attention to the following when storing.

#### Storage Temperature and Humidity for the Battery

- ♦ Store in an environment specified below without corrosive gas.

Storage Period	Storage Temperature	Storage Humidity
Within 30 days	-20 to 60°C	20 to 85% (non-condensing)
Within 90 days	-20 to 45°C	
Within 1 year	-20 to 20°C	

- ♦ Do not store in an environment outside the specified temperature range or excessive high humidity. This may result in leakage caused by expansion/contraction inside the battery or rusting of the metal part.

### □ Long-Term Storage

- ♦ If the battery is left installed in the monitor without use for a long period of time, the capacity recovery after storage may be degraded.

When storing the monitor for a long period, remove the battery from the monitor.

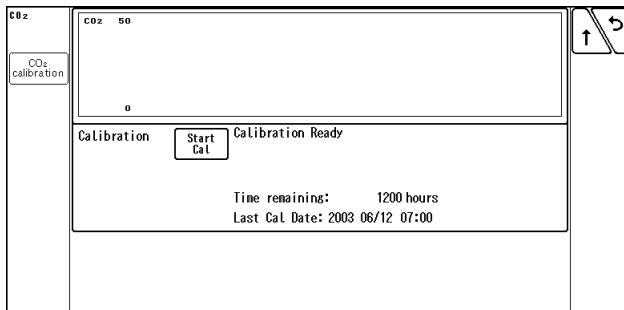
## CO<sub>2</sub> Calibration (HCP-800/HCP-810)

This section describes about the procedure of CO<sub>2</sub> gas calibration.

Perform calibration when 1 year has elapsed from the last calibration, or accumulated EtCO<sub>2</sub> measurement time exceeds 4,000 hours, or any measurement error is found.

**1**

Press the [Menu], [CO<sub>2</sub>] ("Parameter"), [CO<sub>2</sub> Calibration] to display the CO<sub>2</sub> calibration screen.



**2**

Press the [Start Cal] key and conduct calibration according to the displayed messages.

**3**

The message, <Feed CAL. GAS> will be displayed. Press the injection button and inject the calibration gas.

**4**

The message, <Cal. Gas can be removed> will be displayed. Stop pressing the injection button to cease the injection.

**5**

The message, <CAL. OK> will be displayed. "Last Cal. Date" will be updated to the current date.

- ▶ If any of the following messages is displayed, start the procedure again from step 2. <CAL. error>, <CAL GAS error>, <Auto Zero fail>, <No stable gas flow>, <CAL. failure>

**6**

Press the [Cal Complete] key to end the calibration.



### CAUTION

- Perform the calibration 5 minutes after turning ON the power on the HCP-800/HCP-810.
- Do not disconnect the sampling tube during calibration. If disconnected, calibration will cease.
- Conduct CO<sub>2</sub> calibration for the following case.
  - When the accumulated measurement time exceeds 1,200 hours from the first use. However, if the first calibration was performed before the accumulated measurement time reaches 720 hours, another calibration is required when the accumulated measurement time exceeds 1,200 hours from the first calibration.
  - When 12 months has elapsed or the accumulated measurement time has exceeded 4,000 hours from the previous calibration.
  - When EtCO<sub>2</sub> measurement is not stable or accuracy is degraded compared with other measuring device.
  - When the patient monitor was not used for a while, or when EtCO<sub>2</sub> was not measured for a while.
  - When a message, "Calibrate the CO<sub>2</sub> unit (HCP-800/HCP-810)" or "The periodic calibration of the CO<sub>2</sub> unit (HCP-800/HCP-810) is approaching" is displayed at power

ON.

- ♦ Dispose of calibration gas according to the regulation of each medical institution.

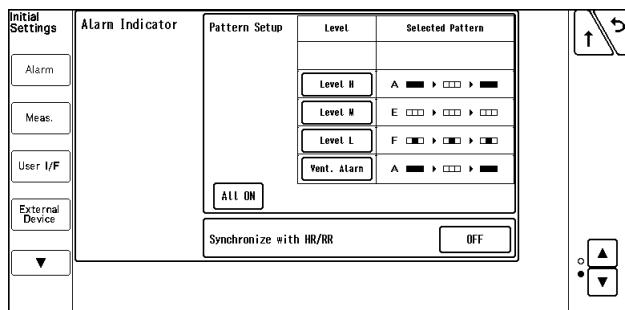
## Program Version

On the maintenance screen, software version of each unit can be verified.

**1**

Press the [Menu], [Maintenance] keys.

- The software version screen will be displayed.



- The software version, boot version, date, comment required for the DS-8200 System will be displayed.

- ♦ Display Unit Software (LC-8210)
- ♦ HS Adapter Software (HSB-80)
- ♦ Base Unit Software (BS-8200)
- ♦ HS-8000 Super Unit Software
- ♦ HR-800 Recorder Unit Software
- [Serial]: The information of the equipment connected to the serial connector of the Base Unit (BS-8210) will be displayed.

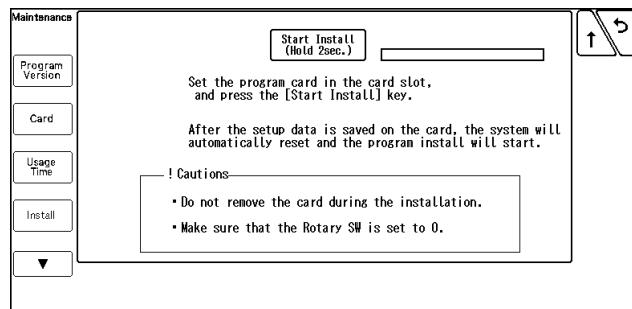
## Software Install

The software can be updated on the install screen.

**1**

Press the [Menu], [Maintenance], [Install] keys.

- The software install screen will be displayed.



**NOTE**

- ♦ Users cannot perform the software update process.  
Contact our service representative.
-



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Printed in Japan 4L0110320 201505