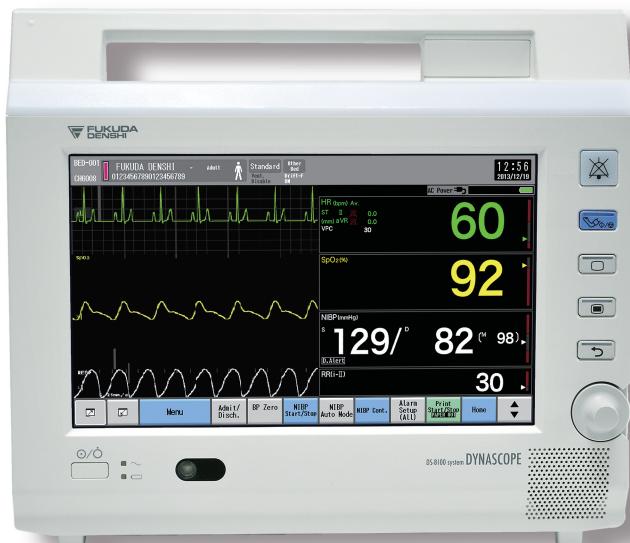


DYNASCOPE 8000 Series Patient Monitor

DS-8100 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-8100 System Version 02.



CAUTION 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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If this manual has pages missing or out of order, contact Fukuda Denshi for replacement.

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Preface

Introduction

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

For Safe Operation of the Equipment

- (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

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

<Intended Use>

Use of the Fukuda Denshi DynaScope Model DS-8100N/8100M Patient Monitor is indicated in those situations where observation of one or more of the following parameters on an individual patient may be required. ECG (waveform, heart rate, ST-Level and ventricular arrhythmias), respiration, non-invasive blood pressure (NIBP), pulse rate, arterial oxygen saturation (SpO₂), carboxyhemoglobin saturation (SpCO)*, methemoglobin saturation (SpMet)*, total hemoglobin concentration (SpHb)*, plethysmograph, temperature, invasive blood pressure (IBP), cardiac output, and carbon dioxide concentration (CO₂).

*: DS-8100M only

The target populations of the system are adult, pediatric and neonatal patients with the exception of the ST segment, arrhythmia analysis, and SpHb for which the target populations are adult and pediatric excluding neonates. These observations can include an audible and visual alarm if any of these parameters exceed values that are established by the clinician. The observations may include the individual or comparative trending of one or more of these parameters over a period of up to 24 hours. The DS-8100N/8100M Patient Monitor is indicated in situations where an instantaneous display of waveform, numeric and trended values is desired. The DS-8100N/8100M Patient Monitor is also indicated where a hard copy record of the physiological parameters, the alarms conditions or the trended values may be required.

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

- (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

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-8100 System is available from your local Fukuda Denshi sales representative.

Contact

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

Expression Used in This Manual

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

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 the 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, trend, recall, NIBP list, Tabular Trend, 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, brightness, night mode
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, power source and ground connection, trolley usage
2.Network System Construction	Network connection and setup
3.Using the CF card	Procedure to use the CF/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

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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
 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.

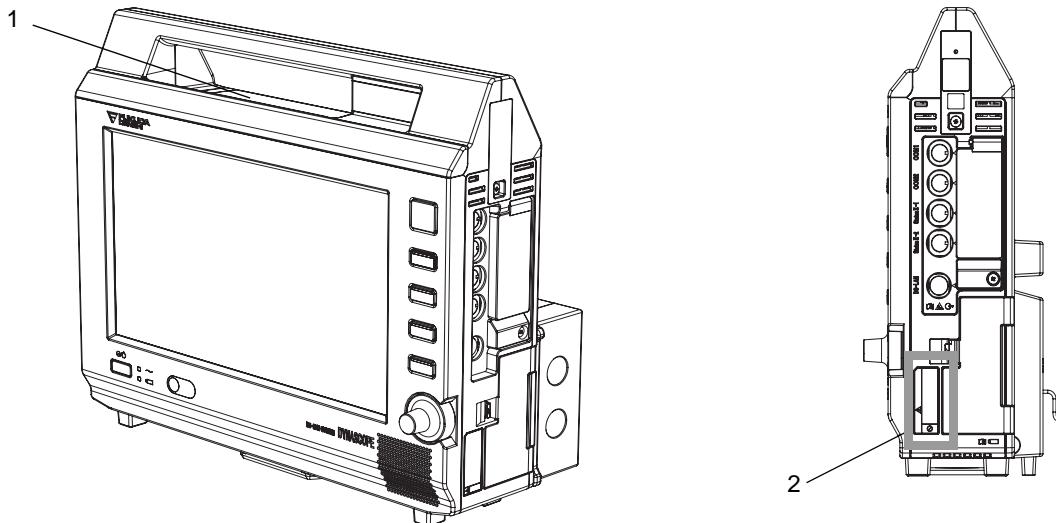
Warning Labels Attached to the Unit

Make sure to read the warning labels attached to the unit and comply with these requirements while operating the unit.

CAUTION

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

DS-8100 Series Main Unit



Warning Labels Attached to the Unit

1	<p>DANGER Risk of explosion if used in the presence of flammable anesthetics.</p> <p>CAUTION Before connecting, read instruction manual.</p> <p>CAUTION To reduce the risk of electric shock, do not remove the cover. Refer servicing to qualified service personnel.</p>
2	<p>DANGER</p> <p>• Use only the specified battery pack "BTO-008" for this equipment.</p> <p>• Do not disassemble or remodel the battery pack.</p>

Warning Label

Graphic Symbols

Refer following for the meaning of the symbols indicated on the equipment.

Symbol	Description
	Warning; indicated in yellow
	Follow operating instructions (Warning); indicated in blue Failure to follow operating instructions could place the patient or operator at risk.
	Follow operating instructions (Information)
	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
	Signal Input/Output
	Gas Input
	GAS Output
	Battery
	Alarm Silence Key: Silences the alarm.
	NIBP Start/Stop Key Starts/stops the NIBP measurement. Stops the measurement if pressed while measurement is in progress.
	Home Key: Displays the home display.
	Menu Key: Displays the menu screen.
	Previous Display: Displays the previous display.

Precautions for Safe Operation of Medical Electrical Equipment

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.
- ♦ Make sure to secure the monitor using the stand (OAO-66A), etc.

□ 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

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

Medical Telemetry

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.

Bidirectional Wireless Communications Module (TCON)

**CAUTION****Precautions about the Installation**

- ♦ The medical institution (hereinafter referred to as "Institution" must execute investigation required to prevent interference including types of radio waves, frequencies, and antenna power if wireless equipment is already installed and being used in the facility.
- ♦ Even if this equipment is installed within the range of radio communication, the communication may not be possible due to noise or multi-path phasing etc.
- ♦ If the TCON is installed in a line-of-sight distance where there are no obstacles or on the upper floors, unexpected long distance transmission may occur which may cause interference with nearby medical institution. Before using the TCON system, test the reception to make sure that it does not interfere with other channels. If the channel is used by other medical institution, change the channel ID.
- ♦ Do not install the TCON system in an area where it will be subject to splashing water. Water entering the equipment may cause the equipment to malfunction or be damaged.

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

- ♦ The Institution should appoint a person (hereinafter referred as the "Overall Manager" to manage the wireless devices for the whole facility.

- ♦ When installing TCON, the Overall Manager has to receive an explanation of the precautions for use of the TCON from the manufacturer or sales representative.
- ♦ The Overall Manager is responsible for the maintenance and storage of the equipment.
- ♦ 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 user needs to verify the transmitting/receiving operation before use.
- ♦ If interference or breakdown occurs in the communication, the TCON user is required to stop using the TCON and to inform the Overall Manager of the problem. The Overall Manager is to deal with the problem properly and/or contact the nearest Fukuda Denshi representative for service.



CAUTION Precautions for Operation

The Bidirectional Wireless Communications Module (TCON) uses radio waves to transmit data. Therefore, necessary precautions need to be taken for the characteristics and difficulties of using the wireless devices that emits radio waves. The TCON user should fully understand these precautions beforehand, and use the TCON system safely. The TCON communication status can be verified by the messages and symbols () displayed on the screen. If TCON communication is interrupted by other wireless devices, a mark indicating the communication status and technical messages, <TCON Interference>, <Chk TCON Reception> will be displayed. For details, please refer to the HTC-702 Instruction Manual.

Furthermore, situations in which interference may occur are outlined below. In such cases, pay special attention to the condition of the patient connected to the bedside monitor, and eliminate the cause of interference.

- ♦ When the patient's data become mixed with a different patient's data due to interference.
- ♦ When there are multiple TCON communication devices set to the same TCON ID and channel (group).
- ♦ When symptoms such as being unable to communicate, unstable communication, or poor reception occur.
- ♦ When the radio communication is bad because there are metal, concrete, or other such obstacles between the Bidirectional Wireless Communications Modules (TCON).
- ♦ When a different wireless device is using the same frequency (channel).
- ♦ When there are other TCON devices nearby using different channels (groups).
- ♦ When a cell telephone or other wireless device is being used nearby.
- ♦ When citizens broadcast bands such as amateur radio or truck radios are used in the vicinity of the TCON operating area.
- ♦ When a computer or word processor, or electrical device that has an internal computer, is used near the TCON device antenna.
- ♦ When the TCON device is installed or moved to a location that is outside the radio communication range.
- ♦ If a nearby different group is set with a TCON channel frequency that is too close to the channel frequency set for the current TCON group.



CAUTION Precautions about the Setting

- ♦ Follow the instructions from the Overall Manager for the wireless channel when setting the TCON and channel IDs to prevent interference within the same institution.
- ♦ If the TCON is set to [OFF], all TCON messages such as "Check TCON Comm." will not be displayed.
- ♦ When TCON is used, even if [ON] is set for "Start NIBP Auto Mode with Start/Stop key."([Initial Settings]>[User I/F]>[Power ON/Discharge]), Backup at Discharge (NIBP Auto Mode) function will be [ON] since the central monitor will not be on Standby mode.
- ♦ Check that three antenna bar marks () are displayed.
- ♦ Make sure that the TCON group number between the bedside monitor and central monitor is the same.
- ♦ If the equipment is moved during TCON operation, the radio waves signal may become interrupted.
- ♦ There are following restrictions when connecting the DS-8100 System to the TCON network.

- ♦ When the BP measurement unit is [kPa], the central monitor does not receive the NIBP/BP1/BP2 Data. Also, the NIBP/BP1/BP2 Alarm Setup cannot be changed on the central monitor.
- ♦ The NIBP measurement cannot be started from the central monitor via TCON system if the NIBP measurement interval is set to [5 min] or less, or during the 1-minute or continuous measurement. However, it can be stopped.
- ♦ If the measurement unit of CO₂ concentration is [mmHg], the CO₂ value of 100mmHg or above will be transmitted as 99mmHg.

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

⚠ 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

⚠ 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

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)

WARNING

- ♦ MRI-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

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-8100 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

This System

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 SpO₂ 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 SpO₂ 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 SpO₂ Monitoring (DS-8100M)

- ♦ 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.
- ♦ SpO₂ 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 SpO₂ measurement.
- ♦ For increased COHb: COHb levels above normal tend to increase the level of SpO₂. 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 SpO₂. When elevated levels of COHb are suspected, laboratory analysis (CO-Oximetry) of a blood sample should be performed.
- ♦ For increased MetHb: the SpO₂ may be decreased by levels of MetHb of up to approximately 10% to 15%. At higher levels of MetHb, the SpO₂ 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 SpO₂, SpMet, SpCO, SpHb, SpOC measurements.
- ♦ Motion artifact may lead to inaccurate SpMet, SpCO, SpHb, SpOC measurements.
- ♦ Severe anemia may cause erroneous SpO₂ readings.
- ♦ Very low arterial Oxygen Saturation (SpO₂) 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 valve 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 Warnings about the CO₂ 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 Resironics Novametrix, LLC. Refer to the section on "Optional Accessories" for list of specified airway adapters.
(☞ Operation Manual "CO₂ Concentration Measurement (Resironics)" P13-6)
These accessories may be purchased from Fukuda Denshi or any authorized Resironics Novametrix, 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, CO₂ 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.
- ♦ CO₂ readings and respiratory rate can be affected by sensor application errors, certain ambient environmental conditions, and certain patient conditions.

CAUTION Precautions for Installing the Equipment

- ♦ Make sure to secure the equipment using the stand (OAO-66A), etc. Otherwise, the equipment may fall down, resulting in injury to the operator or damage to the equipment.

CAUTION Precautions about the System

- ♦ Use only the accessories specified for this system. 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, module connection cable and lithium-ion battery from the main unit.
- ♦ The lithium-ion battery can only be charged in the specified operational 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 SpO₂ 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 SpO₂ connector. Otherwise, the measurement data may be erroneously displayed by the ambient light.
- ♦ The pulse wave is normalized for SpO₂ 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 (DS-8100N)/Masimo Unit (DS-8100M), refer to SpO₂ 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 (DS-8100N)/Masimo Unit (DS-8100M), refer to SpO₂ sensor instruction manual.

- ♦ If " - - " is displayed for the SpO₂ 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 SpO₂ Monitoring (DS-8100M)

- ♦ 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

- ♦ 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.

⚠ CAUTION Precautions about the BP Monitoring

- ♦ 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.

⚠ CAUTION Precautions about the CO₂ Monitoring (HCP-800/HCP-810)

- ♦ Conduct CO₂ calibration for the following case.
If the CO₂ gas calibration is not performed at a specified interval, CO₂ 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 EtCO₂ 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 EtCO₂ 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® EtCO₂ 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® EtCO₂ sampling tube.
- ♦ Only use Microstream® EtCO₂ sampling lines to ensure the monitor functions properly.

⚠ CAUTION Precautions about the CO₂ 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 CO₂ 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 and HCP-800/810, the measurement range is 0 to 99mmHg/0 to 13.3kPa, and the upper

EtCO₂ alarm will not generate if the upper alarm limit is set to 100mmHg/13.4kPa and above.

- ♦ Whether to use the SpO₂ second alarm function and its threshold selection should be based on the patient's clinical indication portent and medical evaluation.
- ♦ If the SpO₂ 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 DS-8100 System 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.



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 [SpO₂], and if SpO₂ waveform/numeric data is set to [Disp. OFF], the PR value will not be displayed.
- ♦ If the RR source is set to [CO₂/GAS], and if CO₂ 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.



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.



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.



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-8100 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 4 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 [CO₂] (Or, if [Auto] selects a setting other than [CO₂]), the CO₂ 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 CO₂ concentration is mmHg and [99mmHg] is selected for "CO₂ (mmHg) Upper

"Limit of Transmission" ([Initial Settings]>[System]>[DS-LAN]), the CO₂ value of 100mmHg or above will be transmitted as 99mmHg.

- ♦ As the DS-8100 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-8100 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-8100 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-8100 System will be displayed. The RR and APNEA monitored on the central monitor and the DS-8100 System will be the same.

Wireless Network System

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 CO₂ concentration is mmHg and [99mmHg] is selected for "CO₂ (mmHg) Upper Limit of Transmission" ([Initial Settings]>[System]>[Telemeter]), the CO₂ value of 100mmHg or above will be transmitted as 99mmHg.

RTC and Data Backup

⚠ CAUTION

- ◆ 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

⚠ WARNING

- ◆ 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-8100 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-8100 System, cable, and replace the cable if necessary. If the malfunction persists, stop using the equipment.
- ◆ The alarm generation on the DS-8100 System is not assured if the alarm other than specified generates at the ventilator.
( Maintenance Manual "Ventilator Measurement and Alarm Input" P4-1)

⚠ CAUTION

- ◆ 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.
- ◆ RESISTANCE (Insp, Exp), COMPLIANCE, P-V loop, F-V loop display function is not available for the current version.

Precautions about the SpO₂ Sensor

⚠ DANGER

Danger of Burn Injury Caused by the SpO₂ Sensor

- ◆ When monitoring SpO₂, 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 SpO₂ measurements of this equipment, please contact Fukuda Denshi service representative.

Precautions about the NIBP Cuff

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.)

Precautions about Disposing of the Equipment, Accessories, or Components

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

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

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.

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

To Prepare for Emergency Use

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 4 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

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

Precautions for Safe Operation under Electromagnetic Influence

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 magnetic 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-8100 System is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-8100 System should assure that it is used in such an environment.

Guidance and Manufacturer's Declaration - Electromagnetic Emissions		
Emissions Test	Compliance	Electromagnetic Environment - Guidance
RF Emissions CISPR 11	Group 1	The DS-8100 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-8100 System is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network which supplies buildings used for domestic purposes.
Voltage Fluctuations/ Flicker Emissions IEC 61000-3-3	Complies	

Compliance to the Electromagnetic Immunity (1)

The DS-8100 System is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-8100 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-8100 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-8100 System is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-8100 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-8100 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>$d = 1.2\sqrt{P}$ 80MHz to 800MHz $d = 2.3\sqrt{P}$ 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). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey^{*1}, should be less than the compliance level in each frequency range^{*2}. 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-8100 System is used exceeds the applicable RF compliance level above, the DS-8100 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-8100 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-8100 System

The customer or the user of the DS-8100 System can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the DS-8100 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-8100 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.

Chapter 1 Installation of the Unit

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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
 - ♦ Relative Humidity: 30 to 85% (non-condensing)
 - ♦ Atmospheric Pressure (Altitude): 700 to 1060hPa (-380 to 3550m)
- ♦ This equipment is intended for patient monitoring in NICU, ICU, CCU, surgery, emergency room and ward. Direct use in MRI environment or home-care should be prohibited.
- ♦ The power source should fulfill the following condition.
 - ♦ Use the accessory 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 "Main Unit: DS-8100 System" 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.

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.

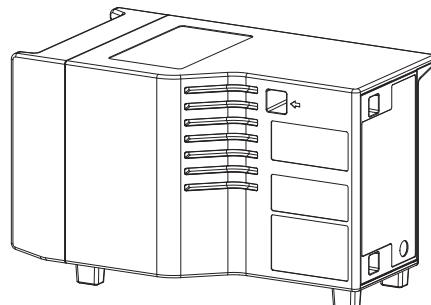
Connect the main unit (DS-8100 system) with necessary units such as Recorder Unit (HR-810), Recorder/Expansion Port Unit (HR-811), Expansion Unit (CU-810).

Connection with the Recorder/Expansion Port Unit

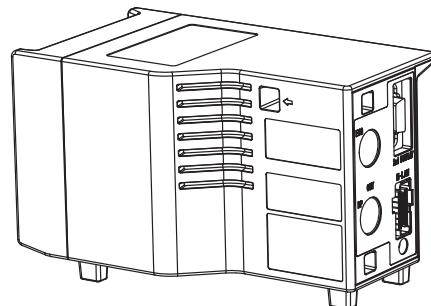
⚠ WARNING

- When lifting this equipment, hold with the handle or the bottom part of the main unit.
- When connecting each unit to the main unit, make sure to secure them with screws.
- Turn OFF the power when connecting the option unit.

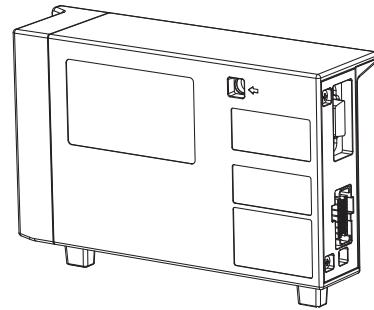
1 Recorder Unit (HR-810)



2 Recorder/Expansion Port Unit (HR-811)



3 Expansion Port Unit (CU-810)



1 Place the DS-8100 main unit upright on a table.

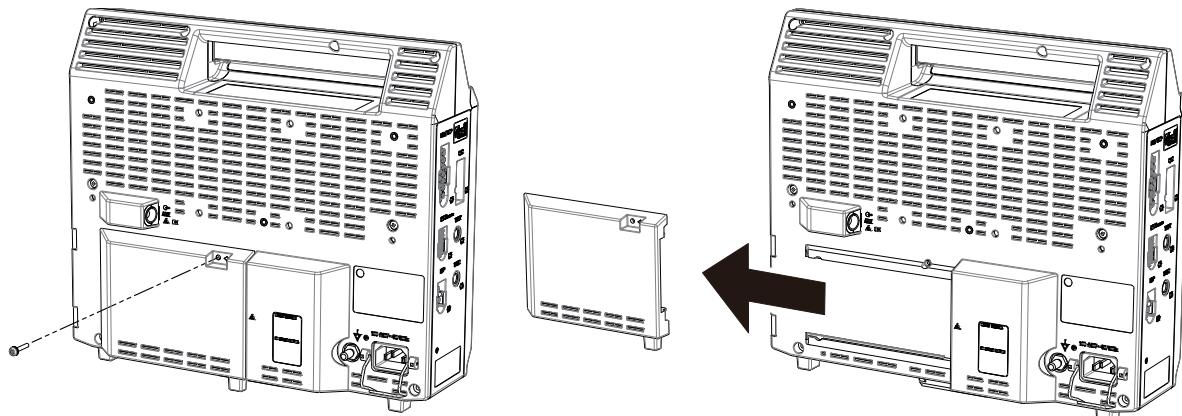
NOTE

- Secure sufficient workspace for installation.

2 Hold the handle of the DS-8100 main unit and remove the screw on the blanking cover. Remove the cover by sliding along the rails on the rear side of the main unit.

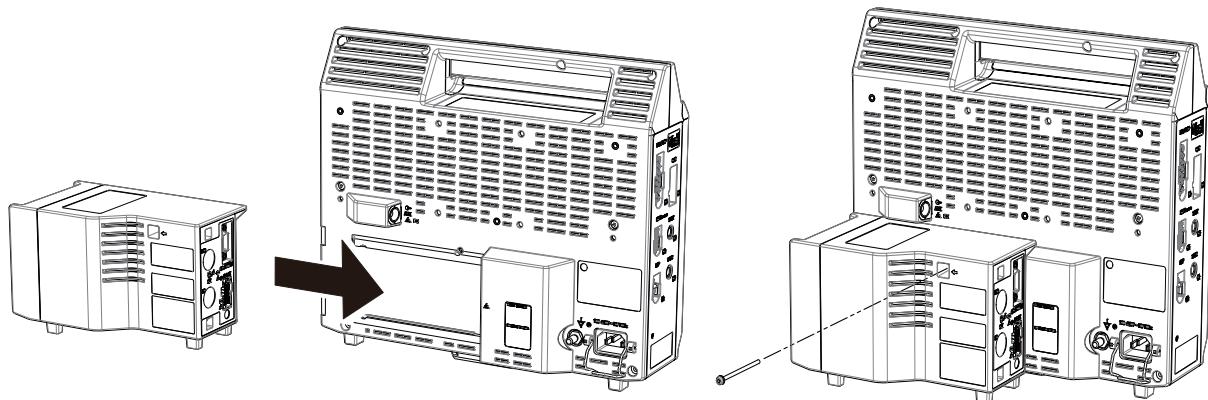
NOTE

- When sliding the cover, do not apply excessive force.

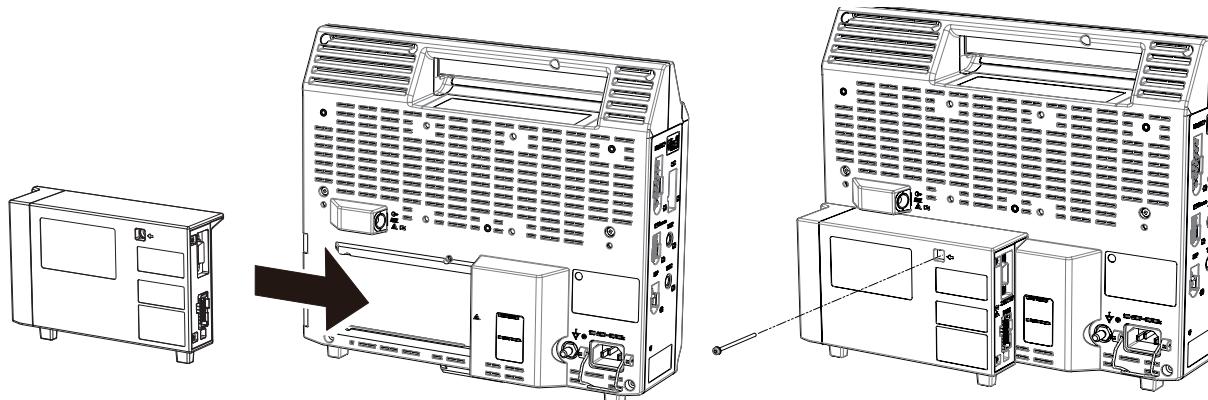


3 Align the HR-810/HR-811 or CU-810 with the rails on the rear side of the main unit and slide it into place. Fix it using the accessory screw (Double Washer Sems Screw M3 x 50).

1 For HR-810/HR-811(the figures below illustrate the case of HR-811)



2 For CU-810



Connecting the HPD-810, HCP-810

⚠ WARNING

- When lifting this equipment, hold with the handle or the bottom part of the main unit.
- When connecting each unit to the main unit, make sure to secure them with screws.

1

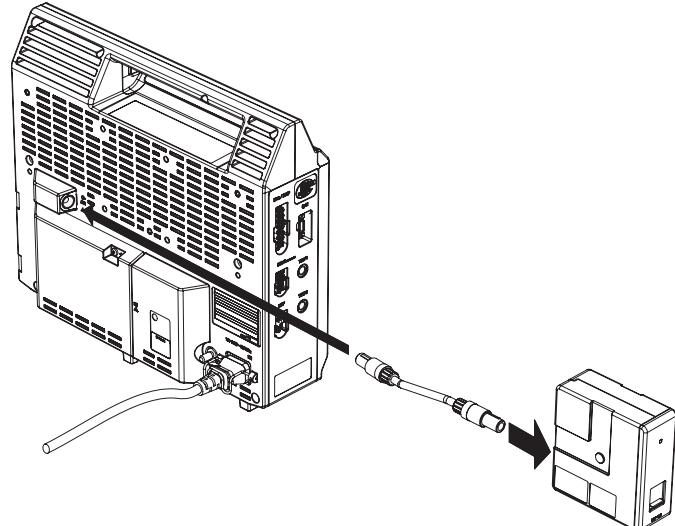
Place the DS-8100 main unit upright on a table.

NOTE

- Secure sufficient workspace for installation.

2

Connect the HPD-800/HPD-810 or HCP-800/HCP-810 to the DS-8100.

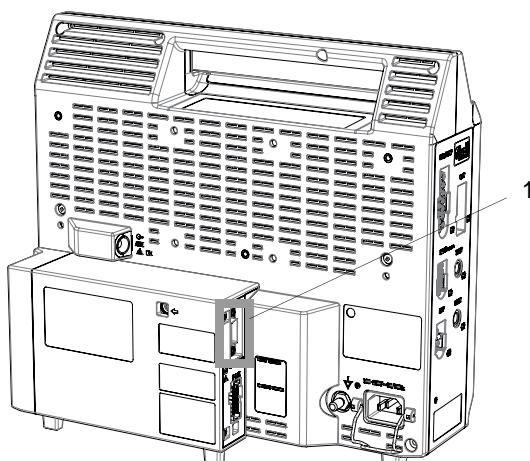


Connecting the External Monitor

To use an external monitor (commercially available monitor which satisfies the following specification), connect the CU-810 or HR-811 to the DS-8100. Use analog RGB cable to connect the analog output connector of the CU-810/HR-811 and the analog input connector of the external monitor.

When connecting an external monitor, contact our service representative.

1 Analog Output Connector



⚠ WARNING

- The external monitor output of this system is not isolated. If connecting a commercially available display unit, it should comply with IEC 60601-1.

An external 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.

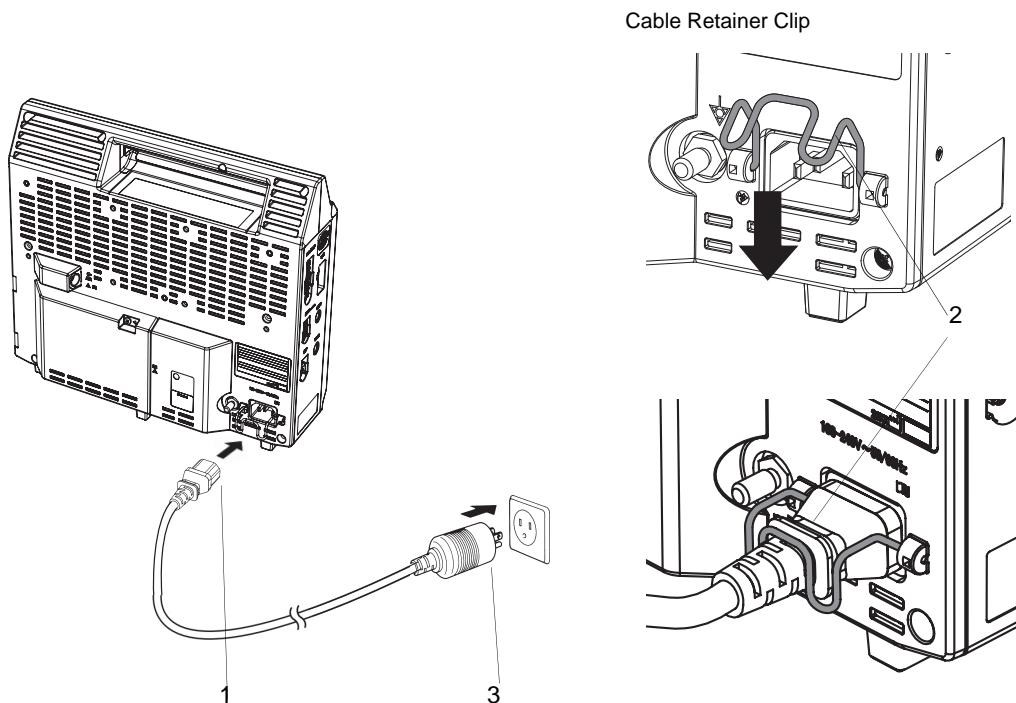
Power Source and Ground Connection

This section explains about the power connection.

Power Connection of the Main Unit

- 1** Connect the power cable to the main unit (DS-8100).

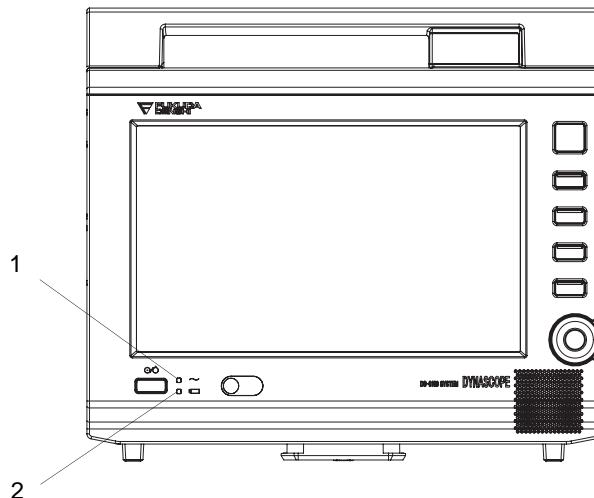
- 1** Connect the power cable (CS-24) to the rear side of the main unit.
- 2** Press down the lever to lock the cable retainer clip.
- 3** Connect the other end of the power cable to the 3-way outlet with ground terminal.



*To disconnect the power cable, unplug one end from the outlet, and the other end from the connector on the rear side of the main unit after releasing the lock lever.

2

Turn ON the standby switch on the main unit.



♦ AC power will be supplied and the power supply LED on the front side of the main 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

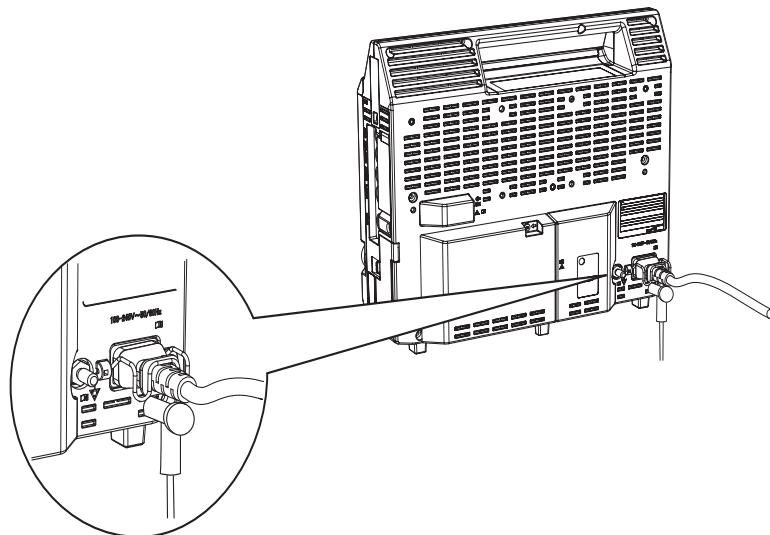
NOTE

- ♦ 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.

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.

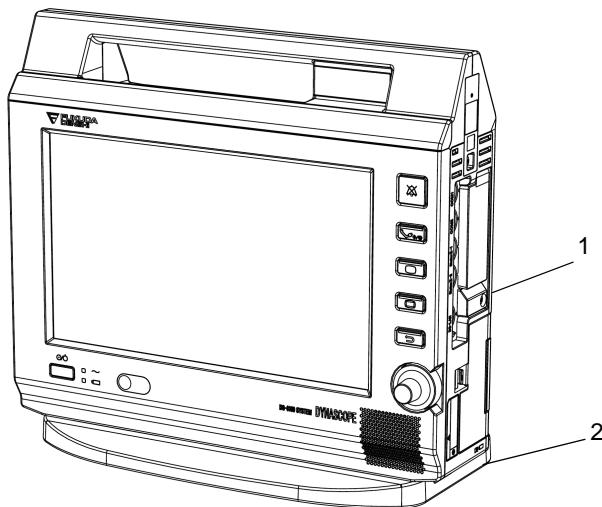
The ground cable is a connector which can be connected/disconnected manually without using tools.



Attaching the Stand (OAO-66A)

! CAUTION

- Make sure to secure the equipment using the stand (OAO-66A), etc. supplied as optional accessory. Otherwise, the equipment may fall down, resulting in injury to the operator or damage to the equipment. For details of the assembly procedure, refer to the "OAO-66A Assembly Instruction".



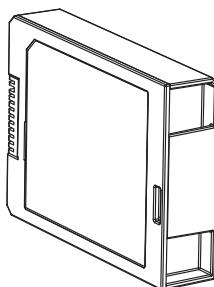
1 DS-8100

2 OAO-66A (Stand for DS-8100)

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

! WARNING

- When lifting this equipment, hold with the handle or the bottom part of the main unit.
- When replacing the battery while monitoring, make sure to supply power by connecting the power cable.



- 1** Place the DS-8100 main unit upright on a table. Connect the power cable when replacing the battery while monitoring.

NOTE

- ♦ Secure sufficient workspace for installation.

- 2** Open the battery cover on the DS-8100 main unit. If the battery is already in the main unit, slide and hold the battery lever and slide it away.

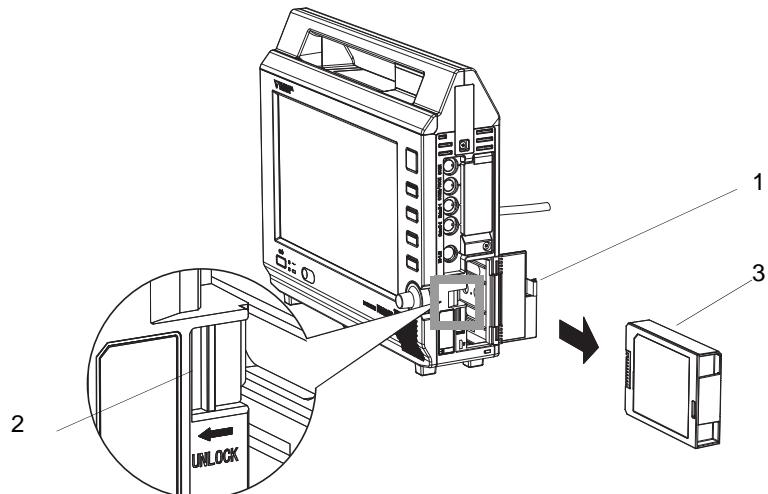
NOTE

- ♦ Hold the battery lever when removing the battery.
- ♦ Do not apply excessive force when removing the battery.

1 Battery Cover

2 Battery Lever

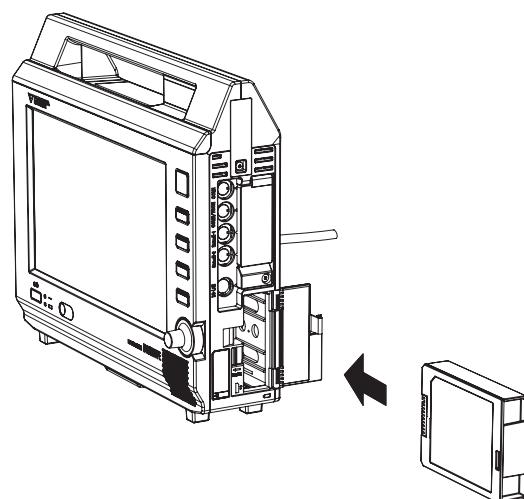
3 Battery



- 3** Insert the BTO-008 to the main unit and close the battery cover.

NOTE

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



Chapter 2 Network System Construction

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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

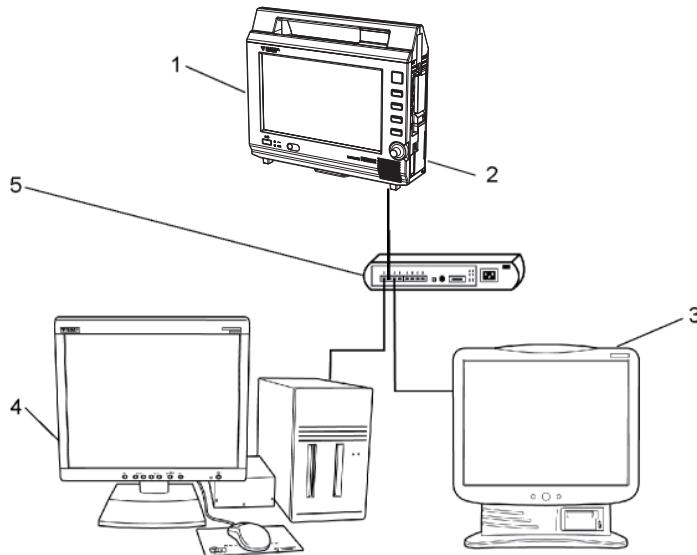
WARNING

- 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 CO₂ concentration is mmHg and [99mmHg] is selected for "Upper Limit of CO₂ (mmHg) Transmission" ([Initial Settings]>[System]>[DS-LAN] or [Telemeter]), the CO₂ value of 100mmHg or above will be transmitted as 99mmHg.

By connecting a Ethernet branch cable to the DS-LAN connector on the DS-8100, a wired network system can be constructed.



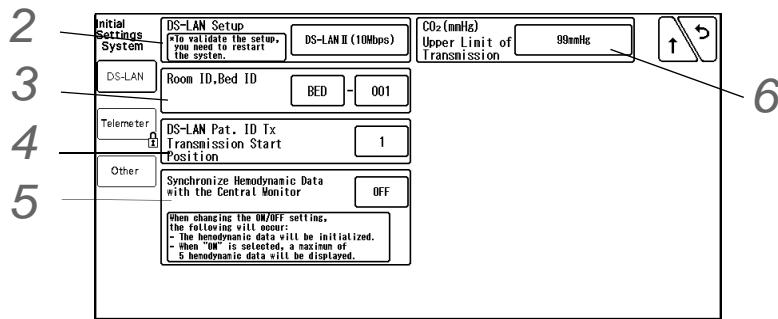
- 1 DS-8100 System Bedside Monitor
- 2 Ethernet Branch Cable (CJ-522)
- 3 DS-7700 System Central Monitor
- 4 DS-5700 Central Monitor (For DS-LANII connection)
- 5 HUB

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^{MB}, 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

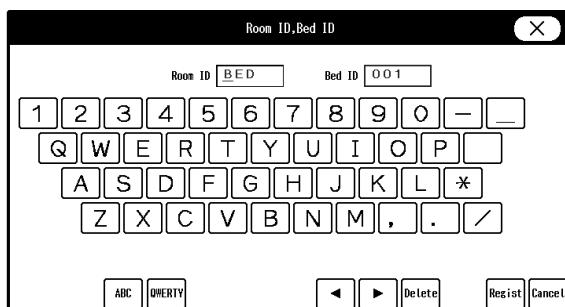
- The Bed ID is factory set to 000. If connected to the wired network with the ID unchanged, monitoring on the central monitor will not be possible.
- When connected to the wired network, make sure that there are no other bedside monitors with the same Bed ID. If the Bed ID is duplicated, monitoring 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-8100 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 "CO₂(mmHg) Upper Limit of Transmission".**REFERENCE**

- ♦ If the CO₂ measurement unit is "mmHg", and the CO₂ 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 "CO₂ (mmHg) Upper Limit of Transmission".

- ▶ The dropdown list will be displayed.

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

- ▶ [No limit]: Actual CO₂ value will be transmitted to the central monitor even if the value is 100mmHg or above.

- ▶ [99mmHg]: 99mmHg will be transmitted as the CO₂ 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.
 - When the BP measurement unit is "kPa", 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.
 - 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 TEMP3 to 4 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-8100, 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 [CO₂] (Or, if [Auto] selects a setting other than [CO₂]), the CO₂ 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 CO₂ concentration is mmHg and [99mmHg] is selected for "Upper Limit of CO₂ (mmHg) Transmission" ([Initial Settings]>[System]>[DS-LAN] or [Telemeter]), the CO₂ value of 100mmHg or above will be transmitted as 99mmHg.
 - When the DS-5800N/NX/NX^{MB} 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^{MB} 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
Temperature	-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

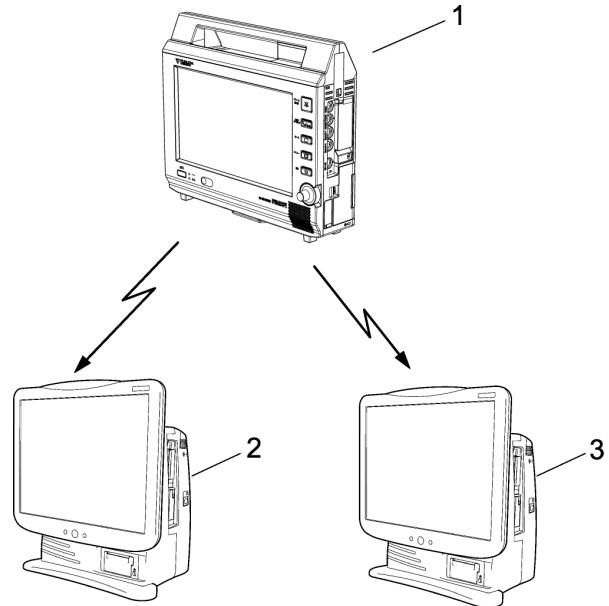
- Some wireless combinations of telemetry transmitters may generate interference with other devices.
- Before selecting the channel, verify it will not interfere with other channels.
- Make sure the telemetry manager of your system is aware of any changes to the telemetry channels.
- If transmitters 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

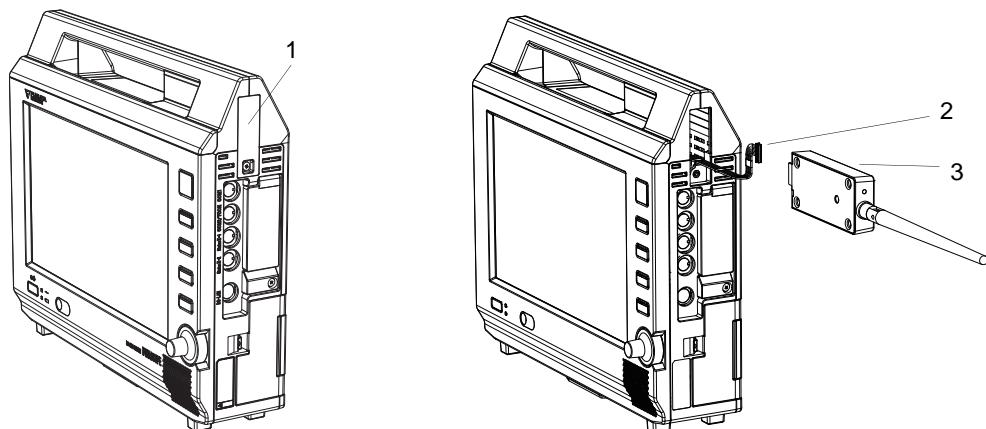
- The setup of channel ID and group ID should be performed only by our service representative. Users should not perform this procedure as malfunction may occur.

- 1 Bedside Monitor
DS-8100 System
- 2 Central Monitor
DS-7600 Series
- 3 Central Monitor
DS-7700 Series



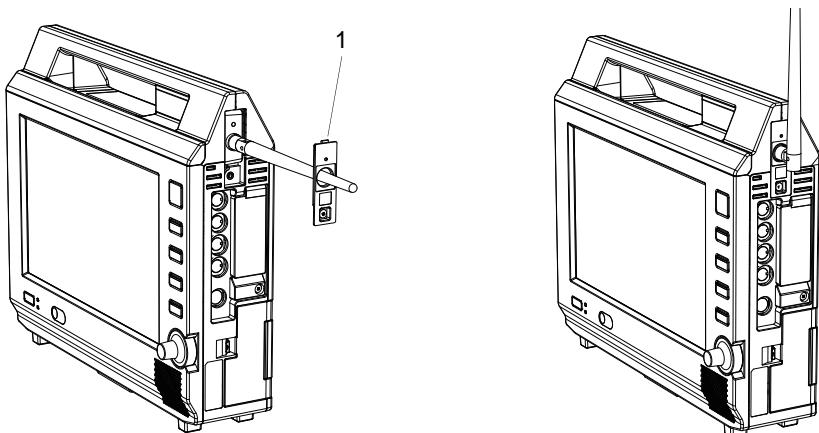
Connecting the Telemetry Transmitter Module (HLX-801)

- 1** Loosen the screw, and remove the telemeter cover. Peel off the sheet on the telemeter cover.
- 2** Pull out the connection cable, and connect the telemetry transmitter module (HLX-801).



- 1 Telemeter Cover
- 2 Connection Cable
- 3 Telemetry Transmitter Module (HLX-801)

- 3** Insert the antenna through the hole on the telemeter cover, and fix on the cover using the screws.



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

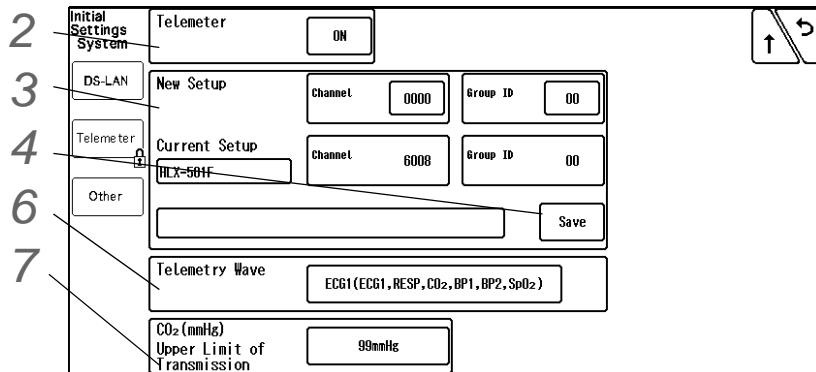
- A password can be set to access the channel ID setup menu to allow only the telemetry channel administrator to change the channel ID.
- Some combinations of channels may generate interference with other telemetry transmitters.
- Before selecting a channel, verify it will not interfere with other channels.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

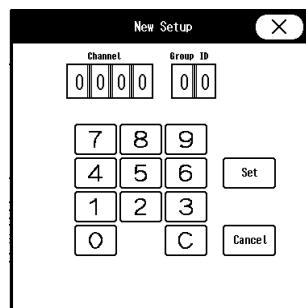
► [ON]: Telemetry transmission will be performed.

► [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.

Current Setup HLX-501F	Channel 6008	Group ID 00
---------------------------	-----------------	----------------

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.

- Press the key for "Telemetry Wave".
 - The dropdown list will be displayed.
- Select from [ECG1] / [ECG2].
 - [ECG1]: ECG1, RESP, CO₂, BP1, BP2, SpO₂ will be transmitted. However, RESP waveform will not be transmitted if APNEA source is CO₂.
 - [ECG2]: ECG1, ECG2, RESP/CO₂, BP1, SpO₂ will be transmitted. One of either CO₂ or RESP waveform will be transmitted in accordance with the APNEA source setting.

7 Set the "CO₂(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 CO₂ concentration is mmHg and [99mmHg] is selected for "Upper Limit of CO₂ (mmHg) Transmission" ([Initial Settings]>[System]>[DS-LAN] or [Telemeter]), the CO₂ value of 100mmHg or above will be transmitted as 99mmHg.

- When using the Nellcor™ 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.

TCON Network

This section explains the connection and setup procedure of the TCON function using the Bidirectional Wireless Communications Module (HTC-702).

There are following features for the TCON network.

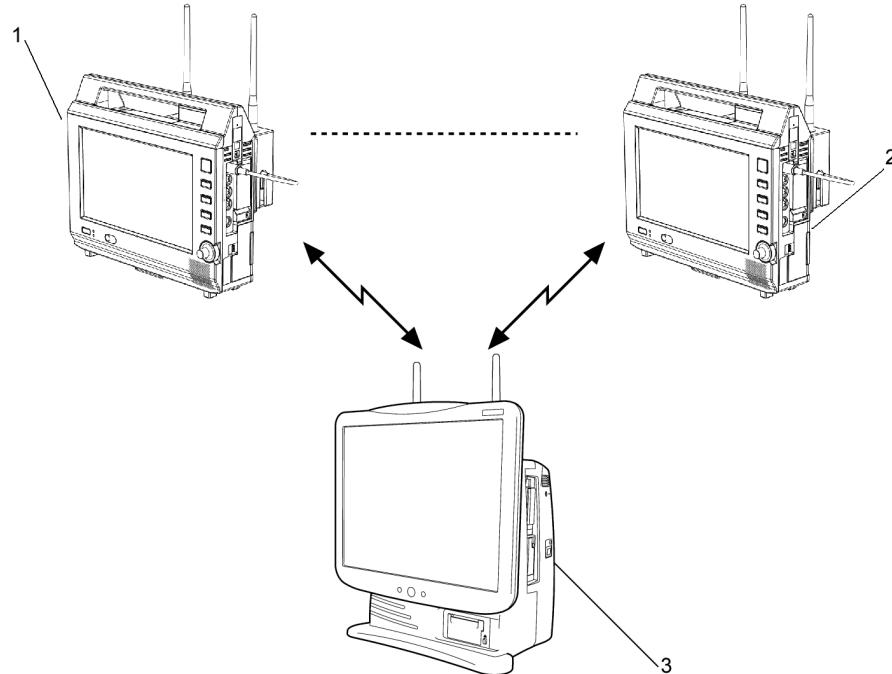
- The measured data on this equipment can be sent to the central monitor.
- Alarm settings can be synchronized.
- NIBP can be measured from the central monitor.

Example of TCON Network Configuration

This section describes the configuration example of the bedside monitor and the central monitor using the TCON network.

Unlike medical telemetry, the TCON network does not require floor antenna.

□ Configuration Example of Medical Telemetry and TCON



1 Bedside Monitor: DS-8100 System

ID: 1

Channel: 9

2 Bedside Monitor: DS-8100 System

ID: 16

Channel: 9

3 Central Monitor: DS-7600/DS-7700 series, etc.

ID: 1

Channel: 9

CAUTION

- ♦ Check that three antenna bar marks () are displayed.
- ♦ Make sure that the TCON group number of the bedside monitor and the central monitor is the same.
- ♦ If the equipment is moved during TCON operation, the radio waves signal may become interrupted.
- ♦ There are following restrictions when connecting this system to the TCON network.
 - ♦ When the NIBP measurement interval is set to [5] (Min) or less, or during the 1-minute or continuous measurement, NIBP measurement cannot be started from the central monitor. However, the measurement can be stopped from central monitor.
 - ♦ If the measurement unit of CO₂ concentration is mmHg, the CO₂ value of 100mmHg or above will be transmitted as 99mmHg.

Connecting the TCON Network

To connect the Bidirectional Wireless Communications Module (HTC-702) to the DS-8100, HTC Attachment Case for DS-8100 (OAO-64A) is required.

By using the OAO-64A, HTC-702 can be attached to the DS-8100.

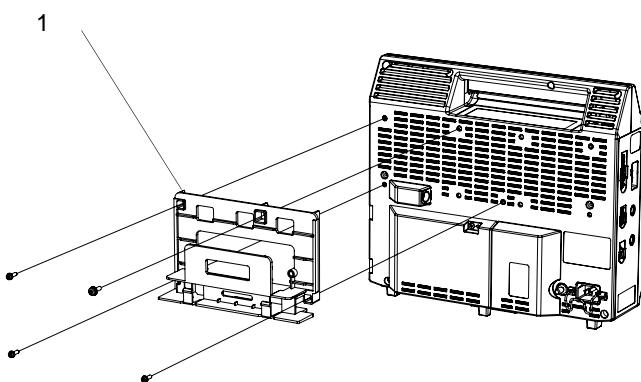
WARNING

- ♦ Do not connect unspecified equipment to the serial connector (COM2) on the DS-8100.

1

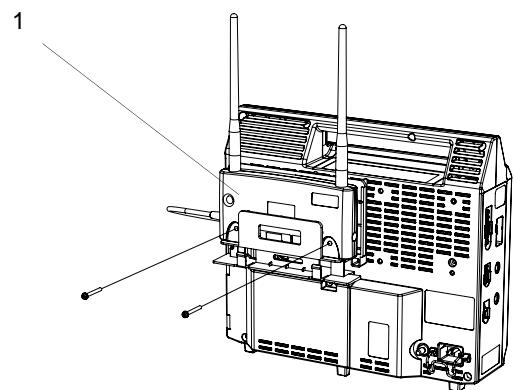
Attach the HTC Attachment Case to the DS-8100 using the screws.

1 HTC Attachment Case (OAO-64A)



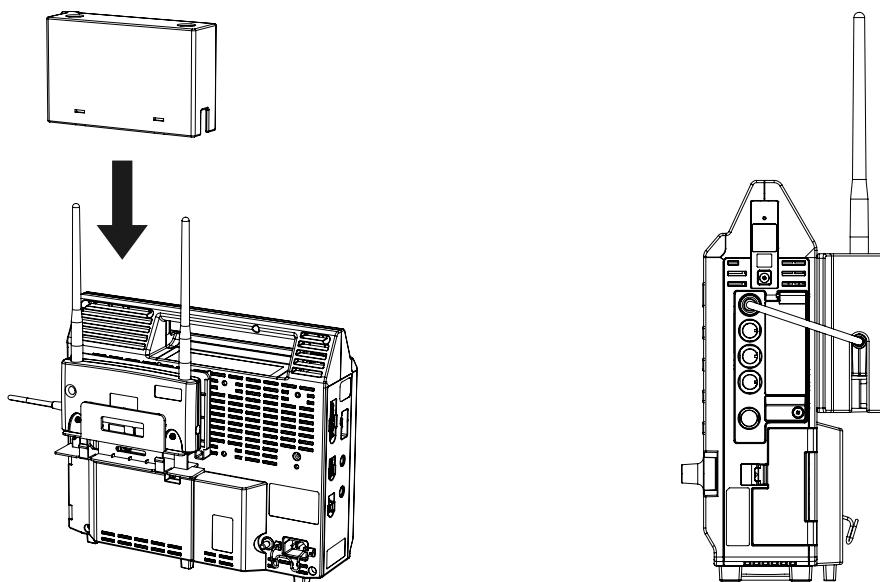
2 Securely attach the HTC-702 using the screws.

1 HTC-702



3 Attach the HTC Case R.

1 HTC Case R

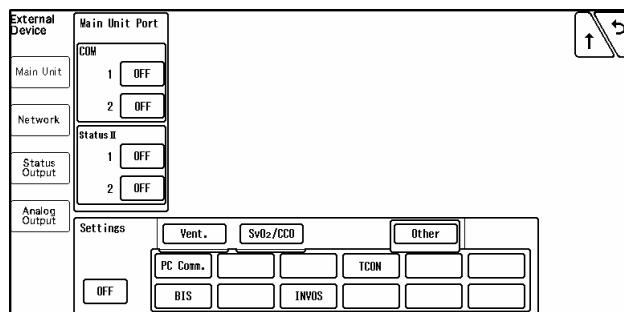


Serial Communication Setup

To use the TCON function, the serial communication setup needs to be performed.

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

► The "Main Unit Port" screen will be displayed.



2 Press the key for "COM2".

- ▶ The setup mode will change to COM2 settings.

3 Press the [TCON] key.

TCON ID/Channel Number Setup

To connect to the TCON network, it is necessary to set the TCON ID and channel number. The set ID and channel number will be retained even after the power is turned OFF.

CAUTION

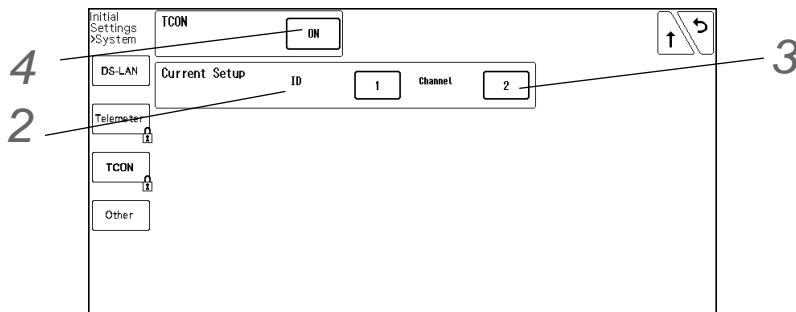
- ◆ The TCON setup should be performed only by our service representative. Users should not perform this procedure as malfunction may occur.

NOTE

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

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

- ▶ The TCON setup menu will be displayed.



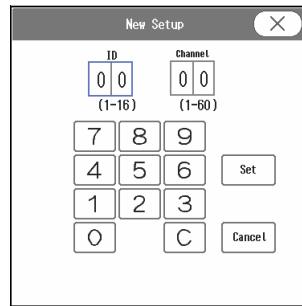
2 Set the TCON ID and channel number

NOTE

- ◆ TCON ID is set to distinguish the bedside monitors in the same TCON group. Make sure not to set the same TCON ID to the bedside monitors in the same TCON group.
- ◆ Make sure to set the same TCON channel number in the same TCON group. Otherwise, communication failure or interference with other TCON group may occur.

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

- ▶ The "New Setup" window will be displayed.



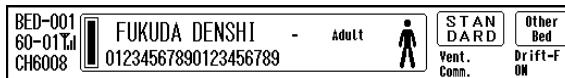
- 2** Use the numeric keypad to enter the ID in the range from 01 to 16.
The ID should not be duplicated with other bedside monitors.
- 3** Press the input area for the channel number.
- 4** Use the numeric keypad to enter the TCON channel in the range from 01 to 60.
The same channel should be set for the monitors within the same TCON group.
- 5** Press the [Set] key.

3 Select ON/OFF of TCON communication.

- 1** Press the key for "TCON".
► The dropdown list will be displayed.
- 2** Select from [ON] or [OFF].
► [ON]: The bidirectional wireless communication will start and the TCON mark will be displayed.
► [OFF]: The bidirectional wireless communication will cease.

REFERENCE

- If the reception is proper, three antenna bar marks will be displayed as shown below and TCON ID and TCON channel number will be also displayed next to the bar marks.



- 1** TCON ID
The set TCON ID will be displayed.
- 2** TCON Channel Number
The same channel number (group number) with the central monitor will be displayed. If the numbers are different, check the setting. The TCON channel number (group number) will not be displayed unless communication with the corresponding central monitor is established. In such case, check the TCON settings of the bedside monitor and the central monitor.
- 3** Antenna Mark
The TCON antenna marks show the strength of the signal reception (electric field strength) in the same way as on a cell phone.

- (Green): The electrical field strength is sufficient and communication errors rarely occur.
- (Green): The electrical field strength is sufficient, but exogenous noise may cause communication errors.
- (Yellow): The reception is available, but communication errors may occur frequently.
- (Red): The communication is not possible.

4 Press the [Home] key.

NOTE

- ♦ When the <TCON Check Reception> is displayed, the communication with the central monitor is not established. In such case, check if proper TCON setting is made on the bedside monitor and the central monitor, and repeat the setup procedure from step 1 to 4.
 - ♦ When the <TCON Cross Talk> message is displayed, other equipments transmitting the same radio wave may exist nearby, or other bedside monitor with the same TCON ID may exist. Check the setting.
-

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.....	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. When the Recorder Unit (HR-810/HR-811) is not connected, pressing the [Print] key will store waveform and review data (Graphic Trend, Tabular Trend, Recall, Alarm History, etc.). The stored data can be verified and printed on a PC.

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-8100 System.

NOTE

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

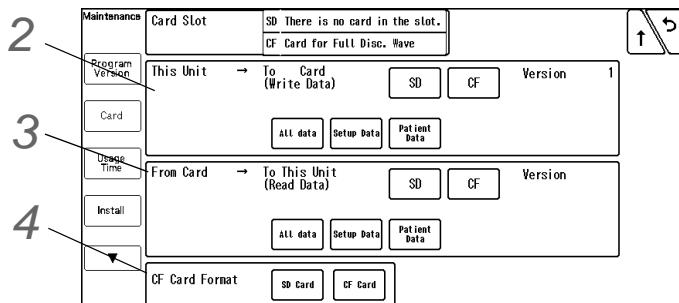
REFERENCE

- 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.)
 - ◆ TCON Setup
(If the setting is duplicated, proper TCON communication will not be performed.)
 - ◆ 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
 - ◆ OCG 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.

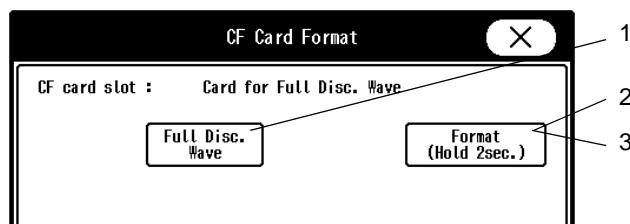
CAUTION

- ◆ 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

In this section, formatting of SD card to be used for DS-8100 data transfer is explained.

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



CAUTION

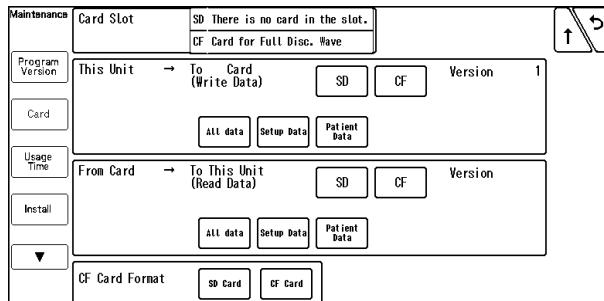
- It will take about 1 minute to format the SD card. Do not format the card during monitoring as all operation will not be possible during the format process.
- During the format process, do not turn OFF the power, or enter into standby condition, or remove the SD card. It may damage the SD card.
- The SD card formatted on other DS-8100 cannot be used.

1

Make sure that the SD card is inserted to DS-8100, and that the card is unformatted and is the specified card for data transfer.

2

Press the [Menu], [Maintenance], [Card] keys.



3

Format the SD card.

- 1 On the "SD Card Format" window, press the [Format (Hold 2sec.)] key 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 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-8100 System using the STATUS II port on the DS-8100 main unit. 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, wired, and TCON network. This section describes the procedure to connect the DS-8100 System and ventilator, and to input the ventilator measurement and alarm.

Ventilator	Connection Cable
	For Connection to DS-8100 main unit STATUS II
Servo Ventilator 900C/900D/900E*	CJ-400RI-70SV9 (x1)
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-8100 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, O₂ concentration alarm

♦SV-300:

airway pressure upper limit alarm, high continuous pressure alarm, O₂ concentration lower limit alarm, expiratory minute volume upper/lower limit alarm, apnea alarm, gas supply alarm, air supply alarm, O₂ supply alarm, battery alarm, limited battery alarm, no battery alarm, overrange alarm

♦Servo-i:

airway pressure upper limit alarm, high continuous pressure alarm, O₂ concentration lower limit alarm, expiratory minute volume upper/lower limit alarm, apnea alarm, gas supply alarm, O₂ 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, EtCO₂ upper limit alarm, EtCO₂ lower limit alarm

♦Servo-s:

airway pressure upper limit alarm, high continuous pressure alarm, O₂ concentration lower limit alarm, expiratory minute volume upper/lower limit alarm, apnea alarm, gas supply alarm, air supply alarm, O₂ 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.
 - ♦ O₂ monitoring disabled alarm, CO₂ 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-8100 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-8100 System.
-

 **CAUTION**

- ♦ The ventilator operation should be performed by well-trained and authorized personnel.
 - ♦ When connecting DS-8100 System and a ventilator, use only the specified connection cable.
 - ♦ Make sure that the ventilator is connected to the specified connector on the DS-8100 System.
 - ♦ When connecting the cable, make sure that the main power of this system and the ventilator is OFF.
-

Ventilator Connection

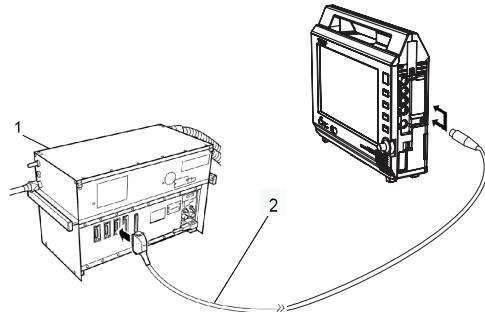
CAUTION

- Only one ventilator can be connected to each DS-8100 System. Do not connect more than one ventilators.

□ Connection of SV-900

1 Connect the SV-900 to STATUS II connector on the DS-8100 System.

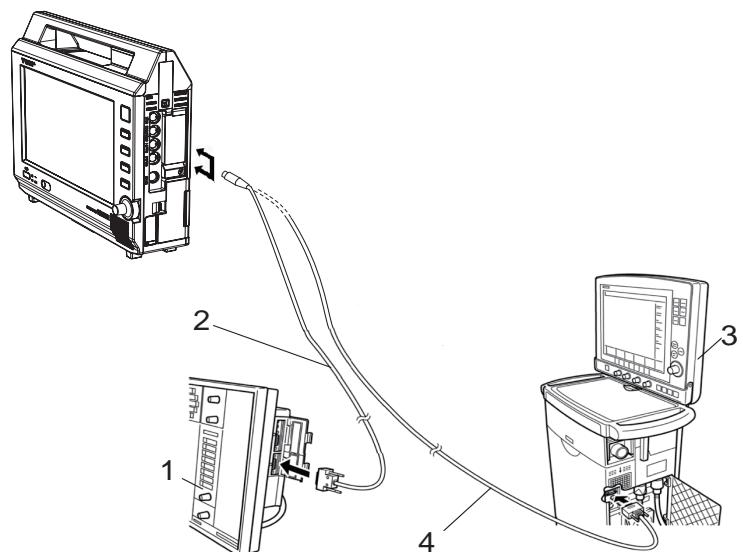
- 1 SV-900
2 CJ-400RI-70SV9



□ Connection of SV-300, Servo-i/s

1 Connect the SV-300 or Servo-i/s to STATUS II connector on the DS-8100 System.

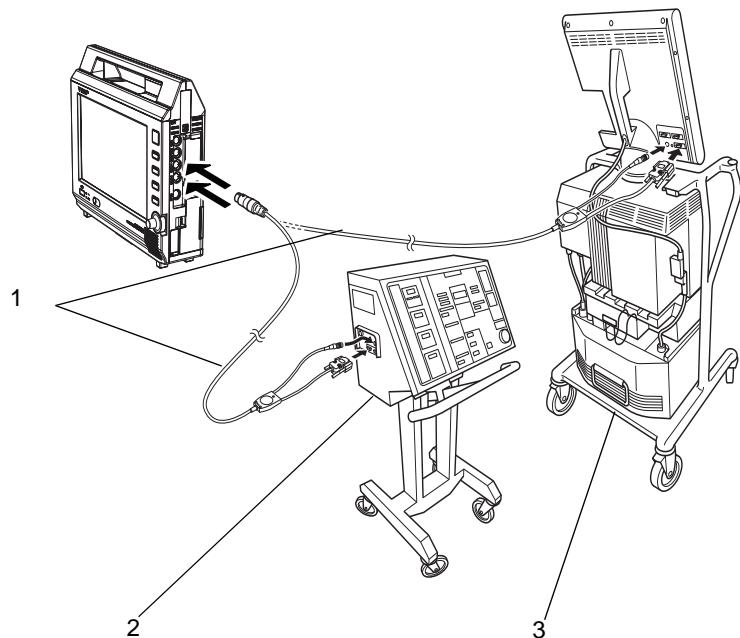
- 1 SV-300
2 CJ-401RI-70SV3
3 Servo-i/s
4 CJ-402RI-70SVi



□ Connection of PB740/760/840

- 1** Connect the PB740/760/840 to STATUS II connector 1 or STATUS II connector 2 on the DS-8100.

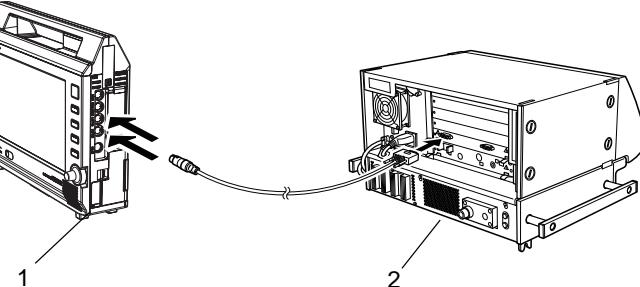
- 1 CJ-403RI-70PB
- 2 PB740/760
- 3 PB840



□ Connection of Evita

- 1** Connect the Evita 2 dura/Evita 4/Evita XL to STATUS II connector 1 or STATUS II connector 2 on the DS-8100.

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

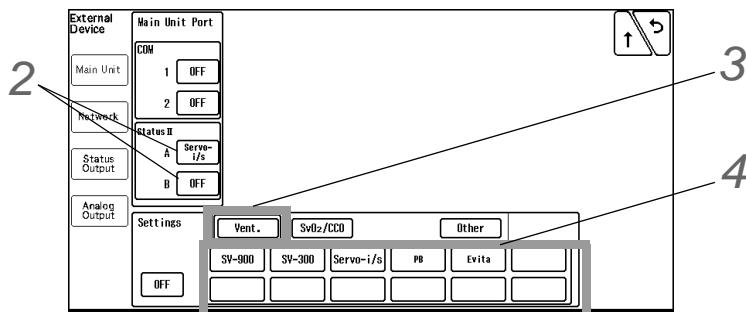


External Device Setup

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].

SvO₂/CCO Monitor Connection

This section describes the procedure on how to connect the DS-8100 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-8100 System using the COM1 to 2 on the DS-8100 main unit.

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

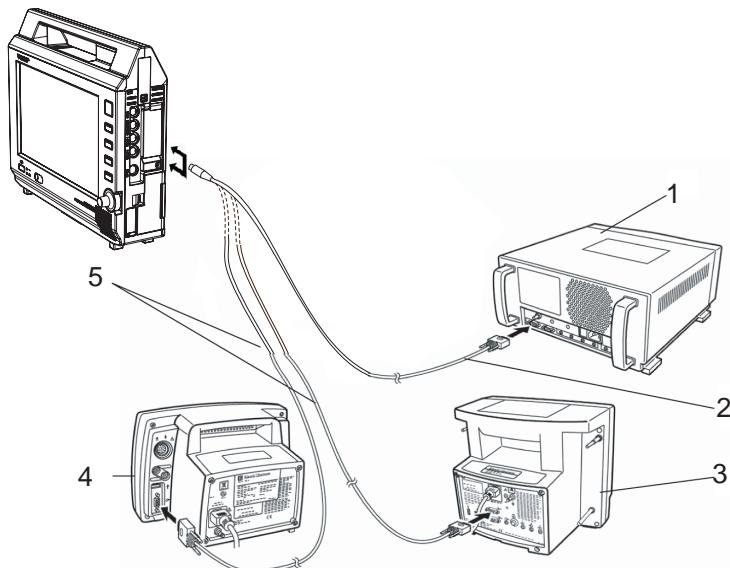
- When connecting this system and the oximeter or CCO measurement device, use only the specified connection cable.
- Make sure that the oximeter and CCO measurement device is connected to the specified

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

SvO₂/CCO Monitor Connection

- 1** Connect the oximeter or CCO measurement device to the DS-8100 System.

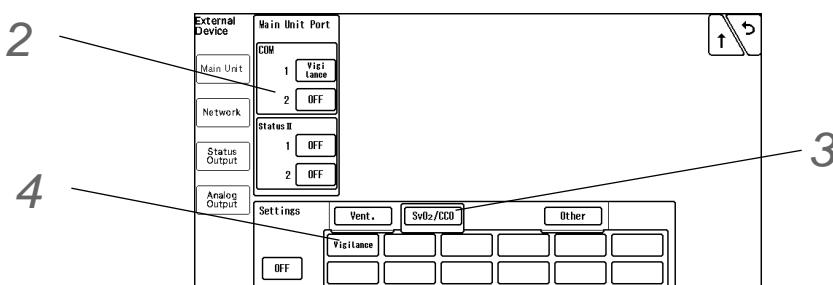
- 1 Vigilance
- 2 CJ-406RI-70VIGI
- 3 Vigilance II
- 4 Vigileo
- 5 CJ-402RI-70SVi



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 [SvO₂/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].

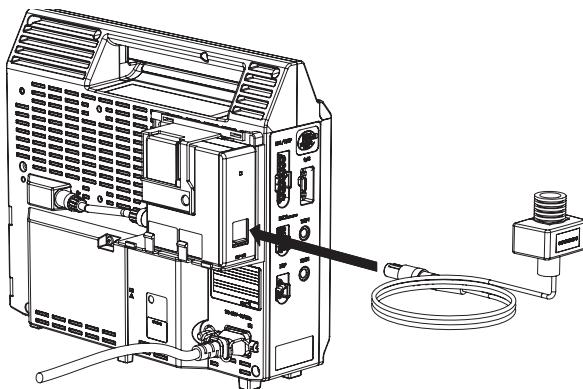
CO₂ Concentration Data Input

By connecting the Gas Unit I/F (HPD-800/HPD-810), or CO₂ Gas Unit (HCP-800/HCP-810), waveform and numeric data of CO₂ concentration can be monitored on the DS-8100 System.

Connecting the Capnostat 5

By connecting the Capnostat 5 via HPD-800/HPD-810 Gas Unit I/F, CO₂ concentration measured by mainstream method can be monitored.

HPD-800/HPD-810 is used by connecting to the AUX connector of the DS-8100.

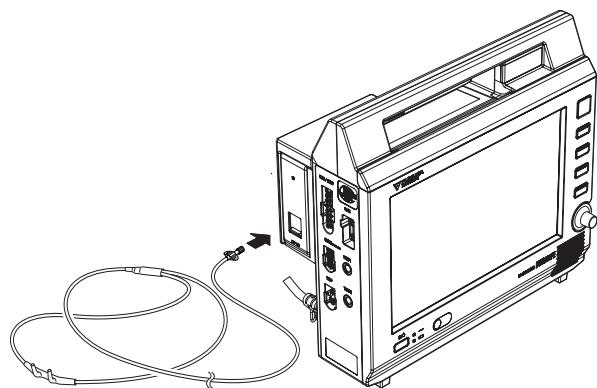


*Mainstream Method
Capnostat 5 manufactured by Respiromics Novametrix*

Connecting the Sampling Line (Covidien)

By connecting the FilterLine CO₂ sampling line series, CO₂ concentration measured by intubation or non-intubation can be monitored.

HCP-800/HCP-810 is used by connecting to the AUX connector of the DS-8100.



*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 DS-8100 main unit 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.
-

1

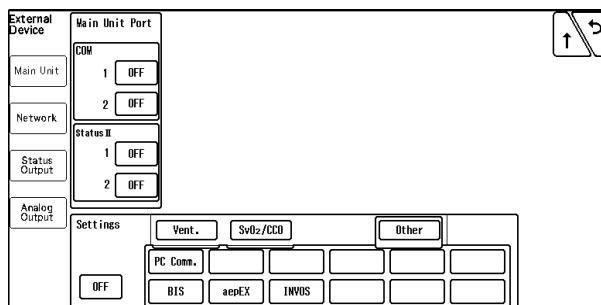
Connect the serial connector or Status II connector on the DS-8100 System to the serial port on the BIS monitor using the BIS connection cable (CJ0-03RS4).

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.

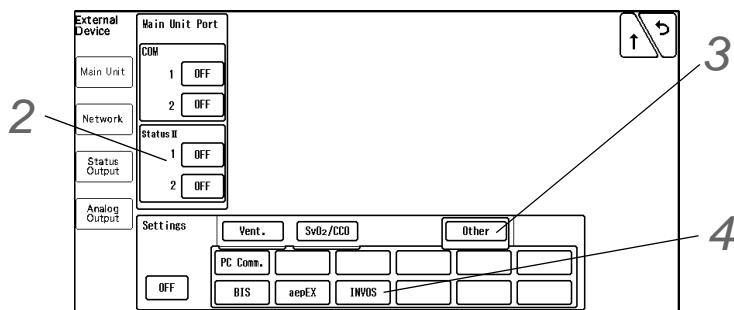
Connecting to the INVOS

- 1** Connect the INVOS 5100C to the serial connector or STATUS II connector on the left side of the DS-8100 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

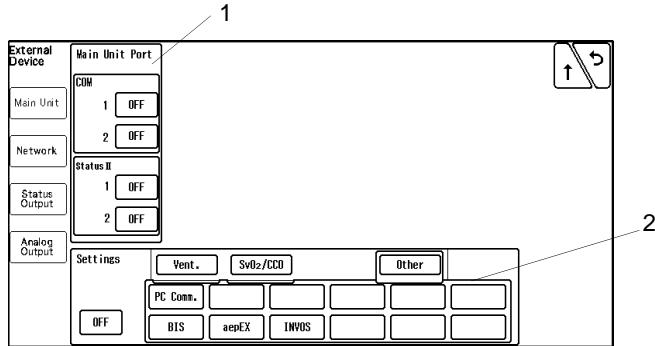
This section explains about the external device connection setup.

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.], [SvO₂/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
COM2	TCON

NOTE

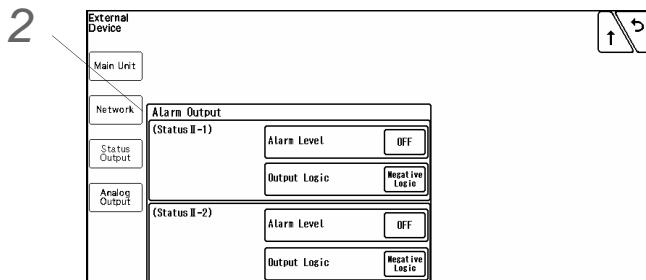
- The same function cannot be set to multiple ports.
- When [TCON] is selected, perform TCON setup (TCON ID, etc.) on the TCON setup screen.

Alarm Output Setup

The alarm can be output from the status input/output connector or I/O connector (optional) on the DS-8100.

- 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].

► [OFF]: Alarm will not be output.

► [APNEA]: Apnea alarm will be output.

► [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.

- 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

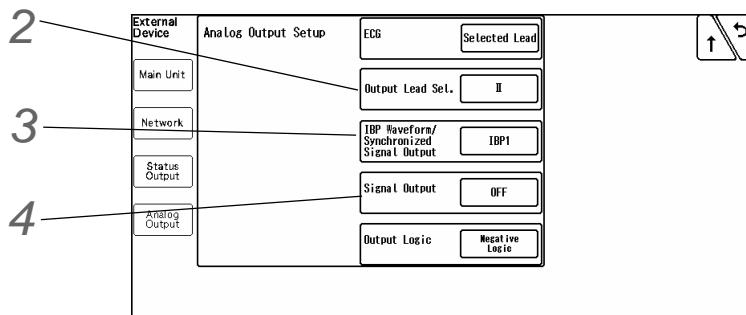
DS-8100 is capable to output the analog HR and BP waveform, and also output the synchronized signal (HR, RR) and alarm.

The BP waveform for analog output can be selected from the measured waveforms on the DS-8100 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-8100.

- 1** Press the key for "IBP Waveform/Synchronized Signal Output".

► The dropdown list will be displayed.

- 2** Select from [IBP1] / [IBP2] / [Sync Signal].

- 4** 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, CO₂) 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.

NOTE

- The QRS synchronized signal is a delay output (35msec or less during Monitor/Diagnosis Mode).
The delay time varies depending on the filter mode setting and input waveform type.
- When the QRS synchronized signal is input to the external device, make sure that the delay time is within the acceptable range of the connected device.

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.

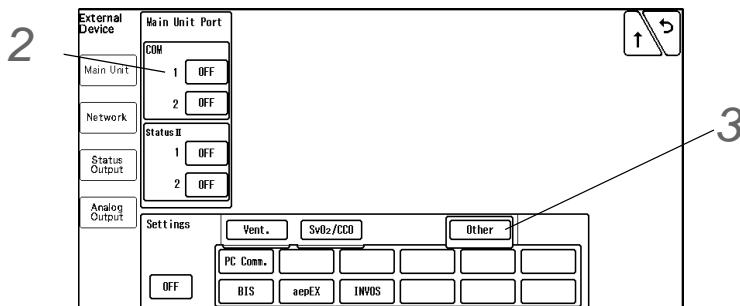
Connection with the System

1 Connect the accessory cable for system connection to the serial connector (COM1) on the DS-8100 main unit.

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)

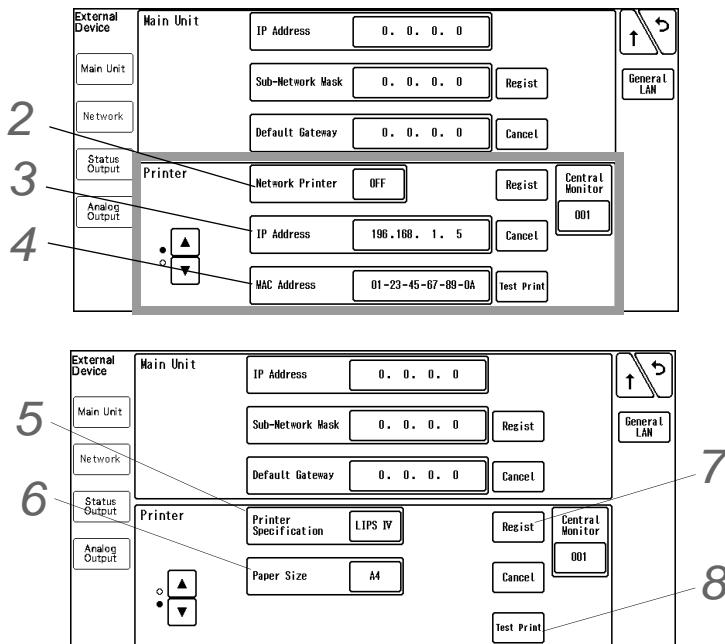
Laser Printer Setup

□ 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

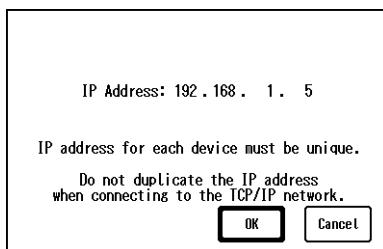
- ♦ MAC (Media Access Control) address is an address assigned for each network equipment. Refer to the operation manual of the printer or printer network board.

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

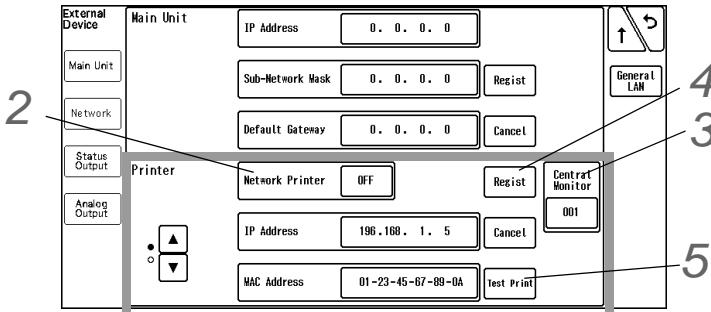
- ♦ If the output characters are garbled, printer specification may be incorrectly set on the central monitor. Refer to the operation manual of the printer and check the printer specification.

□ 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.



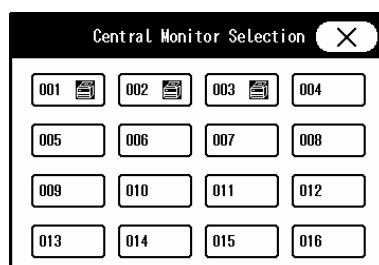
- 2** Select [DS-LAN] for "Network Printer".

- 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 ₂ , 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.
	TCON	TCON settings such as TCON ID, TCON channel.
	Other	Settings for AC filter, search patient ID, etc.
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

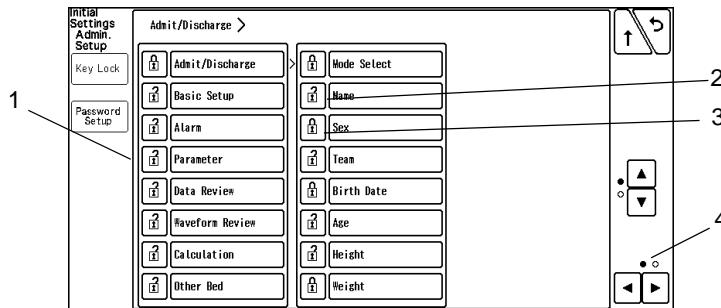
- To display the administrator setup menu, a password is required. There are 3 levels of password with different operation authorization. With higher level password, the lower level settings can be changed.
- For details of the password, contact Fukuda Denshi service representative.

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

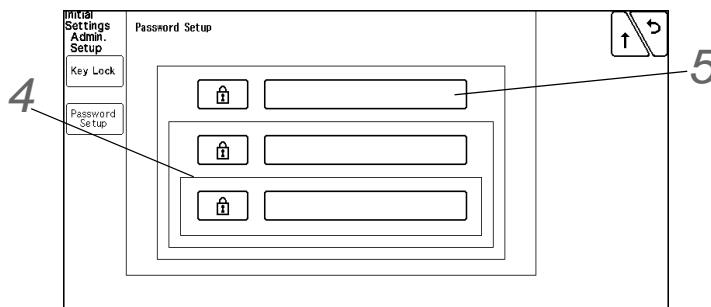
- The default passwords are set as follows.
Red Key: 11111111
Yellow Key: 22222222
Green Key: 33333333
- Before using the equipment, make sure to change the password.
- For details of the password, contact Fukuda Denshi service representative.

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.



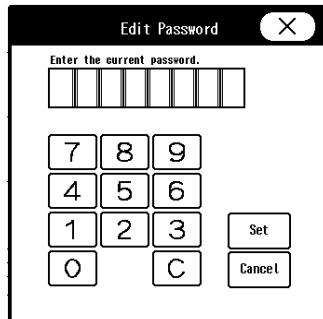
4 Enter the password.

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

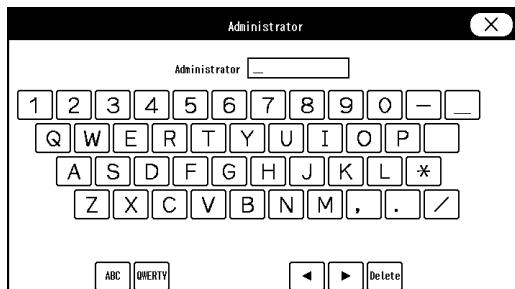
- ♦ There are 3 levels of password which are distinguished by the color of the icon. The level is in the order of red>yellow>green and are distinguished by the entered password to display the administrator setup menu.

- 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

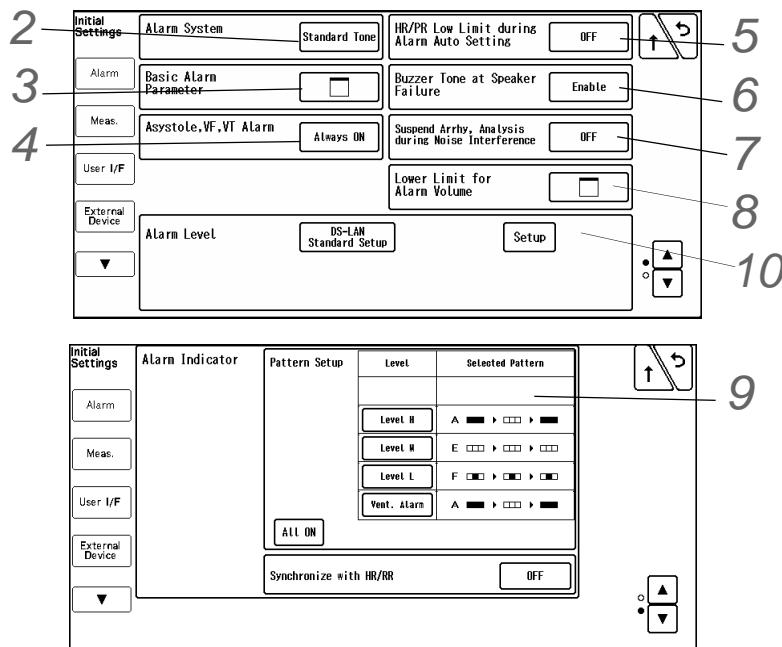
- Maximum of 8 characters can be set for the administrator name.

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.

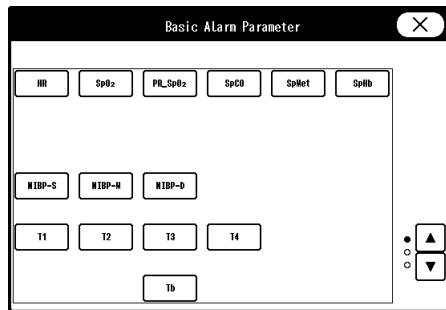
► [Melodic Tone]: The alarm tone which the rhythm is the same with [Standard Tone] with different melody will be set.

► [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 "HR/PR Low Limit during Alarm Auto Setting".
 - ▶ None: No limit will be set.
 - ▶ 30bpm: When the auto alarm is set and the lower limit is below 30bpm, the lower limit will be fixed to 30bpm.
 - ▶ 40bpm: When the auto alarm is set and the lower limit is below 40bpm, the lower limit will be fixed to 40bpm.
- 6** 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.

REFERENCE

- A buzzer tone can be silenced by pressing the [Alarm Silence] key.

7

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.

8

Set the "Lower Limit for Alarm Volume".

**WARNING**

- Changing the setting for "Alarm System" will also change the alarm volume and tone setting. As the "Lower 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 "Lower Limit for Alarm Volume".

- ▶ The "Lower 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.

9

Set the operation for the alarm indicator located at the upper part of the main 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)

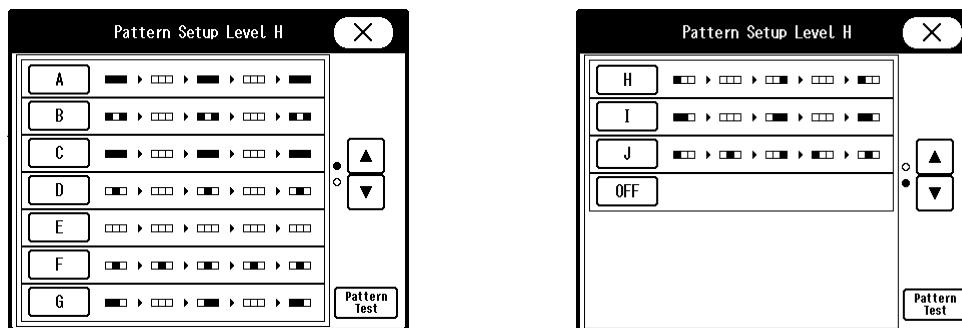
Alarm Indicator Flashing Pattern

Pattern	Flashing Pattern
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)

* (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.

10

Set the "Alarm Level".

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

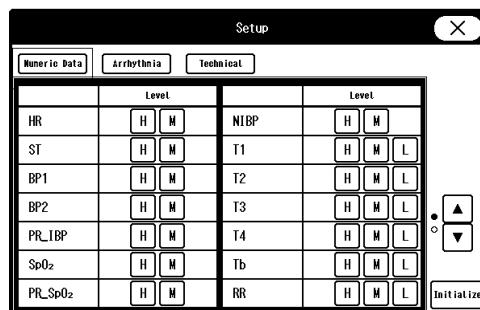
Press the [Setup] key to display the alarm level setup window.

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.

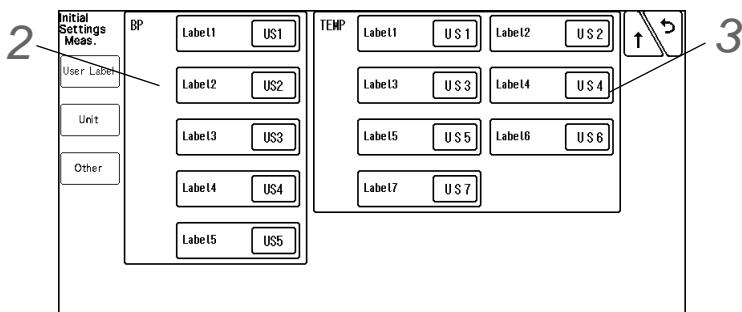
Measurement Related Setup

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.

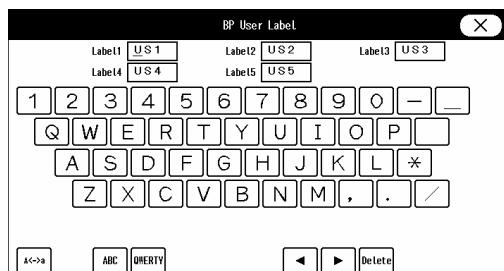
► The user label setup screen will be displayed.



- 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].
- The upper case/lower case can be changed using the [A <-> a] key.

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 CO₂ 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]/[cmH₂O].

- 4 TEMP

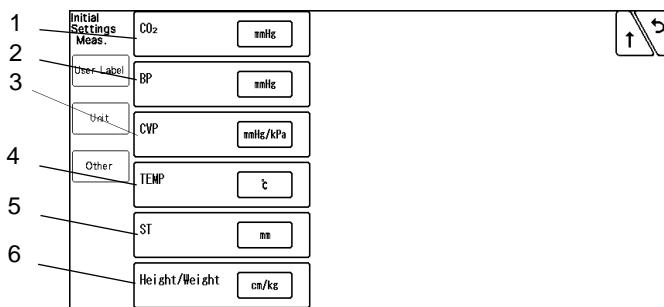
Select the measurement unit from [°C] / [°F].

- 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

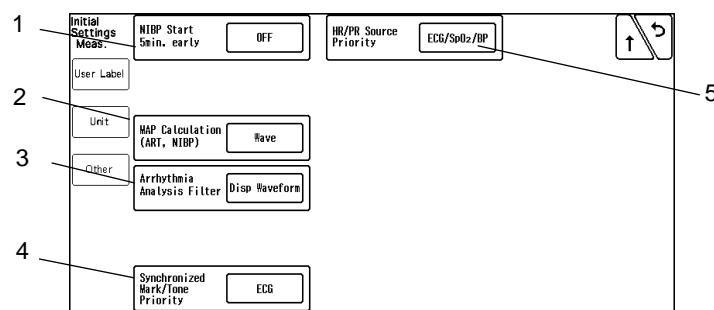
- When the BP, CVP unit is changed, the tabular/graphic trend data with the previous measurement unit will be deleted. Also, when the unit is changed, it is necessary to perform the alarm setup for the new measurement unit.

Other Setup

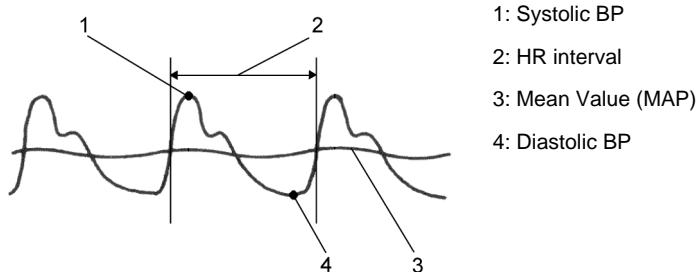
On the "Other" setup screen, other measurement related setup can be performed.

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

► "Other" setup screen will be displayed.



- 1 [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.
- 2 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.



- 3 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>SpO₂>BP. The synchronized tone will be set to [ON].
[SpO₂]: The synchronizing priority will be set in the order of SpO₂>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/SpO₂/BP] is selected, HR/PR source will be set in the priority of ECG>SpO₂>BP.

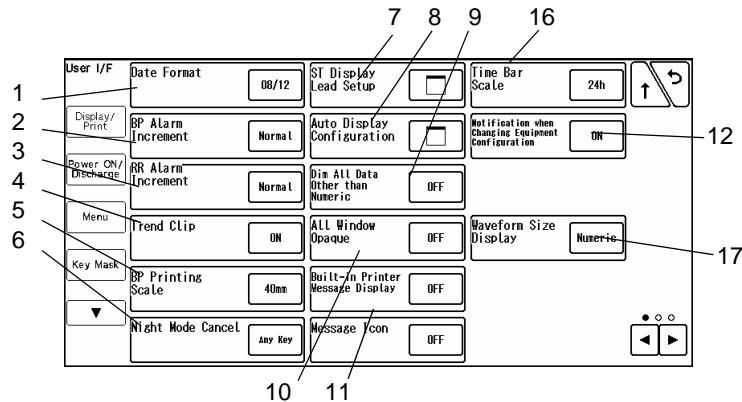
User I/F

Display/Print Setup

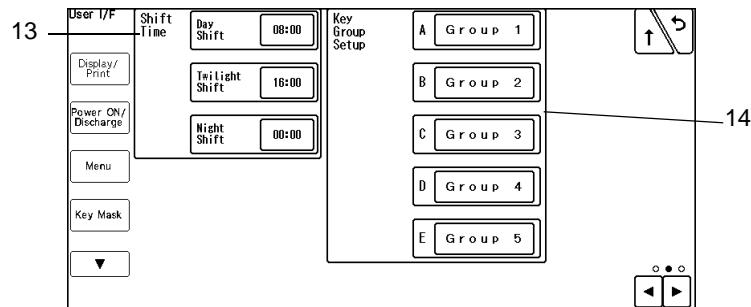
On the display/print setup menu, initial settings for display/print can be performed.

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

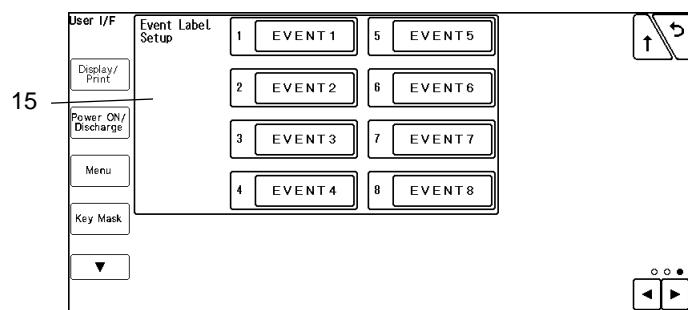
► The "Display/Print" setup screen will be displayed.



First Page



Second Page



Third Page

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

- 2 Select the BP alarm increment from [Normal] or [Small].

	[Normal]	[Small]
0 to 50mmHg	2mmHg increment	1mmHg increment
55 to 300mmHg	5mmHg increment	
0 to 7.1kPa	0.2kPa increment	0.1kPa increment
7.5 to 40.0.1kPa	0.5kPa increment	

- 3 Select the RR alarm increment from [Normal] or [Small].

[Normal]: increment of 5 (used for the software version up to 1.6)

[Small]: increment of 1

- 4 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.

- 5 Select the printing scale height for the BP1 to 2 waveform.

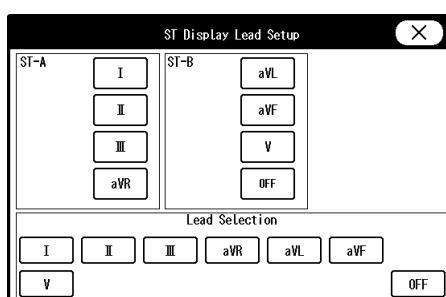
- 6 Select the procedure to cancel the night mode when [No Change]/[Darker]/[Dark] is set.

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

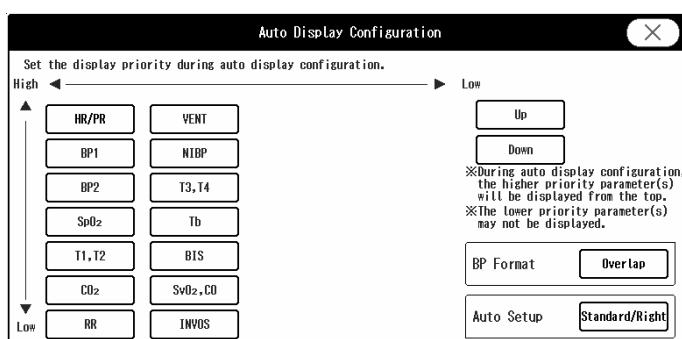
[Night Mode Key]: The night mode can be cancelled by pressing the [Night Mode] key on the user key or on the menu screen.

- 7 The ST lead to be displayed for ST-A to ST-B can be set.

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



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



- 9 [ON]: The display brightness of measurement unit, alarm limit, etc. displayed inside the numeric data box will be dimmed.

[OFF]: The display brightness will not be dimmed.

- 10 [OFF]: The window will become translucent allowing to view the waveform displayed behind the window.

[ON]: The window will not become translucent.

- 11 [OFF]: The built-in printer status will be displayed on the home display.

[ON]: The built-in printer status will not be displayed.

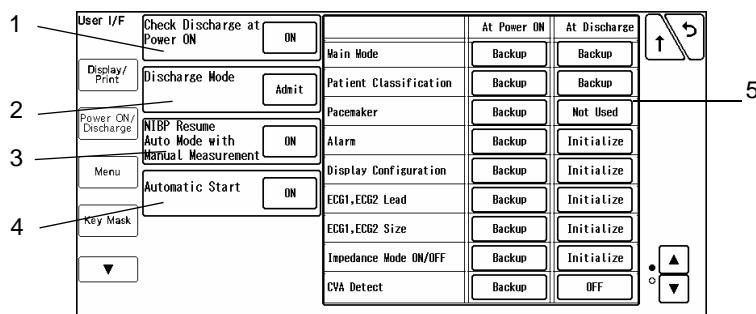
- 12 Select [ON]/[OFF] for "Message Icon".
When there are many numeric data display, the parameter key size will be reduced which may disable the message to be displayed inside the parameter key.
A message icon will be displayed instead to notify that a message is present.
- 13 Select [ON]/[OFF] for "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 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
- 15 8 user keys can be registered for each group. The label for the key group can be also set.
- 16 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.
- 17 The time bar range can be selected from [24h]/[48h].
- 18 Select the waveform size display type on the home display from [Numeric]/[Bar].
[Numeric]: The waveform size for the ECG, RESP, SpO₂ will be displayed in numerics.
[Bar]: The waveform size will be indicated by a bar.

Power ON/Discharge

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

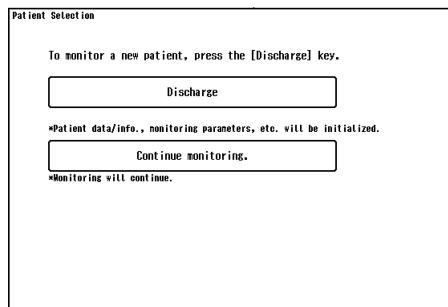
- 1 Press the [Menu], [Initial Settings], [User I/F], [Power ON/Discharge] keys.

► 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.

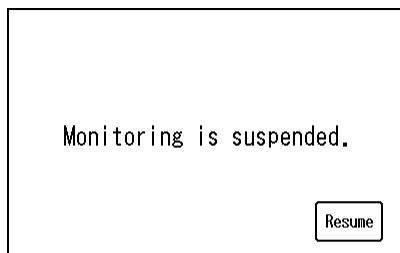
[OFF]: The discharge confirmation window will not be displayed and monitoring will be immediately started.
 [ON]: The discharge confirmation window will be displayed if previous data remains when the power is turned ON.



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

[ON]: Patient monitor will automatically start without pressing the standby switch when the power is supplied in the following way:

* Connect the AC cable.

[OFF]: The standby switch needs to be pressed to start the patient monitor.

- 5 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".
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.

Selection other than Backup

Item	Setup	Power ON/Discharge
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 ₂ Averaging	Initialize	The setting will be initialized with the currently selected mode.
CO ₂ Scale	Initialize	The setting will be initialized with the currently selected mode.
EtCO ₂ Peak Duration	10 sec.	EtCO ₂ 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].
- When the discharge procedure is performed on the central monitor, alarm will be reset according to the setting on "Admit Setup" of the central monitor.

NOTE

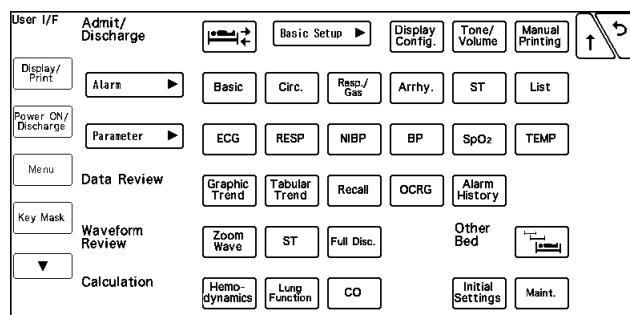
- To connect the DS-8100 system and DS-8500 system using the module connection cable, make sure to connect the AC power cable to the DS-8100 system.
- The operation after the power is turned ON will be according to the setting made on [Initial Settings] > [User I/F] > [Power ON/Discharge]. However, if 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, SpO₂ Averaging, CO₂ Scale, EtCO₂ 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.

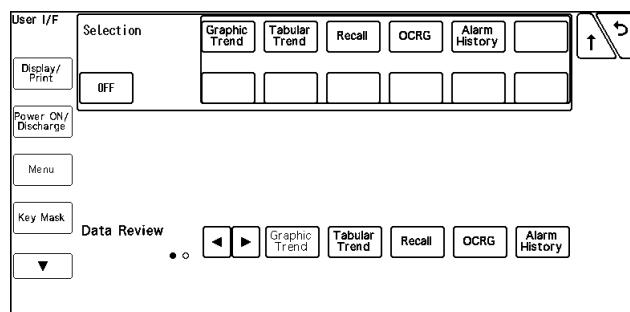
- 1** Press the [Menu], [Initial Settings], [User I/F], [Menu] keys.

► 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.

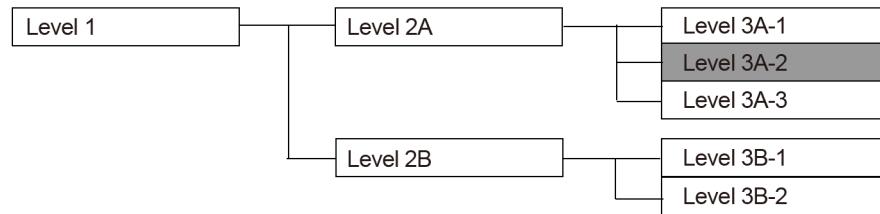
NOTE

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

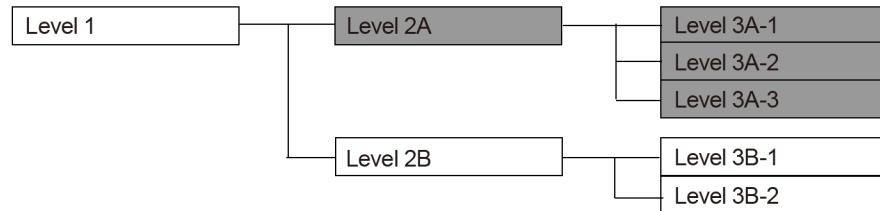
The setup items are in tree structure.

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

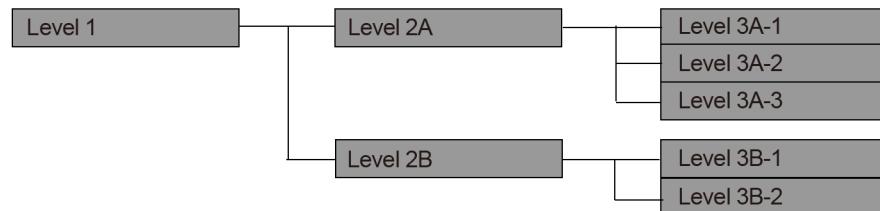
For the following tree structure, if "Level 3A-2" is masked, only this item will be masked.



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

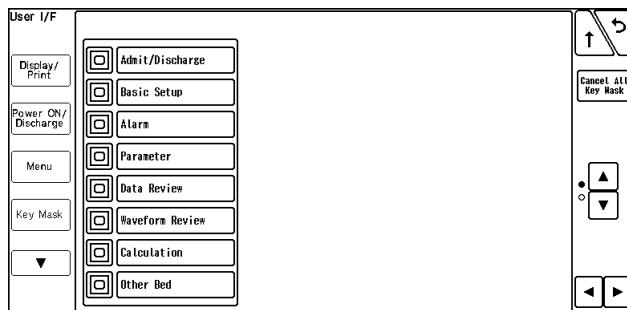


If "Level 1" is masked, the masked items will be as follows.



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

► The key mask setup screen will be displayed.

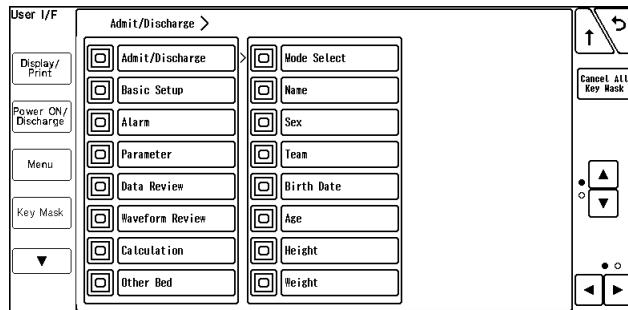


2 Select the item to perform the setting.

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.

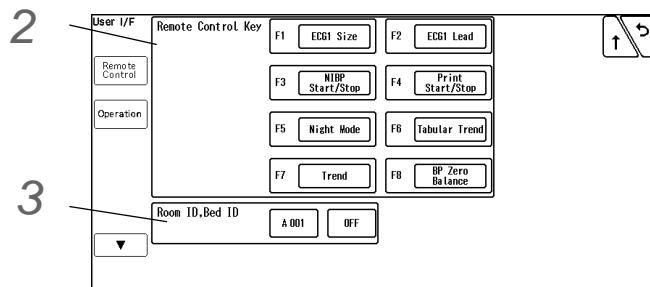
4 Press for the item to display.

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.

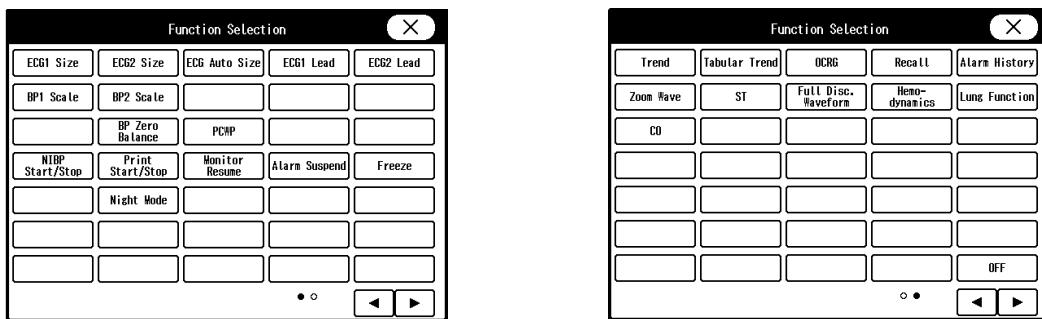
- The remote control setup screen will be displayed.



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 BP2) Scale	Switches the BP1 (to 2) scale each time the key is pressed. The scales will differ depending on the label. (Operation Manual "BP Parameter Setup" P7-27)
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.

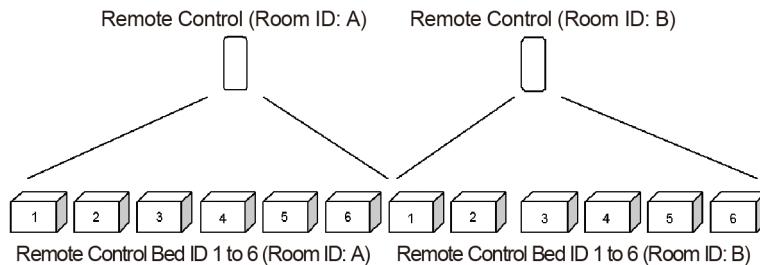
3 Set the Room ID/Bed ID.

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.

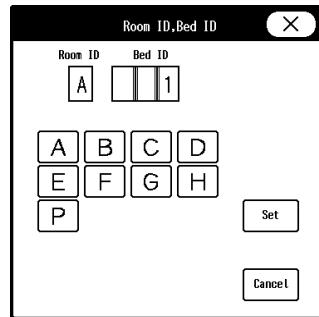
REFERENCE

- ♦ 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.

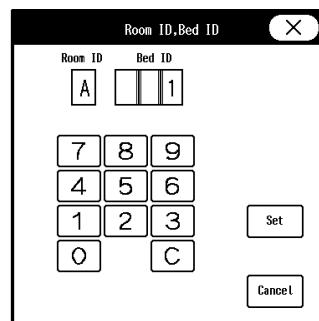
- The "Room ID, Bed ID" window will be displayed.



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.

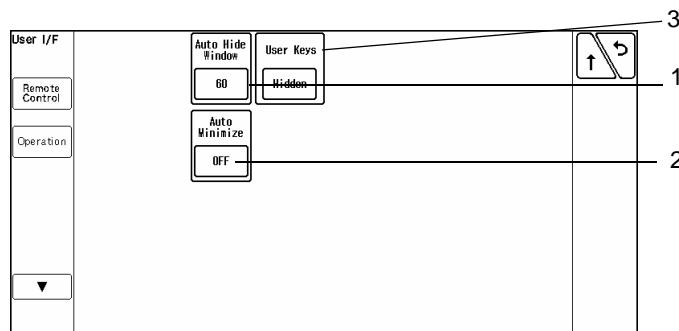
► [Cancel]: The entered Room ID/Bed ID will be cancelled.

Operation Related Setup

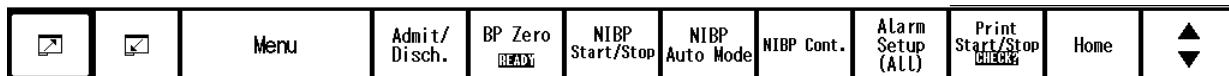
The initial settings for the operation can be performed.

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

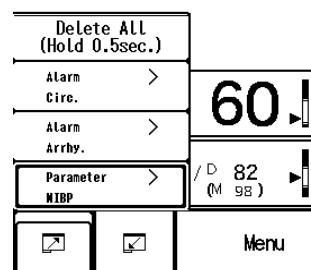
- The operation setup screen will be displayed.



- 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.



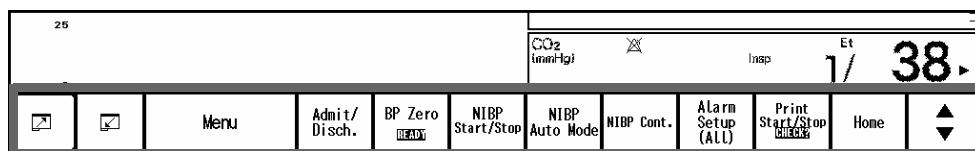
To restore the minimized window, press this key and select the window to restore.



NOTE

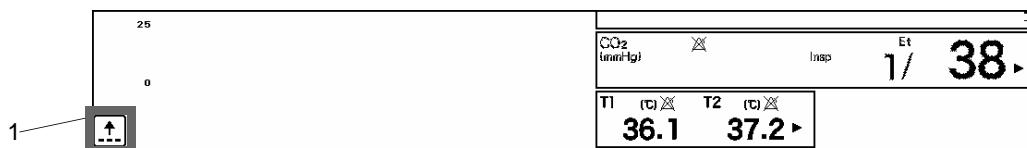
- Maximum of 9 windows can be minimized. If exceeded, the minimized condition from the oldest window will be deleted respectively.

- 3 Whether or not to display the user key area can be selected.
 [Displayed]: The user key area will always be displayed.



[Hidden]: The user key area will be hidden by pressing the [Home] key or after being idle for 5 seconds.

To restore the hidden user key area, press the User Key Area Display Icon or the [Menu] key.



1 User Key Area Display Icon

NOTE

- When "Auto Hide Window" is enabled, the user key area will be hidden at the time the window closes.
- When "User Key" is set to [Hidden], "Auto Hide Window" cannot be set to [OFF].

System Setup

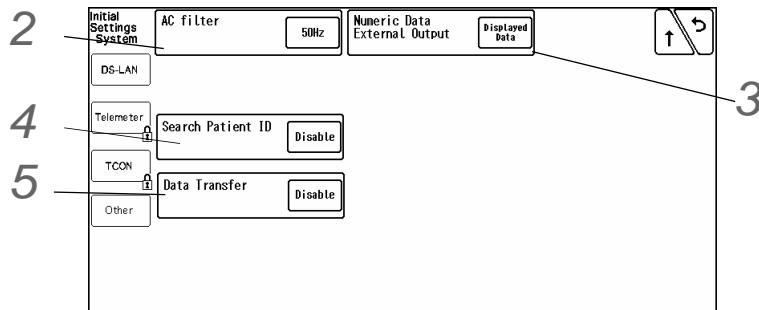
On the system setup menu, system related setup can be performed.

REFERENCE

- For setup of DS-LAN, Telemeter, TCON, 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 "Numeric Data External Output".

The numeric data to be output during DS-LAN, HLX, TCON, PC communication will also change with this selection. The numeric data for trend data will also change with this selection.

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.

4 Set the "Search Patient ID".

1 Press the key for "Search Patient ID".

► The dropdown list will be displayed.

2 Select from [Enable] or [Disable].

► [Enable]: Patient data can be searched on the patient data server using the patient ID.
 (☞ Operation Manual "Entering Patient Information from the Patient Data Server (When DS-LANIII, TCON is used)" P5-6)

► [Disable]: Patient data will not be searched on the patient data server.

5 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.

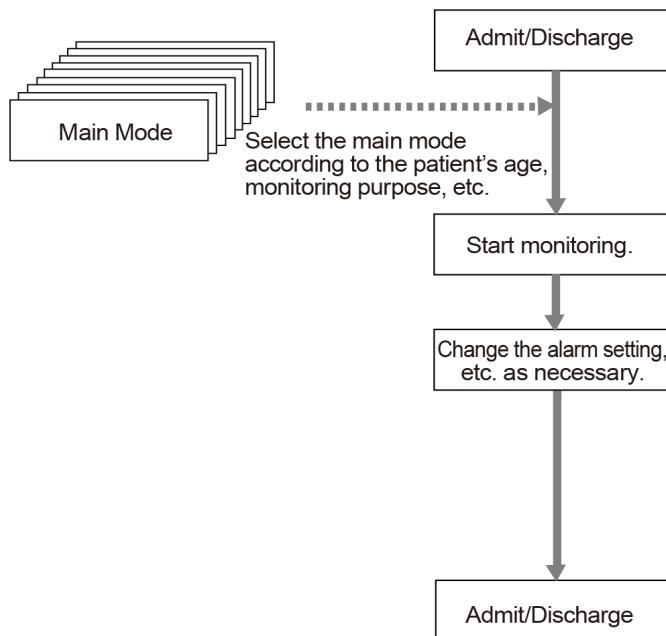
User Mode Registration

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

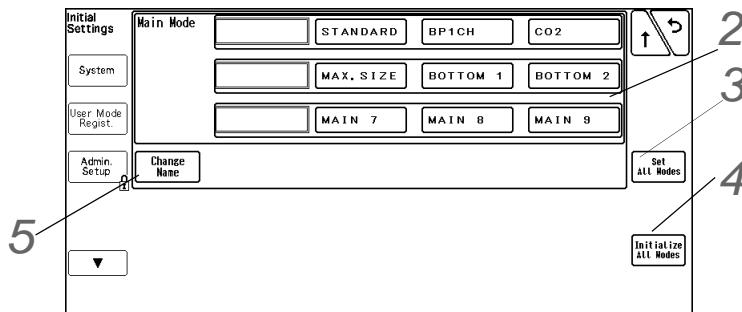
- ♦ Parameter Setup
- ♦ Graphic/Tabular Trend Display
- ♦ Synchronized Mark/Tone
- ♦ RR/APNEA Alarm Source

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.

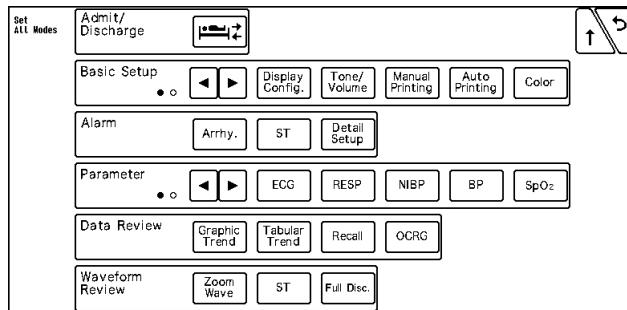
NOTE

- ♦ 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.

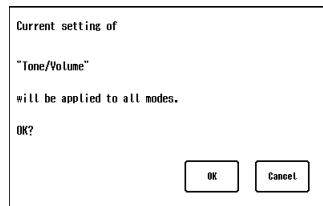
- 1** Press the [Set All Modes] key.

- 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 ₂ , NIBP-S, CO ₂ Et	Yes
Asystole, VF, VT Alarm	Always ON, ON/OFF	Always ON	Yes
HR/PR Low Limit during Alarm Auto Setting	OFF, 30bpm, 40bpm	OFF	Yes
Buzzer Tone at Speaker Failure	Enable, Disable	Enable	Yes
Suspend Arrhy. Analysis during Noise Interference	ON, OFF	OFF	Yes
Lower 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 ^{*1} 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 Sync. to HR, Sync. to RR, OFF
Alarm Level ^{*2}	DS-LAN Standard Setup, User Setup	DS-LAN Standard Setup	Yes
Numeric Data	HR ST BP1 to 2 PR_IBP SpO ₂ PR_SpO ₂ NIBP TEMP1 to 4	S, H, M H, M H, M H, M H, M H, M H, M H, M, L	M M M M M M M L

Item	Details	Default	Backup
Tb RR APNEA CO_2 In CO_2 Et SpCO SpMet SpHb	H, M, L	L	Yes
	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_2 Low Perfusion	L, N	L
	Check NIBP cuff, hose	M, L, N	L
	NIBP meas. failed. (**-**)	M, L, N	M
	Check System Conn.	L, N	N
	Chk DS-LAN Comm	L, N	L
	Some parameters are not displayed due to the display layout setting	L, N, OFF	N
	Check Electrodes	H, M, L	L
	SpO_2 Check Sensor Attach.	H, M, L	L
	Chk TCON Reception	L, N	L

*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 ₂	ECG	Yes
HR/PR Source Priority		ECG/SpO ₂ /BP, ECG/BP/SpO ₂ , SpO ₂ /ECG/BP, SpO ₂ /BP/ECG, BP/ECG/SpO ₂ , BP/SpO ₂ /ECG	ECG/SpO ₂ /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 ₂	mmHg, kPa, %	mmHg	Yes
	BP	mmHg, kPa	mmHg	Yes
	CVP	mmHg/kPa, cmH ₂ O	mmHg/kPa	Yes
	ST	mm, mV	mm	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
RR 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 and B)		4 leads for each pattern of A and B I to V, OFF	ST-A: I, II, III, aVR ST-B: aVL, aVF, V, OFF	Yes
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

Display/Print

Item	Details	Default	Backup
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
Waveform Size Display	Numeric, Bar	Numeric	Yes
Time Shift	Day Shift	Selectable Time	08:00
	Twilight Shift		16:00
	Night Shift		00:00
Key Group Setup	Label A to E	8 alphanumeric characters	Blank*
	A to E	Up to 8 user keys can be registered to each group (Home, Key Lock, Menu, Mode Select, Alarm Silence, Admit/Disch., Alarm Suspend, Rapid Discharge, NIBP Start/Stop, HR/PR Source, NIBP Cont., HR/PR, ECG Size (All Leads) Alarm History BP Zero, Print Start/Stop, Scale, Monitor Suspend, SpO ₂ Display ON/OFF, CO ₂ Display ON/OFF, Freeze, Auto Display Config., ST, Short Trend ON/OFF, PCWP, Transparent Window ON/OFF, Hemodynamics, Change Palette, Lung Function, Trend, Full Disc. Wave, Tabular Trend, Tone/Volume, NIBP List, NIBP Auto Mode, Recall, Alarm Setup (All), Other Bed, Print (LBP) Cancel, OCRG, Manual Printing, Display Config., Time/Date, Stopwatch), Standard, BP1CH, CO ₂ , Standard Bottom, Standard Bottom CO ₂ , Main Mode 7, Main Mode 7, Main Mode 8, Main Mode 9	None
Event Label Setup	EVENT1	8 alphanumeric characters	EVENT1
	EVENT2		EVENT2
	EVENT3		EVENT3
	EVENT4		EVENT4
	EVENT5		EVENT5
	EVENT6		EVENT6
	EVENT7		EVENT7
	EVENT8		EVENT8

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

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
	Main Mode	Backup, Current Mode, Standard, BP 1ch, CO ₂ , Maximum, Bottom 1, Bottom 2, Main 7, Main 8, Main 9	Backup
	Pacemaker	Backup, Not Used	Backup
	Alarm	Backup, Initialize	Backup
	Display Configuration	Backup, Initialize	Backup
	ECG1, ECG2 Lead	Backup, Initialize	Backup
	ECG1/ECG2 Size	Backup, Initialize	Backup
	Impedance Mode ON/OFF	Backup, Initialize	Backup
	CVA Detect	Backup, OFF	Backup
	NIBP Auto Mode	Backup, OFF OFF->2.5 min. OFF->5 min.	Backup
	BP Scale	Backup, Initialize	Backup
	SpO ₂ Averaging	Backup, Initialize	Backup
	CO ₂ Scale	Backup, Initialize	Backup
	EtCO ₂ Peak Duration	Backup, 10 sec.	Backup
At Discharge Backup/Initialize	Patient Classification	Backup, Adult, Child, Neonate	Backup
	Main Mode	Backup, Current Mode, Standard, BP 1ch, CO ₂ , Maximum, Bottom 1, Bottom 2, Main 7, Main 8, Main 9	Backup
	Pacemaker	Backup, Not Used	Not Used
	Alarm	Backup, Initialize	Initialize
	Display Configuration	Backup, Initialize	Initialize
	ECG1, ECG2 Lead	Backup, Initialize	Initialize
	ECG1/ECG2 Size	Backup, Initialize	Initialize
	Impedance Mode ON/OFF	Backup, Initialize	Initialize
	CVA Detect	Backup, OFF	OFF
	NIBP Auto Mode	Backup, OFF OFF->2.5 min. OFF->5 min.	OFF
	BP Scale	Backup, Initialize	Initialize
	SpO ₂ Averaging	Backup, Initialize	Initialize
	CO ₂ Scale	Backup, Initialize	Initialize
	EtCO ₂ Peak Duration	Backup, 10 sec.	10 sec.

Menu

Item		Details	Default	Backup
Menu Setup	Admit/Discharge	OFF, Admit/Discharge	Admit/Discharge	Yes
	Basic Setup	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
	Alarm	OFF, Basic, Circ., Resp/Gas, Arrhy., ST, List, Detail Setup	Basic, Circ., Resp/Gas, Arrhy., ST, List, Detail Setup	Yes
	Parameter	OFF, ECG, RESP, NIBP, BP, SpO ₂ , TEMP, CO ₂ , Ext. Device, Sp*	ECG, RESP, NIBP, BP, SpO ₂ , TEMP, CO ₂ , Ext. Device, Sp*	Yes
	Data Review	OFF, Trend, Tabular Trend, Recall, OCRG, Alarm History	Trend, Tabular Trend, Recall, OCRG, Alarm History	Yes
	Waveform Review	OFF, Zoom, ST, Full Disc. Wave	Zoom, ST, Full Disc. Wave	Yes
	Calculation	OFF, Hemodynamics, Lung Function, CO	Hemodynamics, Lung Function, CO	Yes
	Initial Settings	Initial Settings	Initial Settings	Yes
	Maintenance	Maintenance	Maintenance	Yes
	Other Bed	OFF, Other Bed	Other Bed	Yes

Key Mask

Item		Details	Default	Backup
Key Mask	Admit/Discharge Items	ON/OFF	All ON	Yes
	Basic Setup	ON/OFF	All ON	Yes
	Alarm	ON/OFF	All ON	Yes
	Parameter	ON/OFF	All ON	Yes
	Data Review	ON/OFF	All ON	Yes
	Waveform Review	ON/OFF	All ON	Yes
	Calculation	ON/OFF	All ON	Yes
	Other Bed	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 BP 1 to 2 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 Communication, TCON, 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	OFF	
		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	A4	
		Central Monitor	001 to 016	001	
Status Output	IBP Analog	Sync. Signal Output	IBP1/IBP2/Sync Signal	IBP1	
		Output Signal	HR, RR	OFF*	
		Output Logic	Positive Logic, Negative Logic	OFF*	
	Alarm Output Setup (Status II-1, Status II-2)	Alarm to Output	OFF, APNEA, Level H, Level H,M, Level H,M,L	Level H*	
		Output Logic	Positive Logic, Negative Logic, Pulse	Positive Logic*	
Analog Output Setup		ECG	Disp. Lead, Selected Lead	Disp. Lead	
		IBP Analog/Sync. Signal Output	IBP1/IBP2/Sync Signal	Sync Signal	

*: 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-LANII (10Mbps), DS-LANIII (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 ₂ (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	Depends on the telemeter
	Group	00 to 63	00 *
	Transmitting Waveform	ECG1(ECG1, RESP, CO ₂ , BP1, BP2, SpO ₂), ECG2 (ECG1, ECG2, RESP/CO ₂ , BP1, SpO ₂)	ECG1(ECG1, RESP, CO ₂ , BP1, BP2, SpO ₂)
	CO ₂ (mmHg) Upper Limit of Transmission	No limit, 99mmHg	99mmHg
TCON Setup	TCON	ON, OFF	OFF *
	TCON ID	1 to 16	No selection*
	TCON Channel	2 to 19	No selection*
Other	AC Frequency	50Hz, 60Hz	60Hz
	Search Patient ID	Enable, Disable	Disable
	Numeric Data External Output	Displayed Data All Data	Displayed Data
	Data Transfer Function	Enable, Disable	Disable

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* ¹	Mode Name 8 characters	Normal BP 1ch CO ₂ Zoom Bottom 1 Bottom 2 Main Mode 7 Main Mode 8 Main Mode 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 (Trend, Tabular Trend, Recall, OCRG, ST, Zoom Wave, Full Disc. Wave)

Main Mode (Mode 1)

Item	Default	Backup
Item	Standard	Yes
Layout	Standard/Right(Large)	
Numeric Data	HR, SpO ₂ , NIBP, RR_IMP	
Waveform	ECG1, SpO ₂ , RESP	
User Key	User Key Down 1/2 User Key Down 2/2	Menu, 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 Reversed
Detail Setup (Waveform)	Grid Scale Thickness Clip Fill CO ₂ Waveform ST/VPC/Arrhy. Alarm Display Block Cascade	ON ON Regular ON ON ON Waveform Quantity: 2 Waveform: ECG1, ECG2

Main Mode (Mode 2)

Item	Default	Backup
Item	BP1CH	Yes
Layout	Standard/Right(Large)	
Numeric Data	HR, SpO ₂ , NIBP, BP1, RR_IMP	
Waveform	ECG1, SpO ₂ , RESP	
User Key	User Key Down 1/2 User Key Down 2/2	Menu, 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 ₂ Waveform	ON
	ST/VPC/Arrhy. Alarm Display	ON
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2

Main Mode (Mode 3)

Item	Default	Backup
Item	CO ₂	Yes
Layout	Standard/Right(Large)	
Numeric Data	HR, SpO ₂ , NIBP, BP1, CO ₂ , RR_IMP	
Waveform	ECG1, SpO ₂ , BP1, CO ₂	
User Key	User Key Down 1/2 User Key Down 2/2	Menu, 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 Reversed
Detail Setup (Waveform)	Grid Scale Thickness Clip Fill CO ₂ Waveform ST/VPC/Arrhy. Alarm Display Block Cascade	ON ON Regular ON ON ON Waveform Quantity: 2 Waveform: ECG1, ECG2

Main Mode (Mode 4)

Item	Default	Backup
Item	Zoom	Yes
Layout	Numeric/Max. Size	
Numeric Data	HR, SpO ₂ , NIBP, NIBP List	
Waveform	ECG1	
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 ₂ Waveform ST/VPC/Arrhy. Alarm Display Block Cascade	ON ON Regular ON ON Waveform Quantity: 2 Waveform: ECG1, ECG2

Main Mode (Mode 5)

Item	Default	Backup
Item	Standard/Bottom	Yes
Layout	Standard (Box Layout: Bottom 3 row)	
Numeric Data	HR, SpO ₂ /PR, NIBP, RR_IMP	
Waveform	ECG1, SpO ₂ , RESP	
User Key	User Key Down 1/2 User Key Down 2/2	Menu, Alarm Silence, BP Zero, Scale, Alarm Setup (All), Trend, Tabular Trend, Recall, 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 ₂ Waveform ST/VPC/Arrhy. Alarm Display Block Cascade	ON ON Regular ON ON ON Waveform Quantity: 2 Waveform: ECG1, ECG2

Main Mode (Mode 6)

Item	Default	Backup
Item	Standard/Bottom CO ₂	Yes
Layout	Standard (Box Layout: Bottom 3 row)	
Numeric Data	HR, SpO ₂ /PR, NIBP, BP1,RR(GAS), CO ₂	
Waveform	ECG1, SpO ₂ , BP1, CO ₂	
User Key	User Key Down 1/2 User Key Down 2/2	Menu, Alarm Silence, Scale, Trend, Tabular Trend, Recall, BP Zero, 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 ₂ Waveform ST/VPC/Arrhy. Alarm Display Block Cascade	ON ON Regular ON ON Waveform Quantity: 2 Waveform: ECG1, ECG2

Main Mode (Mode 7)

Item	Default	Backup
Item	Main Mode 7	Yes
Layout	Standard/Right(Large)	
Numeric Data	HR, SpO ₂ , NIBP, RR_IMP	
Waveform	ECG1, SpO ₂ , RESP	
User Key	User Key Down 1/2 User Key Down 2/2	Menu, 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 Reversed
Detail Setup (Waveform)	Grid Scale Thickness Clip Fill CO ₂ Waveform ST/VPC/Arrhy. Alarm Display Block Cascade	ON ON Regular ON ON ON Waveform Quantity: 2 Waveform: ECG1, ECG2

Main Mode (Mode 8)

Item	Default	Backup
Item	Main Mode 8	Yes
Layout	Standard/Right(Large)	
Numeric Data	HR, SpO ₂ , NIBP, RR_IMP	
Waveform	ECG1, SpO ₂ , RESP	
User Key	User Key Down 1/2 User Key Down 2/2	Menu, 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 Reversed
Detail Setup (Waveform)	Grid Scale Thickness Clip Fill CO ₂ Waveform ST/VPC/Arrhy. Alarm Display Block Cascade	ON ON Regular ON ON ON Waveform Quantity: 2 Waveform: ECG1, ECG2

Main Mode (Mode 9)

Item	Default	Backup
Item	Main Mode 9	Yes
Layout	Standard/Right(Large)	
Numeric Data	HR, SpO ₂ , NIBP, RR_IMP	
Waveform	ECG1, SpO ₂ , RESP	
User Key	User Key Down 1/2 User Key Down 2/2	Menu, 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 Reversed
Detail Setup (Waveform)	Grid Scale Thickness Clip Fill CO ₂ Waveform ST/VPC/Arrhy. Alarm Display Block Cascade	ON ON Regular ON ON ON Waveform Quantity: 2 Waveform: ECG1, ECG2

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 (internal pull-up register)
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 output	+5V Power Supply (150mA)
7	NC	Not connected	
8	NC	Not connected	

COM2 Connector

No.	Signal Type	Note	Signal Level
1	RESET	Reset	
2	EXT_IN+(Logic)	Alarm 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 output	+5V Power Supply (150mA)
7	EXT_IN-(Return)	Alarm External Input Return	
8	NC	Not connected	

Status I/O Signal (Status II Connector 1)

No.	Signal Type	Note	Signal Level
1	ALARM_QRS_OUT1	Alarm Output 1	Logic TTL
2	ALARM_OUT2+	Alarm Output 2+ (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 output	+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 output	+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.
- This equipment 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.

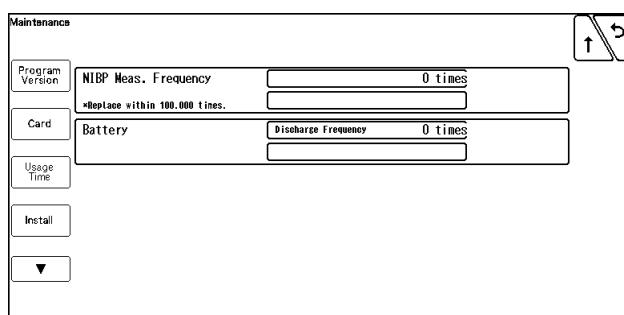
Periodic Replacement Parts	Periodic Replacement Period:
DS-8100 Series Main Unit	
NIBP Unit	100,000 times of measurement
Lithium-Ion Battery Pack BTO-008	300 time of usage or 1 year whichever earlier
HCP-800/HCP-810	
CO ₂ Unit	30,000 hours

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.

2 After the part is replaced, press the [Reset] key.

- ▶ The displayed value will reset.

⚠ CAUTION

- ♦ To reset, set the rotary switch on the main unit to "C".
 - ♦ After resetting, return the rotary switch to original position.
 - ♦ For more details, contact your local Fukuda Denshi service representative.
-

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/Handling the Equipment

This section explains about how to handle the equipment.

After Using the Equipment

- ♦ 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

- ♦ 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

This section explains how to store the equipment and recording paper.

Equipment

- ♦ 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-8100 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" P10-5)
- ◆ 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

Cleaning

Wipe the housing and cables using a tightly squeezed cloth saturated with diluted neutral detergent.

Disinfection

Wipe the housing and cables using a tightly squeezed cloth saturated with alcohol. Then, wipe off with a soft cloth.



CAUTION

- Clean the equipment frequently so stains can be removed easily.
- To prevent injury, it is recommended to wear gloves when cleaning the equipment.
- When cleaning or disinfecting, do not allow chemical solution to enter the equipment or connectors.
- Do not use organic solvents, thinner, toluene or benzene to avoid damaging the resin case.
- Do not polish the housing with abrasive, chemical cleaner, alkaline or acidic detergent. Otherwise, the surface resin or paint coating may be damaged, resulting in discoloration, scratches, and other problems.

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.

BP Transducer

Disinfect the blood pressure transducers according to the manufacturer's guidelines.
Do not reuse / re-sterilize the disposable type transducers.

SpO₂ Sensor

Disinfect the SpO₂ sensor according to the manufacturer's guidelines. Do not reuse/sterilize the disposable SpO₂ 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

- ♦ 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**

- ♦ Do not sterilize the airway adapter using autoclave methods.
 - ♦ Do not reuse / re-sterilize disposable airway adapter.
-

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Chapter 9 Maintenance Check

Daily and Periodic Check

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

- Do not open the housing.
 - Do not allow alcohol or other liquids enter the equipment.
-

Periodic Check

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.

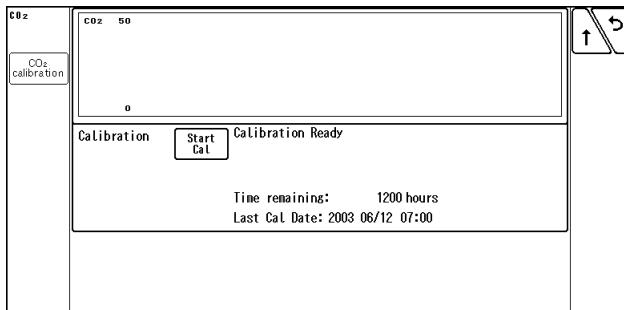
When storing the monitor for a long period, remove the battery from the monitor.

CO₂ Calibration (HCP-800/HCP-810)

This section describes about the procedure of CO₂ gas calibration.

Perform calibration when 1 year has elapsed from the last calibration, or accumulated EtCO₂ measurement time exceeds 4,000 hours, or any measurement error is found.

- 1** Press the [Menu], [CO₂] ("Parameter"), [CO₂ Calibration] to display the CO₂ 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 CO₂ 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 EtCO₂ 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 EtCO₂ was not measured for a while.
 - When a message, "Calibrate the CO₂ unit (HCP-800/HCP-810)" or "The periodic calibration of the CO₂ unit (HCP-800/HCP-810) is approaching" is displayed at power

ON.

- ♦ Dispose of calibration gas according to the regulation of each medical institution.

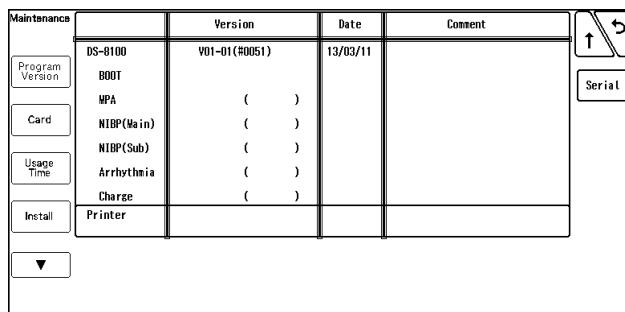
Program Version

On the maintenance screen, software version of the main unit and modules can be verified.

1

Press the [Menu], [Maintenance] keys.

- The software version screen will be displayed.



The screenshot shows a software version table with the following data:

Maintenance	Version	Date	Comment
DS-8100	V01-01 (#0051)	13/03/11	
BOOT	()		
MPA	()		
NIBP(Main)	()		
NIBP(Sub)	()		
Arrhythmia	()		
Charge	()		
Printer			

- The software version, boot version, date, comment required for the DS-8100 System system will be displayed.
 - ♦ DS-8100 Main Unit Software
 - ♦ HR-810 Recorder Unit Software
 - ♦ Recorder/Expansion Port Unit HR-811
- [Serial]: The information of the equipment connected to the serial connector of the main unit will be displayed.

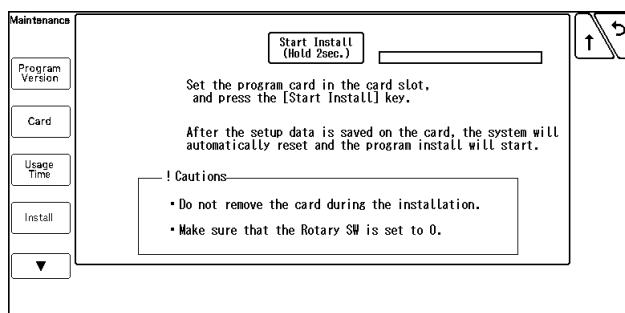
Software Install

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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FUKUDA DENSHI CO., LTD.

3-39-4 Hongo, Bunkyo-ku, Tokyo, Japan
Tel: +81-3-5684-1455 Fax: +81-3-3814-1222
<http://www.fukuda.com>

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