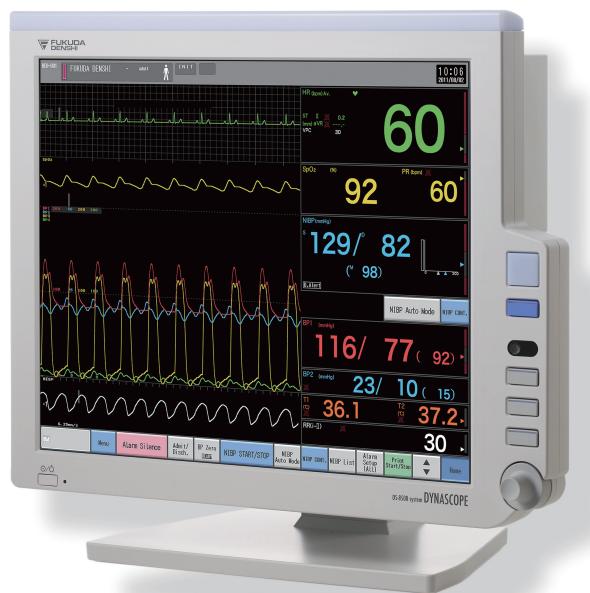


DYNASCOPE 8000 Series Patient Monitor

DS-8500 System

Ver. 10

Maintenance Manual



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

This manual is for the DS-8500 System Version 10.



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>

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

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

Parameters such as ECG, heart rate, respiration, non-invasive blood pressure (NIBP), pulse rate, arterial oxygen saturation (SpO₂), carboxyhemoglobin saturation (SpCO), methemoglobin saturation (SpMet), and total hemoglobin concentration (SpHb), plethysmograph, temperature, invasive blood pressure (IBP), cardiac output, carbon dioxide concentration (CO₂), nitrous oxide concentration (N₂O), oxygen concentration (O₂), anesthetic agent concentration (AG), and Spirometry may be monitored individually or in any grouping required by the clinician.

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

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

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

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

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

Copyright

- (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-8500 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 to the previous display, user key setup
4. Preparation	Installing the recording paper, power ON/OFF, time/date, daily checks
5. Admit/Discharge	Entering patient information (name, age, etc.) at admittance, discharging the patient, user mode selection, suspend monitoring
6. Alarm Function	General description of alarm function, alarm-related setups
7. Monitoring	Measurement condition setup of the monitoring parameters, size/scale setup, etc. Setup of the stop watch, connector
8. Review Function	Arrhythmia analysis, 12-lead analysis, trend, recall, NIBP list, ST measurement, hemodynamics, lung function, alarm history, other bed display, full disclosure waveform
9. Printing	Recorder output function
10. System Configuration	Setup of the display configuration, tone/volume, color, etc.
11. Troubleshooting	Message list, maintenance and troubleshooting of this equipment
12. Setup Item/Default Value	Setup details and default value
13. Accessories	List of accessories and optional accessories of this equipment
14. Specification	Specification and performance of this equipment

The maintenance manual is composed of the following chapters.

Chapter Title	Description
Preface	Outline and purpose of this manual (Important Notice, About This Manual)
Safety	Warning, Precautions for Safety
1. Installation of the Unit	Precautions about the operating environment, system construction, mouse connection
2. Network System Construction	Network connection and setup
3. Using the CF card	Procedure to use the CF 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.

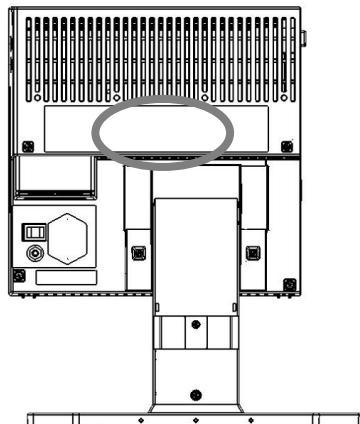
Warning Labels Attached to the Unit

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

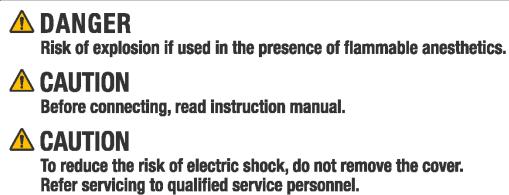


- Do not damage or erase the warning labels attached to the unit.
These warning labels contain important descriptions for handling and operating the unit properly and safely. A damaged label may compromise safe operation.

DS-8500 System Main Unit (DSC-8500 Series)

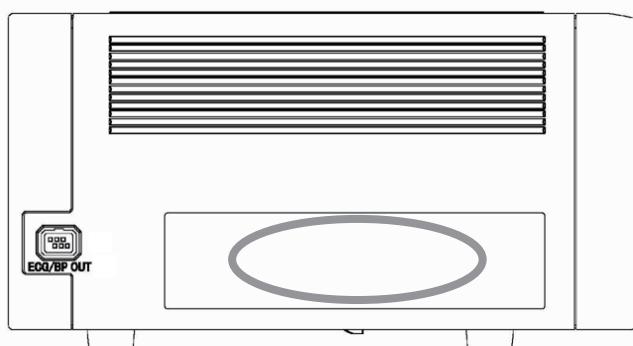


Warning Labels Attached to the Unit

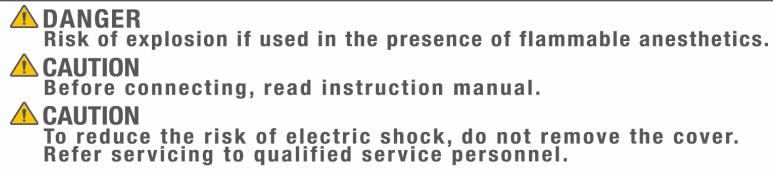


Warning Label

□ DS-8500 System Super Unit (HS-8000 Series)



Warning Labels Attached to the Unit (HS-8312)



Warning Label

Graphic Symbols

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

Symbol	Description
	Caution, refer to accompanying documents. Indicates the need to refer to the related accompanying documents before operation.
	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)
	Power ON Indicates that the main power switch is in the ON position.
	Power OFF Indicates that the main power switch is in the OFF position.
	Electrostatic Sensitive Part Directly touching this connector part with hands should be avoided.
	Type CF Applied Part with Defibrillation-Proof Indicates the degree of protection against electric shock is Type CF Applied Part with defibrillation-proof.
	Type BF Applied Part with Defibrillation-Proof Indicates the degree of protection against electric shock is Type BF Applied Part with defibrillation-proof.
	Signal Output
	Gas Input
	GAS Output
	Signal Input
	TCP/IP Network Connector
	RS-232C Connector
	Eject: Indicates the switch to remove the recorder paper cassette.
	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 system.

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

- Do not install or store in an area where the unit will be subject to splashing water.
- Do not install or store in an area where the environmental conditions, such as atmospheric pressure, temperature, humidity, ventilation, sunlight, dust, sodium, sulfur, will adversely affect the equipment.
- 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.
- Do not install the equipment in a location where it is difficult to unplug the power cable.

□ Precautions Before Using the Equipment

- Verify the power voltage.
- Check the cable connection and polarity to ensure proper operation of the unit.
- Make sure the power system has adequate earth ground.
- Ensure that all cables are firmly and safely connected.
- Pay special attention when the device is used in conjunction with other equipment as it may cause erroneous judgment 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. Also, the operator should not contact the patient and the equipment at the same time.
- 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, do not apply excessive force by pulling on the cable. Pull from the connector part of the cable.
- 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.
- ♦ Danger such as electric shock may result to the patient and operator.

□ Precautions about Maintenance Check

- ♦ Make sure to periodically check the equipment, accessories and cables.
- ♦ Before reusing the equipment that has been left unused for a while, make sure that the equipment works normally and safely.

□ 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 proper ground is selected.

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.

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



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

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

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

Precautions about Connections to Peripheral Devices

For safety and good performance of this equipment, 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, IEC 60601-1-1.
- ♦ 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-8500 System are, with some exceptions, isolated from the power supply, the connecting peripheral devices should comply with IEC 60601-1. It is the user's responsibility to verify that the overall system complies with IEC 60601-1-1, "Collateral Standard: Safety Requirements for Medical Electrical Systems".
- ♦ 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 IEC60601-1-1. 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 unspecified or damaged unit, cable, or sensor to any I/O connector. If done so by mistake, the equipment 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 specified 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 connecting, do not use a multiple portable socket-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 all patient cables to reduce the possibility of patient entanglement or strangulation.
- When lifting this equipment, hold the bottom part of the main unit and not the display unit.
- When attaching the display unit to the main unit, place the display unit facing down and slowly attach the main unit using the guide on the side of the display unit. Then, secure it with the specified screws.

WARNING

Warnings about the Monitoring

- The purpose of the apnea alarm is to alert the user to evaluate for the possible occurrence of apnea events by identifying the absence of respiration. It is not intended to be classified as an "Apnea Monitor" and will not identify the condition creating the possible event. (Central, Obstructive or Mixed)
- 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.
- Pulse oximeter should not be used as a replacement or substitute for ECG based arrhythmia analysis.
- 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 excessive total bilirubin
 - 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
- ♦ For the following case, loss of pulse signal can occur.
 - ♦ Sensor is too tight.
 - ♦ Patient has hypotension, severe vasoconstriction, severe anemia, or hypothermia.
 - ♦ There is arterial occlusion proximal to the sensor.
 - ♦ Patient is in cardiac arrest or is in shock.
- ♦ 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 corresponded to the selected RR/APNEA source is displayed. Make sure to display the parameter key 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.
- ♦ The oxygenator mode is intended to prevent alarms during cardiopulmonary bypass surgery. Pay special attention when using this mode as the alarm generation will not be the same as to the standard monitoring mode.
- ♦ If the "Alarm Setting" under the Oxygenator Mode Setup is set to [All OFF], all vital alarm will not generate regardless of the alarm setting of each parameter. Also, if [Sel. Parameter] is set, vital alarm for unselected parameter will not generate. Pay attention to not miss any significant change of the patient's vital sign as the alarms will not be generated during the Oxygenator Mode.
- ♦ Once the cardiopulmonary bypass is finished, make sure to cancel the Oxygenator Mode and return to the standard monitoring mode.

 WARNING Warnings about the SpO₂ Monitoring (HS-8312M or HG-810)

- ♦ 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 measurements.

- ♦ Motion artifact may lead to inaccurate SpMet, SpCO, SpHb 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 to 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.

⚠ WARNING Warnings about the Gas Monitoring (MGU-800/810 Series)

- ♦ Use only specified gas sampling products manufactured by "Mindray Medical Sweden AB". Refer to section on "Optional Accessories", for list of specified "Mindray Medical Sweden AB" DRYLINE™ gas sampling products. These accessories may be purchased from Fukuda Denshi or any authorized "Mindray Medical Sweden AB" distributor.
(☞ Operation Manual "Anesthetic Gas Concentration Measurement (Mindray Medical Sweden AB)" P13-7)
- ♦ If the water trap should break or become damaged during operation, there is a risk that bacteria and/or mucus may contaminate the MGU-800/810 series.
- ♦ The airway adapter, sampling line, and flow sensor are intended for single patient use only, and must not be reused in order to avoid cross infection.
- ♦ The MGU-800/810 series must not be used with flammable anesthetic agents.
- ♦ To protect the hospital staffs from unnecessary anesthetic agent, it is strongly recommended to connect the exhaust port to the gas exhaust system in the hospital.
- ♦ The sampling line may get clogged by internal condensation.
- ♦ The contents of the water trap should be handled as a potential infection hazard.
- ♦ For MGU-800 Series;

- ♦ Do not use Adult type water traps and/or sampling lines with neonates to avoid high sampling flow.
- ♦ Connect only DRYLINE™ gas sampling lines to the water trap. Note that there may be other compatible tubing present, e.g. IV-lines.
- ♦ Do not use DRYLINE™ neonatal sampling lines (blue Luer lock nuts) with DRYLINE™ adult water traps as this could result in incorrect measurement data.
- ♦ Do not use DRYLINE™ adult sampling lines (colorless Luer lock nuts) with DRYLINE™ neonatal water traps as this could result in incorrect measurement data.
- ♦ For MGU-810 Series;
 - ♦ Only combine SPIRIT™ Flow Sensors and DRYLINE™ Water Traps as described in the table below. Other combinations might lead to incorrect measurements.

Patient Category	Patient Classification Selection on "Admit/ Discharge" Screen	SPIRIT™ Flow Sensor	DRYLINE™ Water Trap
Adult	Adult	Adult (60-16100-00)	Adult (60-13100-00)
Pediatric	Child	Pediatric (60-16200-00)	Neonate (60-13200-00)
Neonate	Neonate	Pediatric (60-16200-00)	Neonate (60-13200-00)

- ♦ Use the adult flow sensor for a patient whose tidal volume is above 150 mL
Use the pediatric flow sensor for a patient whose tidal volume is below 300 mL.
Make sure to use the correct flow sensor depending on the patient conditions, adult or pediatric and the tidal volume
- ♦ Do not confuse the gas sampling line with other compatible tubing, e.g. IV-lines.

⚠ WARNING Warnings about the 12-Lead ECG Analysis Function

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

⚠ CAUTION Precautions about the System

- ♦ 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.
- ♦ When adjusting the angle of the display unit, pay attention not to have your hands get caught in between.
- ♦ 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 not using for a long period, make sure to turn OFF the power of the main unit.

⚠ CAUTION**Precautions about the ECG Monitoring**

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

⚠ CAUTION**Precautions about the ST Measurement**

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

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

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

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

- ♦ ECG Recording by the Mason-Likar System

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

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

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

CAUTION Precautions about the 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 (HS-8312N or HG-820)/Masimo Unit (HS-8312M or HG-810), 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 (HS-8312N or HG-820)/Masimo Unit (HS-8312M or HG-810), 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 (HS-8312M or HG-810)

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

⚠ CAUTION Precautions about the NIBP Monitoring

- ♦ Do not apply the NIBP cuff to site of injury. An injury may be worsened by the measurement.
- ♦ Do not apply the NIBP cuff to the arm on side treated axillary lymph nodes dissection. It may lead to lymphatic edema by the cuff pressure.
- ♦ Measuring on a limb with SpO₂ sensor, arterial catheter, or intracatheter may result in incorrect measurement.
- ♦ An operator must not get away from a patient during the NIBP measurement. However, when getting away from the patient is necessary, do not activate the Alarm Suspend and Silence functions in order not to miss any sudden changes in the patient's condition.
- ♦ Pay attention when measuring the NIBP of patient with bleeding disorders or hyper coagulation. The cuff inflation may cause petechia or circulatory failure by the blood clot.
- ♦ For the following situation, measurements will be terminated.
 - ♦ When the measurement time has exceeded 160 seconds for adult and child, 80 seconds for neonate.
 - ♦ When the inflation value has exceeded 300mmHg for adult, 210mmHg for child, and 150mmHg for neonate.
- ♦ If used with the incorrect patient classification, it will not only cause erroneous measurement, but the inflating level for the adult may be applied to child or neonate causing dangerous situation to the patient.
- ♦ The continuous measurement and 1-minute interval measurement will automatically stop after 12 minutes (maximum 15 minutes).
- ♦ If the mean MAP display is set to OFF, the MAP alarm will not be generated. Also the MAP data will not be displayed for the tabular trend or the NIBP list.



CAUTION Precautions about the BP Monitoring

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



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/HPD-810 Gas Unit I/F with Capnostat 5)

- ♦ 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.
- ♦ The disposable airway adapter should be opened just before use. Do not sterilize.
- ♦ Do not reuse the disposable 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" 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 this message is displayed.
- ♦ For the HPD-800/810 Gas Unit I/F and HCP-800/810 CO₂ Gas Unit, the upper EtCO₂ alarm will not generate if the upper limit is set to 100mmHg/13.4kPa and above as the measurement range is 0 to 99mmHg / 0 to 13.3kPa.
- ♦ Whether to use the 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-8500 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 NIBP alarm is turned OFF under the Oxygenator Mode, NIBP auto mode measurement and NIBP measurement at alarm occurrence will not be performed.

 CAUTION Precautions about the System Setup

- ♦ When the waveform and numeric data display for each parameter is set to OFF, the alarm and trend input will be also suspended.
- ♦ If the HR/PR source is set to [BP], and if BP waveform/numeric data is set to [Disp. OFF], the PR value will not be displayed.
- ♦ If the HR/PR source is set to [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.
- ♦ If the RR source is set to [CO₂/GAS], and if GAS 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 monitors 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 to NIBP measurement, periodic recording, trend, NIBP list data, and age calculation from the birth date.
- ♦ If the time/date is changed, the time/date for all the patient data stored such as trend, NIBP list, recall data will also change. The printed time/date before changing and the displayed time/date on the monitor after changing will differ. Also, the data transmitted to the central monitor before the time/date is changed will be displayed on the central monitor with the previous time/date.

⚠ CAUTION Precautions about the Multigas/SPIRO Monitoring (MGU-800/810 Series)

- ♦ When the Multigas Unit (MGU-800/810 series) and HPD-800/HPD-810 are simultaneously used, the CO₂ concentration measurement will be performed by the equipment selected for the "CO₂ Source Priority" on ([Menu]>"Parameter"[CO₂]).
- ♦ The MGU-800/810 series requires at least 10 minutes of warm up period to perform full accuracy measurement.
- ♦ If the power supply is interrupted due to reason such as power failure, the MGU-800/810 series will be initialized and enter into warm-up state even if the power failure is within 30 seconds.
- ♦ About the gas calibration;
 - ♦ When the MGU-800/810 series is connected, gas calibration will immediately start.
 - ♦ After the warm-up is completed, gas calibration will perform at 4-hour intervals on stable operation.
 - ♦ Gas calibration will be performed at shorter intervals during warm up period.
 - ♦ During gas calibration, measurement data will not be updated.
 - ♦ Gas calibration does not require calibration gas.
- ♦ About the storage;
 - ♦ Do not store the MGU-800/810 series at extreme temperature as it may affect the measurement accuracy. If stored in a temperature exceeding the specified range (-10°C to 60°C), it may damage the equipment.
 - ♦ If the MGU-800/810 series is stored in low temperature, it may require additional warm-up time after turning ON the equipment.
 - ♦ Make sure the sampling line and flow sensor is securely connected to prevent any leakage.
 - ♦ In an environment where there is alcohol vapor, some errors may be observed in the measurement.
 - ♦ Contamination with CO₂, N₂O or anesthetic agent in the air surrounding the MGU-800/810 series may cause significant measurement errors.
- ♦ The MGU-800/810 series complies with standards for cyclical pressure up to 10kPa.
- ♦ SPIRO and ventilator cannot be used simultaneously.
- ♦ During the warming up process, the date of the last measurement accuracy check cannot be updated. Perform the measurement accuracy check after the warming up process is completed.
- ♦ If the gas measurement accuracy check is performed using a low pressure gas, the accuracy of gas measurement will be reduced. Make sure to check the gas measurement accuracy using the specified calibration gas before its expiration date.
- ♦ If the error persists, refer to our service representative.
- ♦ MGU-810 Series
 - ♦ The adult flow sensor dead space is 6.9 mL and the flow resistance is 1.8 cmH₂O at 60 L/min. Adjust ventilation accordingly.
 - ♦ The pediatric flow sensor dead space is 0.75 mL and the flow resistance is 0.9 cmH₂O at 10 L/min. Adjust ventilation accordingly.

- ♦ To prevent condensation, the patient breathing circuit, flow sensor and pressure tubing should not be directly exposed to cooling equipment such as fans or cooling blankets.
- ♦ Leakage of gas from the patient breathing system may occur if the pressure or gas sampling lines are not connected to the MGU-810.
- ♦ The pressure tube and gas sampling lines of the flow sensor should always be routed from the patient circuit to the MGU-810 such a way as to avoid kinking.
- ♦ Flow sensors that have suffered damage to sensor head, tubing or tubing connector must not be used.
- ♦ If liquid has entered the pressure tubes, it can be removed by gently tapping or shaking the flow sensor.

 CAUTION Precautions about the Patient Admit/Discharge

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

 CAUTION Precautions about the CF/SD Card

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

 CAUTION Precautions about the Maintenance

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

Example:

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

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

Wired Network (DS-LANII/ DS-LANIII)

WARNING

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

CAUTION

- ♦ When using the wired network transmission, configure the display so that the numeric data corresponded to the waveform is displayed. If not, the displayed waveform or numeric data may not be transmitted.
- ♦ The Bed ID is factory set to 000. If connected to the wired network with the ID unchanged, monitoring on the central monitor will not be possible.
- ♦ When connected to the wired network, make sure that there are no other bedside monitors with the same Bed ID. If there are more than one bedside monitors with the same Bed ID, the duplicated bedside monitors cannot be monitored on the central monitor.
- ♦ When connected to the DS-LANII network, set the Bed ID in the range from "001" to "048".
- ♦ When connected to the DS-LANIII network, set the Bed ID in the range from "001" to "100".
- ♦ There are following restrictions when connecting the DS-8500 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 DS-LANII network, waveform, numeric data, and alarm of BP7, BP8, TEMP3–8 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" is other than [CO₂/GAS] (Or, if [Auto] selects a setting other than [CO₂/GAS]), 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]), the CO₂ value of 100mmHg or above will be transmitted as 99mmHg.
 - ♦ BIS alarm will not be generated on the central monitor.
- ♦ As the DS-8500 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-8500 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-8500 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-8500 System will be displayed. The RR and APNEA monitored on the central monitor and the DS-8500 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-8500 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-8500 System, cable, and replace the cable if necessary. If the malfunction persists, stop using the equipment.
- ♦ The alarm generation on the DS-8500 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.

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-8500 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-8500 System, cable, and replace the cable if necessary. If the malfunction persists, stop using the equipment.
- ♦ The alarm generation on the DS-8500 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.
- ♦ When Servo-i/s or SV-300 is connected, RESISTANCE (Insp, Exp), COMPLIANCE, P-V loop, F-V loop display function is not available.
- ♦ When FLOW-i is connected, P-V loop, F-V loop display function is not available.

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, 1991.)

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.

MGU-800/810, HPD-800/810, HCP-800/810 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.

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 electromagnetic influence and take appropriate countermeasures.

The following are examples of the common cause and countermeasures.



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.



WARNING

Lightning

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

- ♦ Use the uninterruptible power supply system.



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-8500 System is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-8500 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-8500 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-8500 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-8500 System is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-8500 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-8500 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-8500 System is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-8500 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-8500 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).</p> <p>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}.</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
<p>Note 1: At 80MHz and 800MHz, the separation distance for the higher frequency range applies.</p> <p>Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p> <p>*1: Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast can not be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the DS-8500 System is used exceeds the applicable RF compliance level above, the DS-8500 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-8500 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-8500 System

The customer or the user of the DS-8500 System can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the DS-8500 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-8500 System			
Rated Maximum Output Power of Transmitter (W)	Separation Distance according to Frequency of Transmitter (m)		
	150kHz to 80MHz $d = 1.2 \sqrt{P}$	80MHz to 800MHz $d = 1.2 \sqrt{P}$	800MHz to 2.5GHz $d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

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

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

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

Essential Performance Statement

- ♦ This equipment complies with the requirements of 6.2.1.10 of IEC 60601-1-2:2007 and the accuracy requirements of heart rate range, accuracy and QRS detection range except sub clauses ESD and electrosurgery.
- ♦ This equipment will not change the operation state, lose or change any stored data, generate errors in control software that cause an unintended change in output, or cause errors in blood pressure readings that are outside of 6.2.1.10 of IEC 60601-1-2:2007 and the accuracy requirements of accuracy of systolic and diastolic pressure except for sub clauses ESD and electrosurgery. These criteria do not apply to ESD testing.<IBP>
- ♦ Pulse oximeter equipment meets the requirements of IEC 60601-1-2. <SpO₂>
- ♦ This equipment will not change the operation state, lose or change any stored data, generate errors in control software.<NIBP/TEMP/CO/RESP/EtCO₂>

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 (10 to 35°C for MGU-800/810 series)
 - ♦ Relative Humidity: 30 to 85% (non-condensing)
- ♦ 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 a hospital grade 3-way outlet. When connecting, do not use a multiple portable socket-outlet.
 - ♦ Verify power voltage and frequency before connecting to an AC power source.
 - ♦ Use the power source that can provide adequate power to the device.
Refer  "Operation Manual "Specification" P14-1 for power voltage, frequency, and power consumption.
- ♦ Pay attention when installing or storing the equipment. Do not install or store in the following locations.
 - ♦ where chemicals are stored or gas may generate
 - ♦ where the equipment will be subject to splashing water or humidity from a nebulizer or vaporizer
 - ♦ where the equipment will be subject to direct sunlight
 - ♦ where the equipment will be subject to inclination, vibration, or shock
 - ♦ where it is difficult to unplug the power cable
- ♦ 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 main unit is embedded in a wall or surrounded by a wall, a minimum space of 10 cm is required.
- ♦ The Super Unit (HS-8000 series), Multigas Unit (MGU-800/810 series), Recorder Unit (HR-800), Input Box (IB-8004) must be transversely installed. If installed in incorrect direction, water or chemicals may enter the equipment and cause damage. For the recorder unit, it may also cause paper jam.

WARNING

- ♦ If the equipment is used under an environment not fulfilling the specified condition, not only that the equipment cannot deliver its maximum performance, the equipment may be damaged and safety cannot be ensured.

If using in an environment other than specified above, contact our service representative.

⚠ CAUTION

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

System Construction

This section describes the connection procedure of this equipment.

Connect the Main Unit (DSC-8500 series) with necessary units such as Display Unit (LC-8019T/LC-8019TC/LC-8015T/LC-8015TC), Super Unit (HS-8000 series), Input Box (IB-8004), etc.

Connection with the Display Unit

⚠ WARNING

- ♦ When lifting this equipment, hold the bottom part of the main unit and not the display unit.
- ♦ When connecting the display unit to the main unit, make sure to secure them with screws.

NOTE

- ♦ When turning ON the power for the first time after the display unit and the main unit is connected, the display may scintillate. This is a normal operation of the display unit and not a malfunction.

1

Lay a soft cloth on a table to protect the LCD, and place the display unit facing downwards.

NOTE

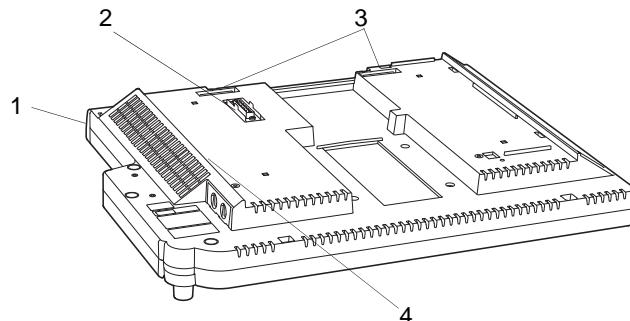
- ♦ Place the display unit so that it will not apply force to the jog dial.

1 Display Unit (LC-8019T/LC-8019TC, LC-8015T/LC-8015TC)

2 Main Unit Connector

3 Connection Guide Hole

4 Side Guide



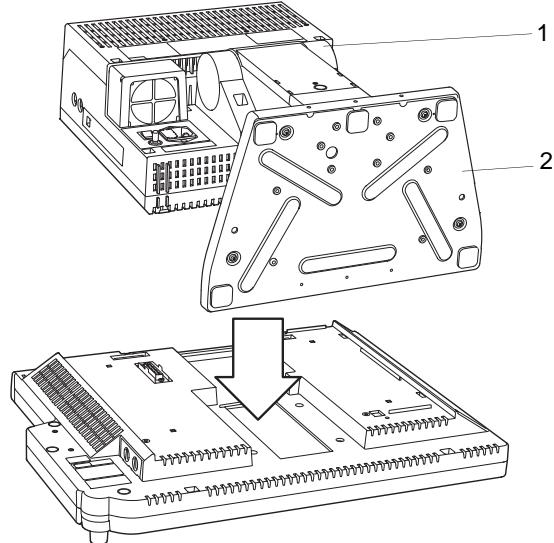
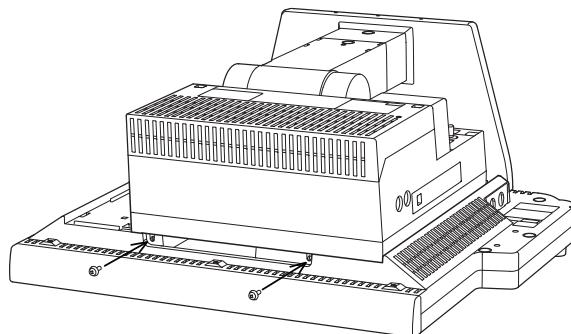
* The figure shown is LC-8019T/TC.

2 Attach the main unit from above using the side guide and connection guide hole.**NOTE**

- Slowly attach the main unit so that it will not apply force to the connector.
- For procedure to connect the main unit with exclusive stand, refer to the OAO-44A manual.

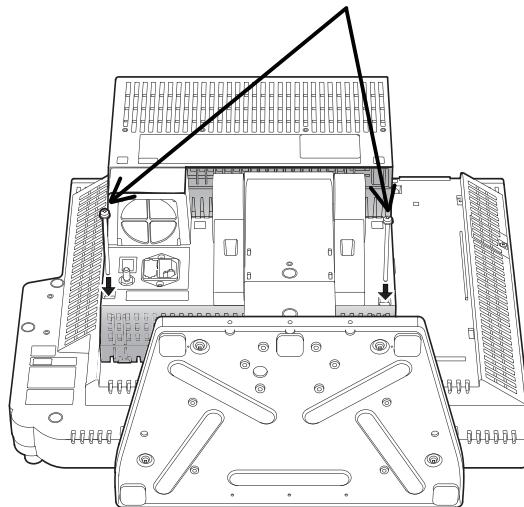
1 Main Unit (DSC-8510/8530)

2 DS-8500 Main Unit Stand (OAO-44A: option)

**3** Fix 2 parts on the top side with accessory screws
(Double Washer Sems Screw: M4x12).

4

Fix 2 parts on the back side with accessory screws (Double Washer Sems Screw: M4x65).



Connection with the Super Unit, Input Box

Connect the main unit and the HS Adapter (HSA-80 series) with module connection cable (CJO-08SSxx).

When using the Input Box (IB-8004), connect the main unit and Input Box with module connection cable and connect the HS Adapter to the main unit via Input Box.

Make sure that the power is turned OFF when connecting or disconnecting the cable.

The following cables of different length are available according to the different arrangement of main unit, Super Unit and Input Box.

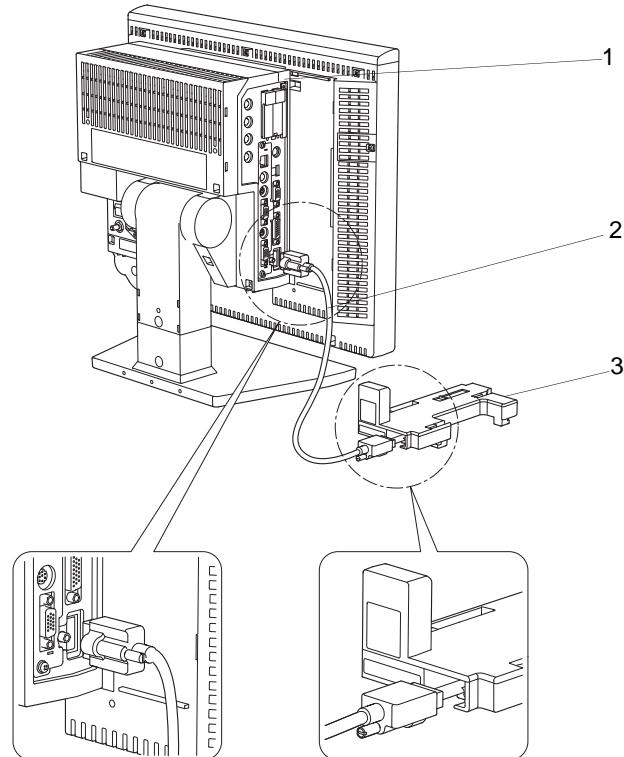
Model	Length
CJO-08SS0.3	0.3m
CJO-08SS1.5	1.5m
CJO-08SS3.5	3.5m
CJO-08SS5	5m
CJO-08SS10	10m

CAUTION

- When connecting the module connection cable, press the connector, tighten the screw with hand and secure it with flat-brade screw driver. If the connection is not secure, contact failure may occur.

□ Connection of Main Unit and Super Unit

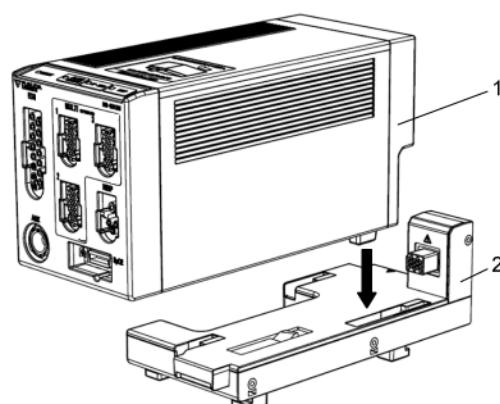
- 1** Connect the main unit (DSC-8500 series) and HS Adapter (HSA-80) using the module connection cable (CJO-08SSxx).



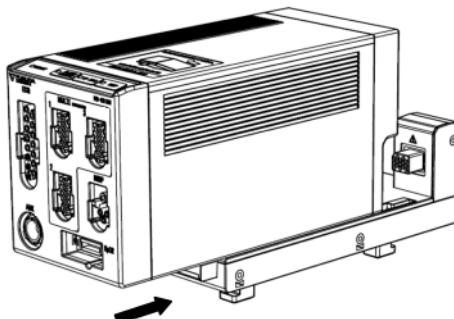
- 1 Main Unit (DSC-8500 series)
2 Module Connection Cable (CJO-08SSxx)
3 HS Adapter (HSA-80)

- 2** Align the HS-8000 leg position with the slots on the HSA-80.

- 1 HS-8000
2 HSA-80



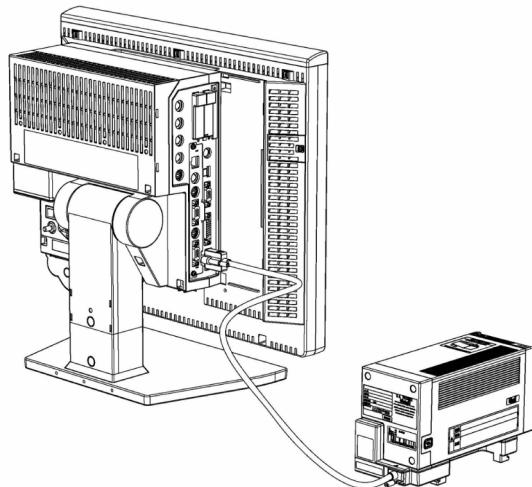
- 3** Slide the HS-8000 backward until it locks with a click sound.



The HS-8000 can be connected/disconnected from the HSA-80 with the DS-8500 power turned ON.

! CAUTION

- The power should be turned OFF before connecting/disconnecting the module connection cable.



Connection of Main Unit and Super Unit

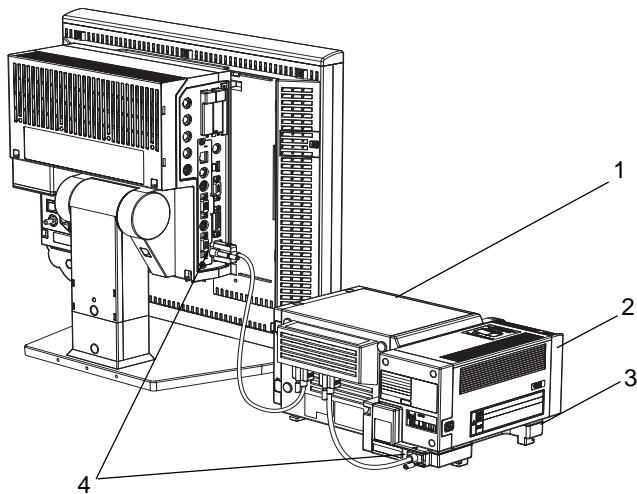
□ Connection of Main Unit, Super Unit, and Input Box

- 1** Connect each cable to the input box on the left side, center, and right side to connect the main unit, HS Adapter, and another input box respectively.

NOTE

- There are 3 module-LAN connectors on the rear side of the input box.
Connect the module connection cable to the specified connector according to the printing on the rear side.

- 1 IB-8004 Input Box
- 2 HS-8000 series Super Unit
- 3 HSA-80 HS Adapter
- 4 module-LAN Connector

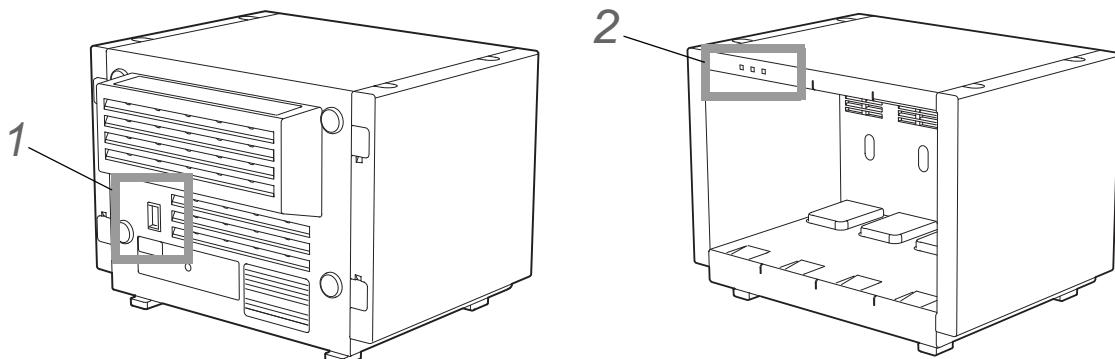


CAUTION

- The power should be turned OFF before connecting/disconnecting the module connection cable.

□ Setup for the Input Box (IB-8004)

Maximum of 2 input boxes can be connected to the DS-8500 system. When connecting more than one input boxes, change the LAN ID using the setting dial on the rear side of the input box.



1 Select 1 or 2 for the LAN ID which does not duplicate with other input box.

2 Verify that correct ID is set by checking the LAN ID setting indicator on the front side.

LAN-ID Setting Dial	Input Box ID*	LAN-ID Setting Indicator
1	IB1	"1" is lighted.
2	IB2	"2" is lighted.

* The input box ID corresponds to the following displayed messages.

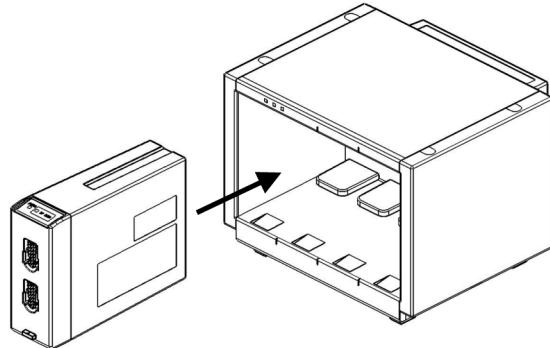
IB1 : "IB-8000-1" or "IB1"

IB2 : "IB-8000-2" or "IB2"

□ Connection of Expansion Module

1

Insert the expansion module to one of the four slots on the Input Box.



NOTE

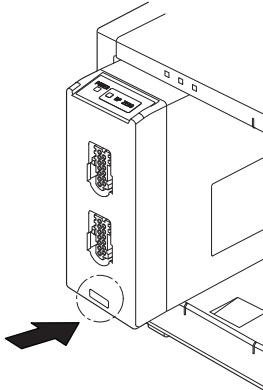
- Insert the expansion module so that the triangle mark on the release button can be seen.

REFERENCE

- The inserted expansion module can be used by setting the parameters on the Unit Module Setup (Menu>Initial Settings>System>Unit Module). By performing the setup, the expansion module can be used regardless of the slot position of the Input Box.

2

Press the release button until it becomes flat.



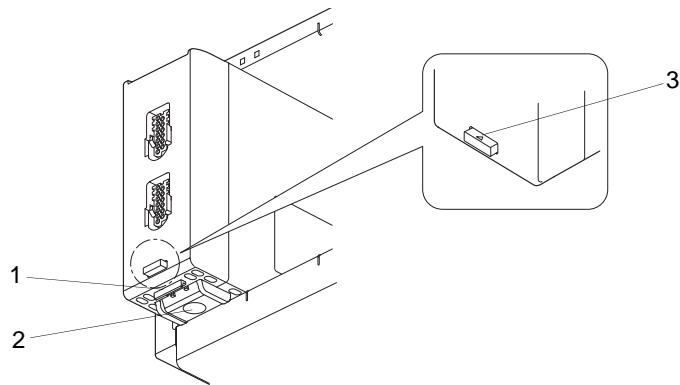
□ Removal of Expansion Module

1 Pull the protruded part on the bottom of the expansion module.

1 Protruded Part on the
Bottom

2 Lever

3 Triangle Mark on the
Release Button



2 Pull out the expansion module by pushing up the lever while the triangle mark on the release button can be seen.

The expansion module can be connected/removed with the DS-8500 power turned ON.

The power should be turned OFF when connecting/disconnecting the module connection cable.

Connection of Multigas Unit

Connect the main unit and the Multigas Unit (MGU-800/810 series).

The following cables of different length are available according to the different arrangement of main unit and the Multigas Unit (MGU-800/810 series).

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

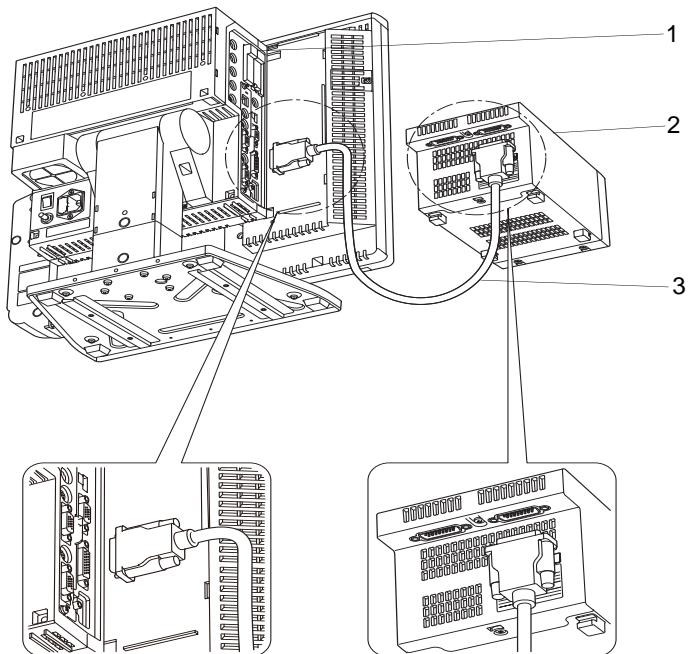
1

Connect the main unit (DSC-8500 series) and the MGU-800/810 series using the unit connection cable (CJO-09SSxx).

1 Main Unit (DSC-8500 series)

2 MGU-800/MGU-810

3 Unit Connection Cable
(CJO-09SSxx)



CAUTION

- When connecting the connection cable, make sure to secure the connector with screws. If the connection is not secure, contact failure may occur.
- Do not connect unspecified equipment to the U-LINK connector on the main unit.
- When not connecting the MGU-800/810 series, make sure to select [OFF] for "U-LINK" on the [Menu > Initial Settings > External Device > Main Unit/HP-800]. Otherwise, printing on the HR-800 cannot be performed.
- Make sure that the power of the DS-8500 is turned OFF when connecting/disconnecting the cable.

□ Connecting the Exhaust Tube

1

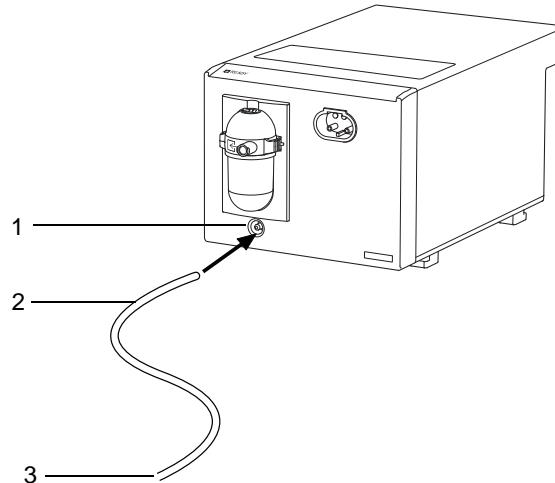
Connect the exhaust tube to the MGU-800/MGU-810 series.

- ▶ Connect one end of the exhaust tube to the exhaust hole of the multigas unit, and the other end to the gas exhaust system in the hospital.

1 Exhaust Hole

2 Exhaust Tube

3 To the gas exhaust system



⚠ WARNING

- To protect the hospital staffs from unnecessary anesthetic agent, it is strongly recommended to connect the exhaust hole to the gas exhaust system in the hospital.

□ HR-800 Recorder Unit Connection Example 1

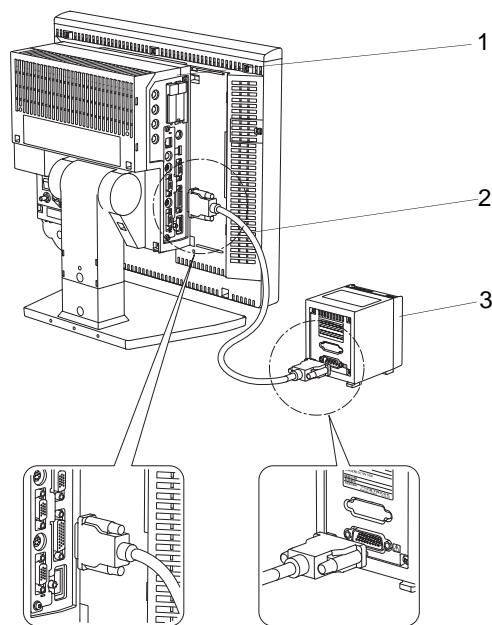
1

Connect the main unit and the HR-800 with the unit connection cable (CJO-09SSxx).

1 Main Unit (DSC-8500 series)

2 Unit Connection Cable (CJO-09SSxx)

3 HR-800



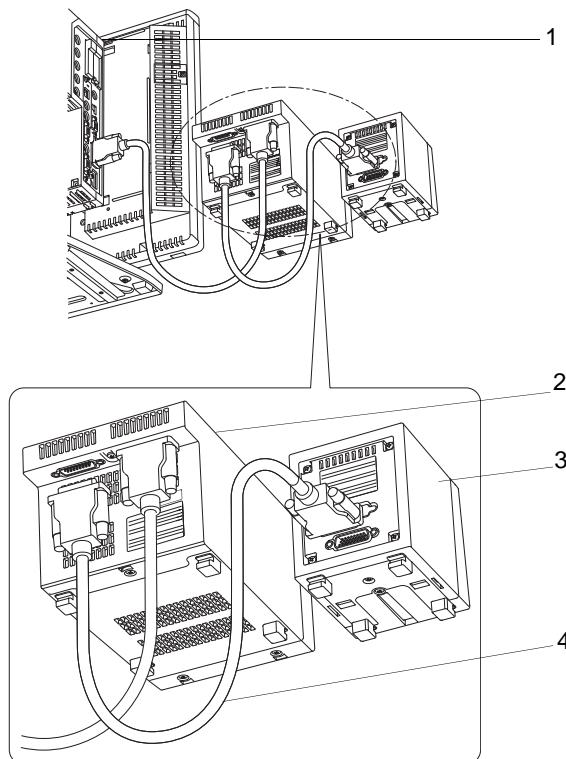
CAUTION

- When connecting the connection cable, make sure to secure the connector with screws.
If the connection is not secure, contact failure may occur.

HR-800 Recorder Unit Connection Example 2

1 Connect the main unit and the MGU-800/810 series with the unit connection cable (CJO-09SSxx).

2 Connect the MGU-800/810 series and the HR-800 with the unit connection cable (CJO-09SSxx).



1 Main Unit (DSC-8500 series)

2 MGU-800/MGU-810

3 HR-800

4 Unit Connection Cable (CJO-09SSxx)

CAUTION

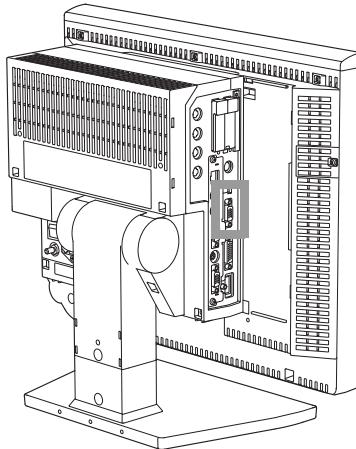
- When connecting the connection cable, make sure to secure the connector with screws.
If the connection is not secure, contact failure may occur.
- Make sure that the power of the DS-8500 is turned OFF when connecting/disconnecting the connection cable.
- When not connecting the MGU-800/810 series, make sure to select [OFF] for "U-LINK" on the [Menu > Initial Settings > External Device > Main Unit/HP-800]. Otherwise, printing on the HR-800 cannot be performed.

NOTE

- ♦ About the setup:
(☞ "Connecting the MGU-800/MGU-810" P4-9)

Connecting the External Monitor

The main unit is equipped with analog output connector for external monitor which allows connection of commercially available display unit by analog RGB connection. When connecting, contact our service representative.

**⚠ WARNING**

- ♦ The external monitor output of the DSC-8500 is not isolated. If connecting a commercially available display unit, it should comply with IEC 60601-1.

A commercially available monitor satisfying the following condition should be used.
The external monitor output resolution will be the same as the display unit.

When connected with Display Unit LC-8019T/LC-8019TC

Resolution : SXGA Size (1280dot ×1024dot)
Horizontal Frequency : 63.98kHz
Vertical Frequency : 60.02Hz

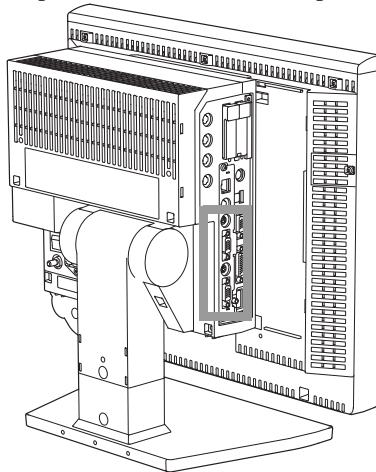
When connected with Display Unit LC-8015T/LC-8015TC

Resolution : XGA Size (1024dot ×768dot)
Horizontal Frequency : 48.36kHz
Vertical Frequency : 60.00Hz
Cable Length : 10m(max)*

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

Connecting the Extended Display Unit

For the main unit equipped with extended board, maximum of 2 extended display units can be connected. Video output connector and touch panel connector are equipped to allow connecting the optional extended display unit. When connecting, contact our service representative for the touch panel calibration.



Model Type and Additional Function

Model Type	External Output	Extended Display Unit Output	LAN (TCP/IP IF)
DSC-8510 (without extended board)	Yes	No	No
DSC-8530 (with extended board)	Yes	2ch	1ch

□ Extended Display Unit Connection

Connect the extended display unit using the accessory cables.

Extended Display Unit Type	Video Output Cable	Touch Panel Cable
Extended Display 1	VIDEO-OUT-A Connector	COM-A Connector
Extended Display 2	VIDEO-OUT-B Connector	COM-B Connector

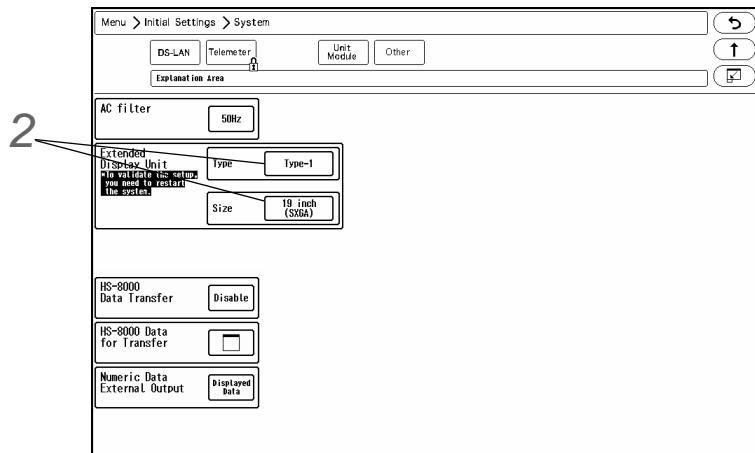
□ Extended Display Unit Setup

Select the extended display unit type.

NOTE

- To validate the setup, the system needs to be restarted.
The change in type will become effective after the system is restarted.
- If the type is not correctly set, touch panel operation cannot be performed from the extended display unit.
- If the LC-8015T/LC-8015TC Display Unit is used for the main display, the size of the extended display unit that can be connected is 15 inch (XGA).
- Pay attention not to accidentally connect the extended display unit to the external monitor output connector.

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



- 2** Select the type and size of the extended display unit.

- ▶ When connecting the LC-7019ET, select [Type-1].
- ▶ When connecting the specified extended display unit other than LC-7019ET, select [Type-2].

- 3** Contact our service representative for the touch panel calibration.

NOTE

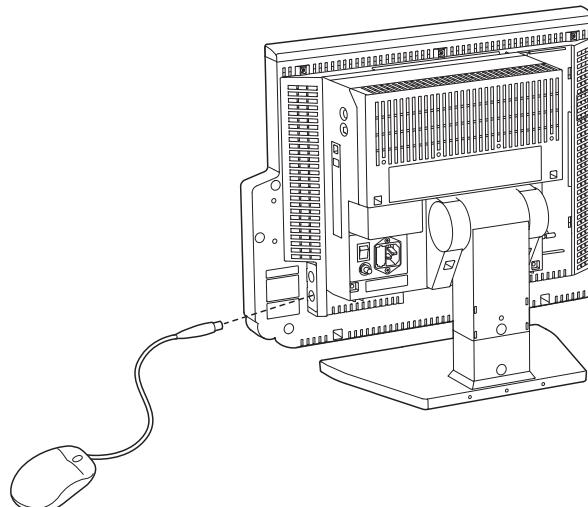
- ◆ The calibration must be performed after connecting the extended display unit. Otherwise it will not function properly.

Connecting the Mouse (Optional)

By connecting a commercially available mouse (including the track ball), the displayed keys can be controlled using a mouse.

Use the PS/2 compatible mouse.

- 1** Connect the mouse to the mouse connector located at the right side of the display unit.



Power Source and Ground Connection

This section explains about the power connection.

Power Connection of the Main Unit

⚠ WARNING

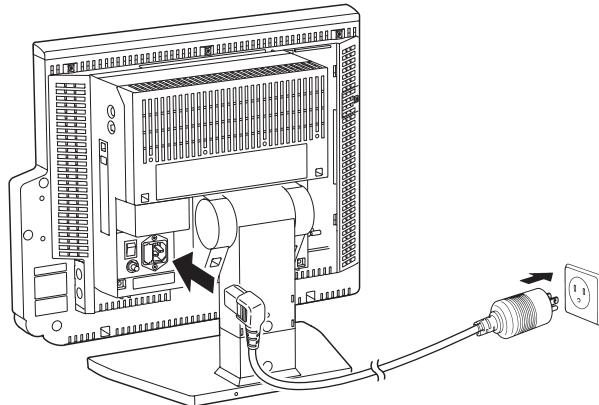
- Use only the specified 3-way AC power cable. Use of other cables may result in electric shock to the patient and the operator.
- The power cable must be connected to a hospital grade outlet. When connecting, do not use a multiple portable socket-outlet.
- When using multiple ME equipment simultaneously, 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.

1

Connect the power supply cable (CS-34) to the rear side of the main unit.

2

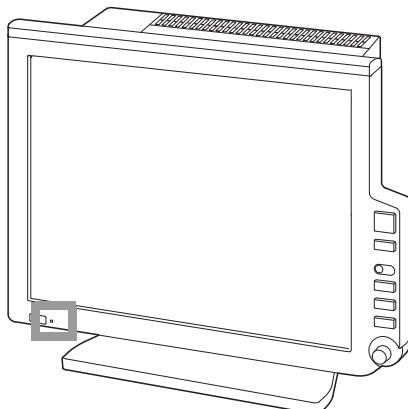
Connect the other end of the power supply cable (CS-34) to the 3-way outlet with ground terminal.



3

Turn ON the power 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.
Green: Power ON
Orange: In Standby Mode

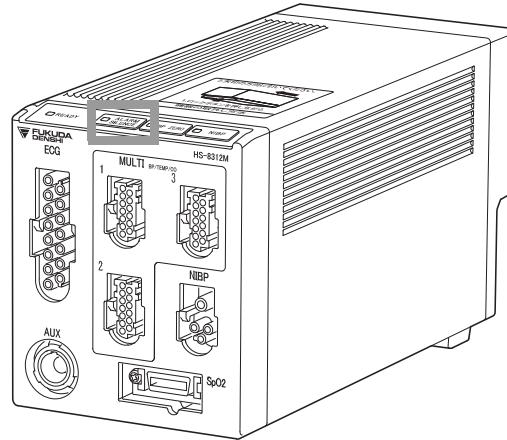


Power Connection of the Super Unit

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

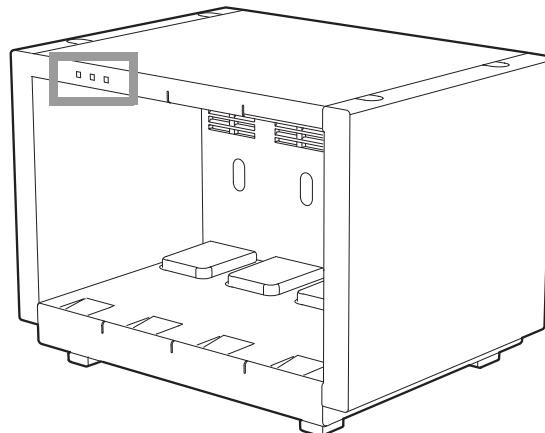
Green: Power is ON and AC power is supplied.

Light OFF: AC power is not supplied



Power Connection of the Input Box

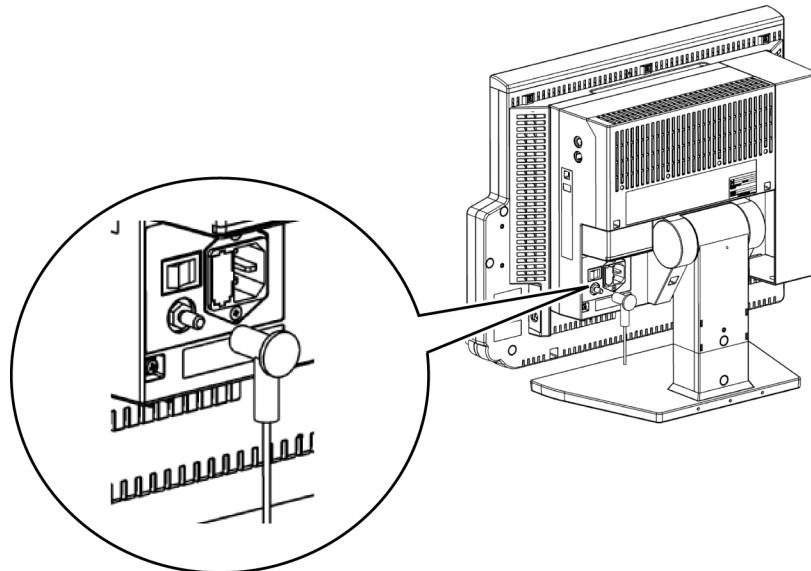
When the power supply switch on the main unit is turned ON, AC power will be supplied to the Input Box and LAN-ID setting indicator on the front side will light.



Equipotential Grounding

When connecting multiple devices, electrical potential difference may be generated between the devices. This may result in electric shock to the patient connected to these devices. 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 device's potential equalization terminal to the same ground terminal. This is called equipotential grounding.

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



Chapter 2 Network System Construction

Wired Network System	2-1
DS-LANII Connection	2-1
DS-LAN Setup	2-2
Precautions about Printing/Display.....	2-5
Wireless Network.....	2-6
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Module Attachment and Serial Communication Setup	2-7
Channel ID and Telemetry Wave Setup	2-8

Chapter 2 Network System Construction

Wired Network System

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

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

DS-LANII Connection

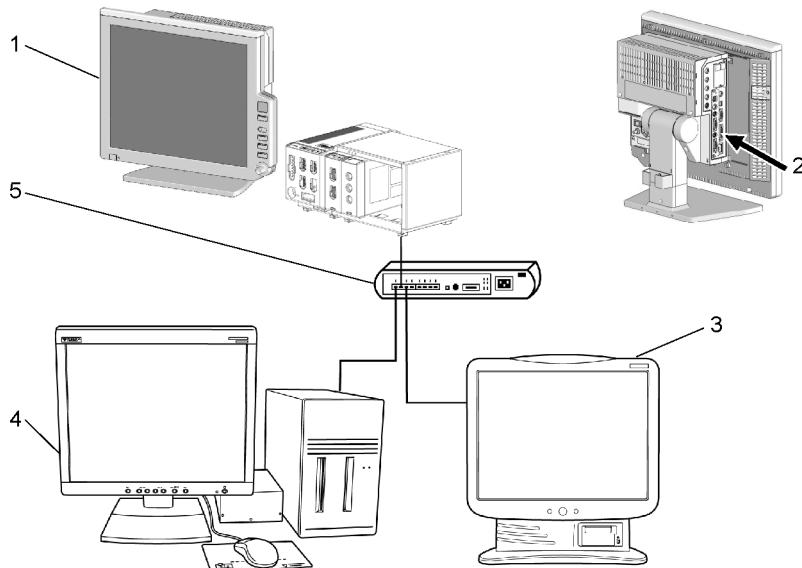
WARNING

- Do not connect unspecified 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

- On a wired network, the alarm generated on the DS-8500 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]), 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 main unit (DSC-8500 series), a wired network system can be constructed.



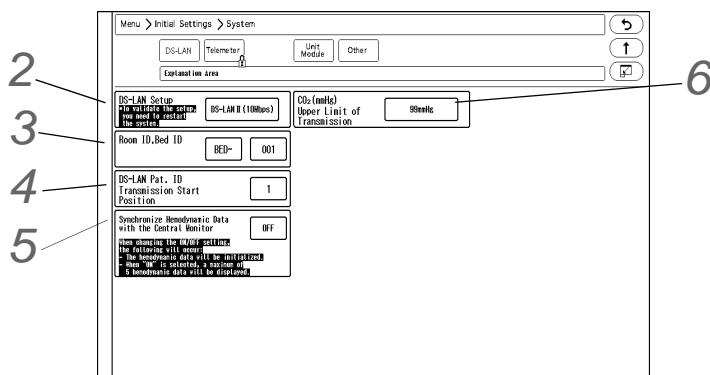
- 1 DS-8500 System Bedside Monitor
- 2 Ethernet Branch Cable (CJ-522)
- 3 DS-7600 System Central Monitor
- 4 DS-5700 Central Monitor (For DS-LANII connection)
- 5 HUB

DS-LAN Setup

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

- 1** Press the [Menu], [Initial Settings], [System] 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

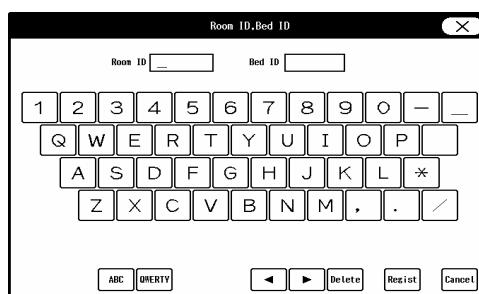
- The Bed ID is factory set to 000. If connected to the wired network with the ID unchanged, monitoring on the central monitor will not be possible.
- When connected to the wired network, make sure that there are no other bedside monitors with the same Bed ID. If the Bed ID is duplicated, monitoring 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.

► 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-8500 system, patient ID of up to 20 digits can be set, but only 10 digits can be transmitted on a DS-LAN II 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 [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 DS-LAN II network, the BP measurement unit should be set to "mmHg".
- There are following restrictions when connecting this system to the wired network.
 - The data cannot be output to the AU-5500N.
 - If the BP measurement unit is kPa, BP waveform, BP numeric data, NIBP numeric data, NIBP list will not be transmitted. They will be treated as not measured data, and will not be displayed on the central monitor. Also, the alarm limit setup from the central monitor cannot be performed.
 - Arrhythmia alarm of Tachy, Brady, Couplet, Pause, Trigeminy will not be transmitted.
 - Arrhythmia alarm of "Slow_VT" will be transmitted as "VT".
 - For the DS-LAN II network, waveform, numeric data, and alarm of BP7, BP8, TEMP3–8 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-8500 system, this alarm will not be generated on the central monitor.
 - If the "RR/APNEA alarm source" setting is other than [Impedance] (or, if [Auto] selects a setting other than [Impedance]), the RESP waveform will not be transmitted on a wired network.
 - If the "RR/APNEA alarm source" is other than [CO₂/GAS] (Or, if [Auto] selects a setting other than [CO₂/GAS]), 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]>[Telemeter]), the CO₂ value of 100mmHg or above will be transmitted as 99mmHg.
 - When the numeric data acquired from FLOW-i is displayed, the alarm setup for InspCO₂/EtCO₂, InspO₂/ExpO₂, InspN₂O/ExpN₂O, InspAgent/ExpAgent, MAC, ExpMV, PEAK, PEEP may be possible on the central monitor connected on the wired network, but these alarms will not generate on the central monitor or bedside monitor.
 - 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
TEMP	-0.1°C and below 45.1°C and above	0°C 45.0°C
Pulse Rate (Masimo Unit)	240bpm and above 25bpm and below	239bpm 26bpm
Pulse Rate (Nellcor™ Unit)	301bpm and above	300bpm

Wireless Network

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

By constructing a wireless network using the telemetry transmitter module (HLX-561), the data on this bedside monitor can be transmitted to the central monitor.

⚠ WARNING

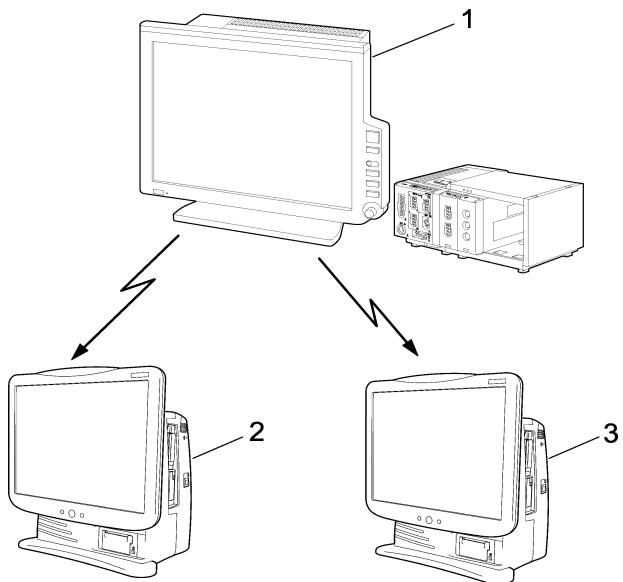
- Some wireless combinations of telemetry transmitters may generate interference with other devices.
- Before selecting the channel, verify it will not interfere with other channels.
- Make sure the telemetry manager of your system is aware of any changes to the telemetry channels.
- If transmitters 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-8500 System
- 2 Central Monitor
DS-7600 Series
- 3 Central Monitor
DS-7700 Series



Module Attachment and Serial Communication Setup

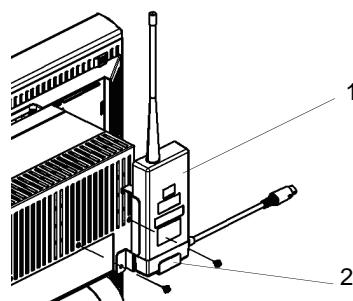
To attach the telemetry transmitter module to the DS-8500 system, a holder which is corresponded to each module is required.

Telemetry Transmitter Module	HLX Holder
HLX-561	OAO-40A

□ Attaching the HLX-561

To attach the telemetry transmitter module (HLX-561) to the main unit (DSC-8500 series), optional HLX Holder is required.

- 1** Assemble the OAO-40A and telemetry transmitter module (HLX-561), then attach them to the DSC-8500 using the accessory screws.

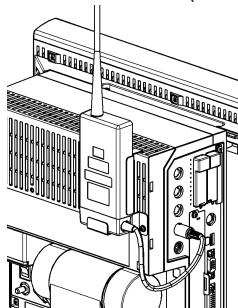


1 Telemetry Transmitter Module

2 HLX Holder

2

Connect the cable of the HLX-561 to the serial connector (COM1 to COM4) on the main unit.

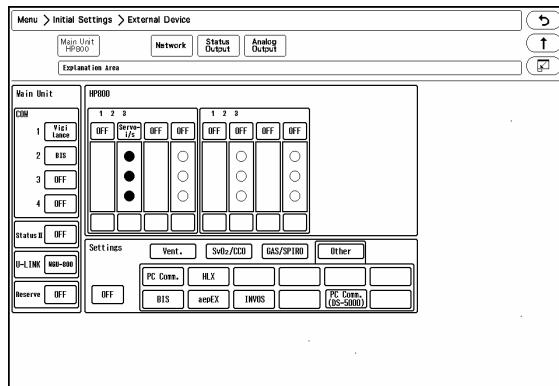


Serial Communication Setup

1

Press the [Menu], [Initial Settings], [External Device], [Main Unit Port HP-800] keys.

► The screen to set the multigas unit type for each port will be displayed.

**2**

Select the port to connect the HLX-561.

3

Press [Other].

4

Press [HLX].

Channel ID and Telemetry Wave Setup

In this section, channel ID and telemetry wave setup when using the HLX-561 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

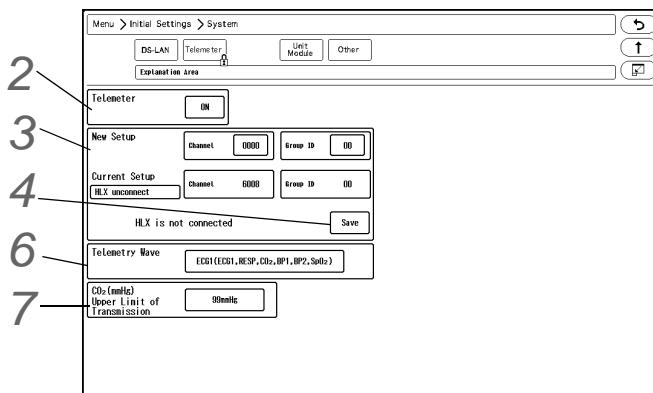
interference.

NOTE

- ◆ To change the setting, enter the password.
(["Administrator Setup" P5-1](#))
- ◆ Before using the telemetry transmitter module (HLX-561), set the port to connect the HLX-561 in advance.
(["External Device Setup" P4-17](#))

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

► The Telemeter Setup window will be displayed.



2 Perform setup for the telemetry transmission.

1 Press the key for "Telemeter".

► The dropdown list will be displayed.

2 Select from [ON]/[OFF].

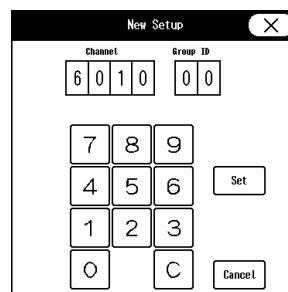
► [ON]: Telemetry transmission will be performed.

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

3 Set the channel ID and group ID.

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

► The "New Setup" window will be displayed.



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

3 Press the input area for the Group ID.

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

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

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

REFERENCE

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

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



NOTE

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

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

- 6** Select the transmitting waveform.

- 1 Press the key for "Telemetry Wave".
 - ▶ The dropdown list will be displayed.
- 2 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]>[Telemeter]), the CO₂ value of 100mmHg or above will be transmitted as 99mmHg.
- When using the NellcorTM unit, the PR value of 255bpm or above will be transmitted to the central monitor as 254bpm.

REFERENCE

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

Chapter 3 Using the CF card

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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.

CAUTION

- Turn ON the power of the main unit before inserting the CF card into the CF card slot 1 (CF1).
The CF card slot 1 (CF1) is for data backup, and CF card slot 2 (CF2) is for full disclosure waveform.
- Use only the specified CF card.
- The CF card formatted for the central monitor full disclosure waveform data cannot be used on the DS-8500 System.

NOTE

- Cancel the write-protect function before using the CF card.
- If the same card is repeatedly used without formatting, card capacity shortage may occur. Make sure to format the card before saving the data to the CF card.

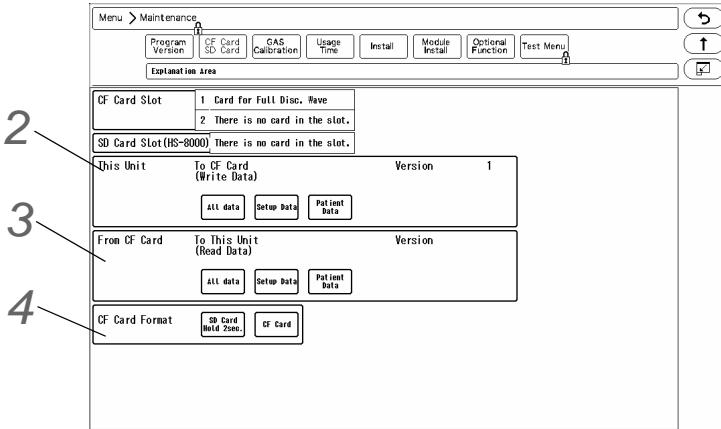
REFERENCE

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

1

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

- The CF card menu will be displayed.



- Format the CF card.

NOTE

- ♦ If the card is unformatted, it is necessary to first format the CF card.
- ♦ Make sure to power cycle the main unit when the CF card format has been repeatedly performed.

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 power cycle the system after the setup data is read from the CF card. By power cycling the system, the read data will become effective.
- ♦ 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.

4 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 Check the slot location which the CF card was inserted, and 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.

□ Data that can be Backed Up/Copied

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

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

Setup Data

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

Patient Data

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

The following items will not be backed up/copied.

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

Formatting the CF Card

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

By inserting the formatted CF card to the CF Card Slot 2, storing of the full disclosure waveform data will automatically start, and the full disclosure waveform review function will become available.

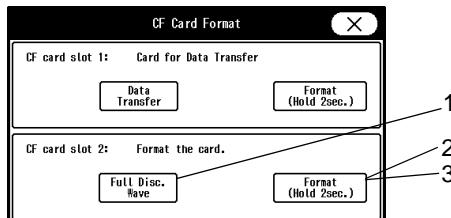
CAUTION

- ♦ 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.
- ♦ Format the full disclosure waveform card in Slot 2 (located on the back side).
Do not insert the full disclosure waveform card in Slot 1 (located on the front side).
- ♦ 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/standby switch or remove the CF card. It may damage the CF card.

1

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

The "CF Card Format" screen will be displayed.



2 Format the CF card.

- 1 Make sure that the card is inserted to Slot 2 (located on the backside), 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 HS-8000 data transfer is explained.



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 HS-8000 or SD card. It may damage the SD card.
- The SD card formatted on other HS-8000 cannot be used.

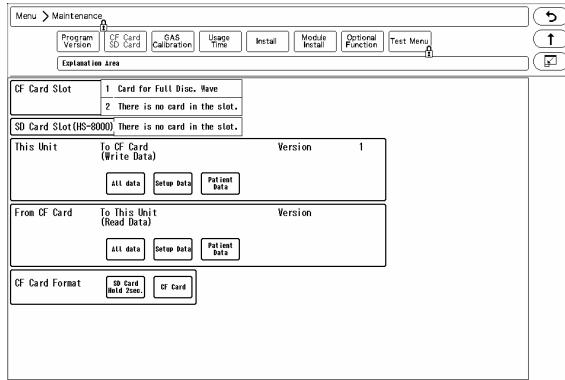
1

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

2

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

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



3

Format the SD card.

- 1 Press the [SD Card 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, HS-8000 or turn OFF the power.
- 3 When <Card for Data Transfer> is displayed, the format process is complete.

Chapter 4 Connection to the External Devices

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Chapter 4 Connection to the External Devices

Ventilator Measurement and Alarm Input

Ventilator can be connected to the DS-8500 system using the Status II port on the main unit (DSC-8500) or via multiport module (HP-800) connected to the input box.

By connecting a ventilator, ventilator measurement data and alarm can be monitored on the patient monitor. Also, ventilator alarm can be notified to the central monitor via wireless and wired network.

This section describes the procedure to connect the DS-8500 system and ventilator, and to input the ventilator measurement and alarm.

Ventilator	Connection Cable
	For Connection to DSC-8500 Status II or HP-800
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-8500 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

♦PB 740/PB 760/PB 840:

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-8500 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 on the DS-8500 system.

 **CAUTION**

- ♦ The ventilator operation should be performed by well-trained and authorized personnel.
- ♦ When connecting this equipment and a ventilator, use only the specified connection cable.
- ♦ Make sure that the ventilator is connected to the specified connector on the DS-8500 system. A confirmation window will be displayed when a ventilator cable is disconnected or when the power of the ventilator is turned OFF. (☞ Operation Manual "Ventilator Disconnected Confirmation Window" P3-20)
- ♦ When connecting the cable, make sure that the main power of this system and the ventilator is OFF.

Ventilator Connection

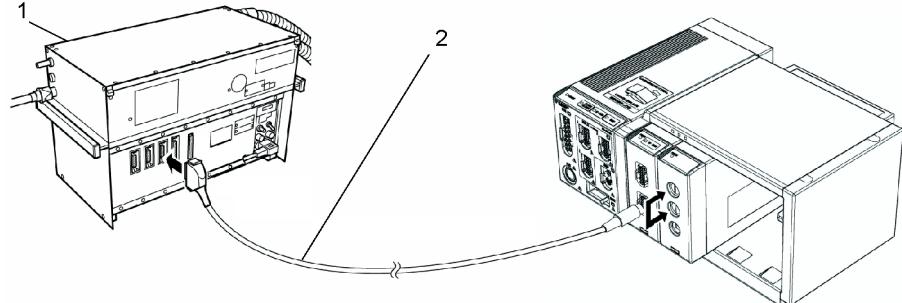
CAUTION

- Only one ventilator can be connected to each DS-8500 system. Do not connect more than one ventilators.
- Ventilator and FLOW-i cannot be connected simultaneously.
- Ventilator and multigas unit (MGU-810 series) cannot be connected simultaneously.

□ Connection of SV-900

- 1 Connect the SV-900 to STATUS II connector on the DS-8500, or one of STATUS II connector A or STATUS II connector B on the multiport module.
(The illustration is example of connection with HP-800.)

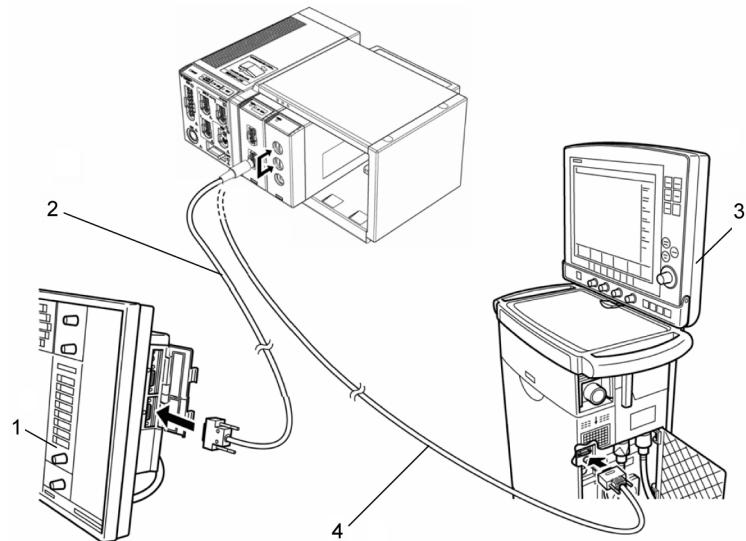
1 SV-900
2 Cable



□ Connection of SV-300, Servo-i/s

- 1 Connect the SV-300 or Servo-i/s to STATUS II connector on the DS-8500, or one of STATUS II connector A or STATUS II connector B on the HP-800.
(The illustration is example of connection with HP-800.)

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



□ Connection of PB740/760/840

⚠ CAUTION

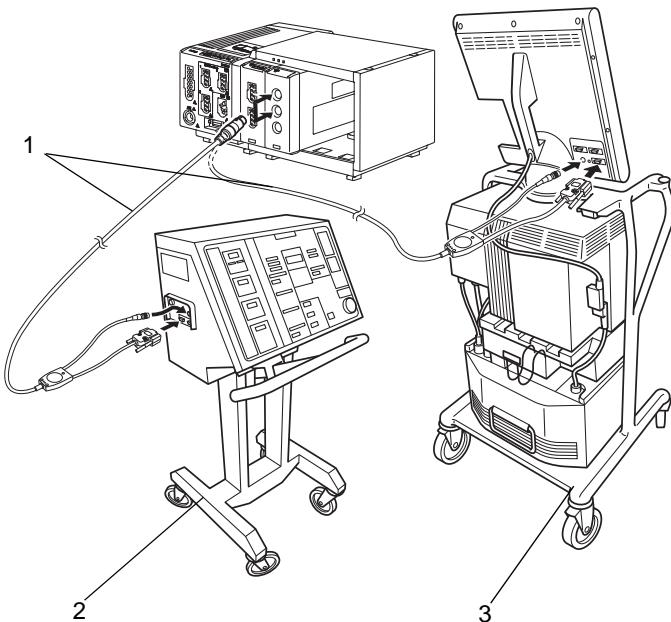
- ◆ When connecting the PURITAN-BENNETT ventilator, the serial port (RS-232C) of the ventilator should be set as follows. Refer to the service representative of the ventilator manufacturer.
Baud Rate: 9600bps
Data Bit: 8bit
Parity Bit: None
(Stop Bit: 1bit)
- ◆ The DS-8500 system detects the "ventilator alarm" when the nurse call port on the ventilator outputs the alarm signal.
For details of ventilator setup and alarm signal output condition from the nurse call port, refer to the service representative of the ventilator manufacturer.

1

Connect the PB740/760/840 to STATUS II connector on the DS-8500, or one of STATUS II connector A or STATUS II connector B on the multiport module.

(The illustration is example of connection with HP-800.)

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



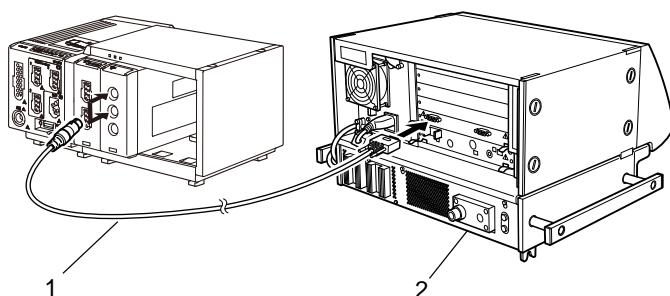
□ Connection of Evita

⚠ CAUTION

- ◆ When connecting the Evita 2 dura/Evita 4/ Evita XL ventilator, the serial port (RS-232C) of the ventilator should be set as follows. Refer to the service representative of the ventilator manufacturer.
Protocol: Medibus
Baud Rate: 19200bps
Data Bit: 8bit
Parity Bit: Even
Stop Bit: 1bit.

- 1** Connect the Evita 2 dura/Evita 4/Evita XL to STATUS II connector on the DS-8500, or one of STATUS II connector A or STATUS II connector B on the multiport module.
 (The illustration is example of connection of Evita 2 dura and HP-800.)

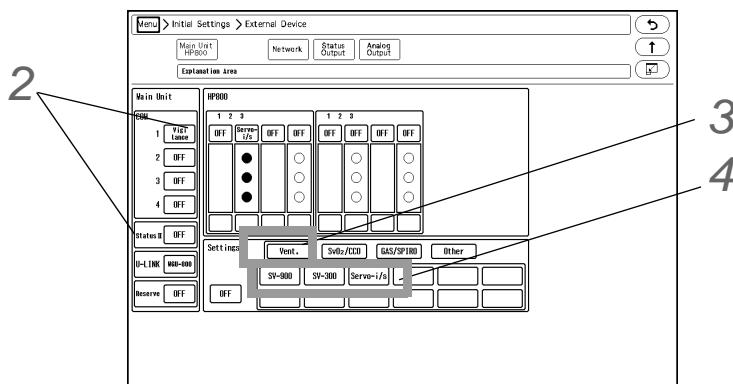
- 1 CJ-402RI-70SVi
 2 Evita 2 dura



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/HP-800] 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. Also, ventilator and MGU-810, ventilator and FLOW-i cannot be used simultaneously.
- 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].
- If the setting is performed for the HP-800, the ventilator setting will be stored on the HP-800 which will allow to use the HP-800 on other slot of the input box or used with the other DS-8500 system.

SvO₂/CCO Monitor Connection

This section describes the procedure on how to connect the DS-8500 system to the oximeter (manufactured by Edwards Lifescience)/CCO measurement device (Vigilance, VigilanceCEDV, VigilanceII, Vigileo, EV1000) and hemodynamic monitoring device, PiCCO.

By connecting the SvO₂/CCO monitor to the DS-8500 system using the COM1 to 4 port on the main unit (DSC-8500) or via multiport module (HP-800), SvO₂/CCO monitor data can be monitored on the patient monitor.

SvO ₂ /CCO Monitor	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)
Vigilancell	CJ-402RI-70SVi (x1)	CJ-502 (x1)
Vigileo	CJ-402RI-70SVi (x1)	CJ-502 (x1)
EV1000	CJ-406RI-70Vigi (x1)	CJO-04RS4 (x1)
PiCCO	CJO-19RS5 (x1)	CJO-18RS5 (x1)

Make sure that the network is set as follows.

For procedure to check the Vigilance/Vigileo network setting, refer to the operation manual for the Vigilance/Vigileo.

Device: IFM Out

Baud Rate: 19200bps

Parity Bit: None

Stop Bit: 1

Data Bit: 8

Flow Control: 2 sec.

CAUTION

- ♦ When connecting this system and the SvO₂/CCO monitor, use only the specified connection cable.
- ♦ Make sure that the SvO₂/CCO monitor is connected to the specified connector on this system. When connecting the cable, verify that the main power of this system and the SvO₂/CCO monitor is OFF.

SvO₂/CCO Monitor Connection

□ Connection of Vigilance

1 Connect the Vigilance to the DS-8500 system.

(The illustration is example of connection with HP-800.)

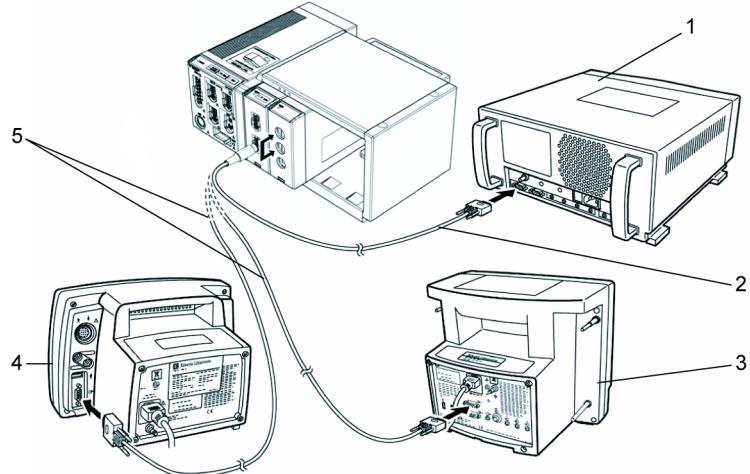
1 Vigilance

2 CJ-406RI-70Vigi

3 Vigilance II

4 Vigileo

5 CJ-402RI-70SVi



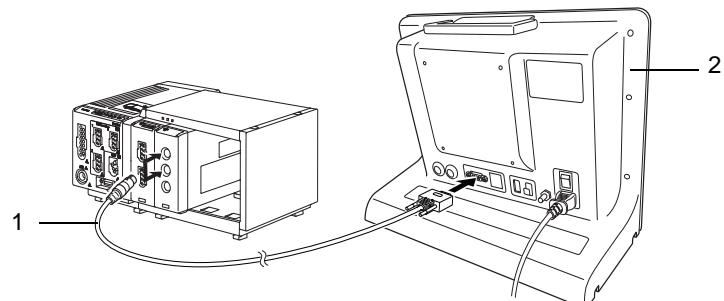
□ Connection of PiCCO

1 Connect the PiCCO to the DS-8500 system.

(The illustration is example of connection with HP-800.)

1 CJO-19RS5

2 PiCCO

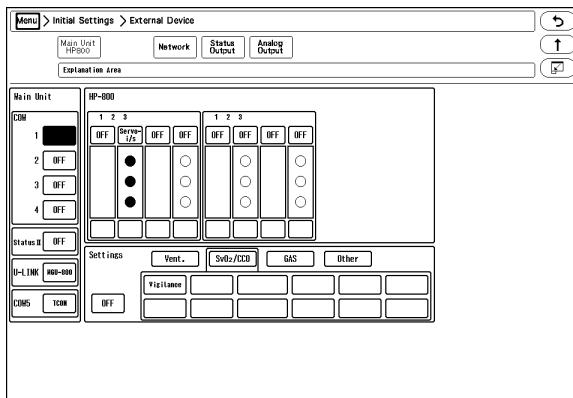


External Device Setup

To display the measurement data, the connecting device type needs to be set.

- 1** Press the [Menu], [Initial Settings], [External Device], [Main Unit/HP-800] keys.

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



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

- 3** Press the [SvO₂/CCO] key.

- 4** Press the [Vigilance] or [PiCCO] key.

NOTE

- ♦ Vigilance and PiCCO cannot be set at the same time. If an oximeter is set to one of the ports, the other port which oximeter was set will be automatically set to [OFF].
- ♦ For the HP-800 and the main port, the setting needs to be different.
- ♦ If the same function is set to multiple ports, the system processing may take time.
- ♦ Vigilance and PiCCO cannot be set at the same time.
- ♦ If the setting is performed for the HP-800, the setting will be stored on the HP-800 which will allow to use the HP-800 on other slot of the input box or used with the other DS-8500 system.
- ♦ When the HP-800 setting is changed, restart the main unit.

CO₂ Concentration Data Input

By connecting the Multigas Unit (MGU-800/810 series), 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-8500 system.

Connecting the MGU-800/MGU-810

The MGU-800 series Multigas Unit can be connected to the DS-8500 system via U-LINK connector.

By connecting the Multigas Unit (MGU-800 series), CO₂, anesthetic agent, O₂, N₂O concentration measurement performed by the sidestream method can be monitored.

By connecting the Spiro Unit (MGU-810 series), spirometry measurement can be additionally monitored.

Multigas Unit	Unit Connection Cable
MGU-801P/MGU-811P	
MGU-802/MGU-812	CJO-09SS0.3, CJO-09SS1.5, CJO-09SS5
MGU-803/MGU-813	

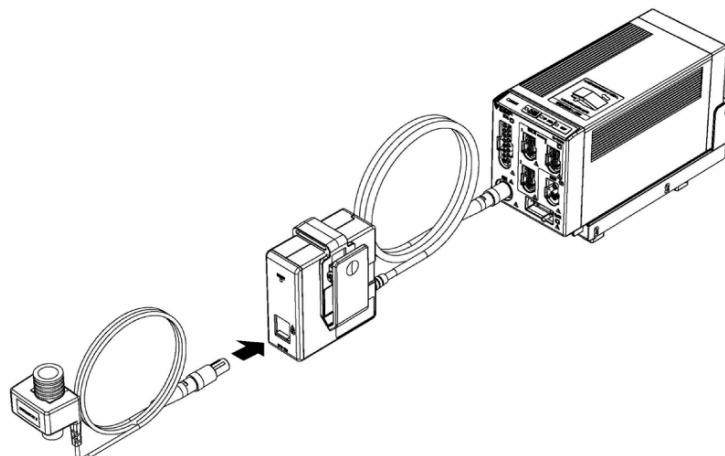
CAUTION

- Ventilator and Multigas Unit (MGU-810 series) cannot be connected simultaneously.
- The FLOW-i and MGU-800/810 cannot be connected simultaneously.

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 HS-8000.

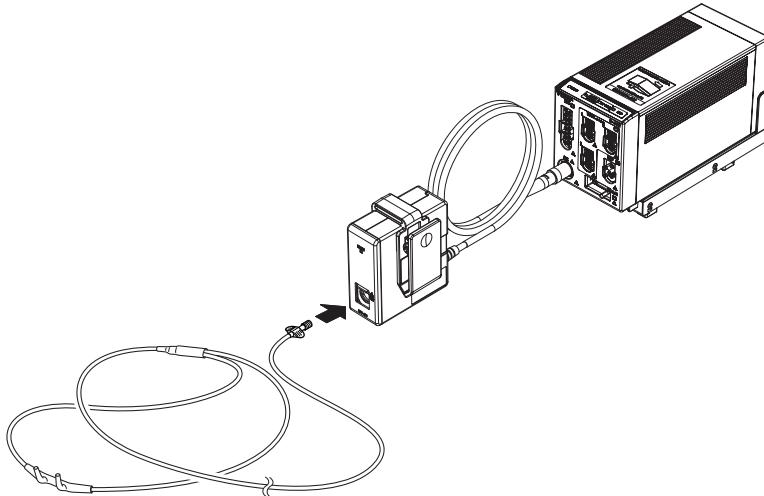


*Mainstream Method
Capnostat 5 manufactured by Respiration Novametrix*

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 HS-8000.



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

CO₂ Source Priority

When MGU-800/810 and HS-8000 are connected simultaneously, the CO₂ source to prioritize for the measurement value can be set.

REFERENCE

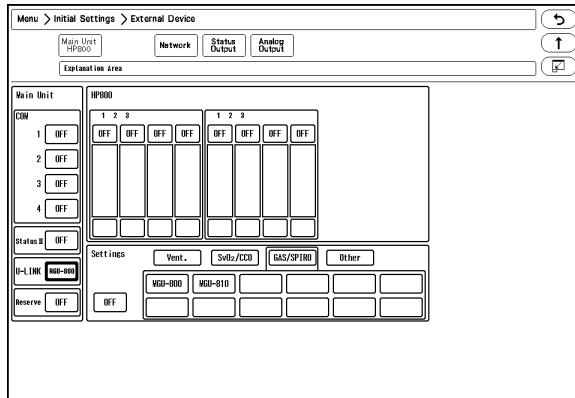
- The setup can be performed on the Gas menu.
(Operation Manual "Multigas Unit Data Setup (Multigas Concentration/Spirometry)" P7-87)

Multigas Unit/ Spiro Unit Selection

To display the Multigas Unit gas concentration data, the type of Multigas Unit, Spiro Unit needs to be selected.

- 1 Press the [Menu], [Initial Settings], [External Device], [Main Unit/HP-800] keys.

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



2 Press the key for "U-LINK".

3 Select [MGU-800] or [MGU-810].



CAUTION

- ♦ When MGU-810 is selected, a ventilator cannot be assigned to Status II or HP-800.
- ♦ When MGU-800 series is not connected, and HR-800 is directly connected to the main unit, select [OFF] for "U-LINK".
If the setting is other than [OFF], printing on the HR-800 cannot be performed.
- ♦ When MGU-800/810 is selected, FLOW-i cannot be assigned to Status II or HP-800.

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	CJO-03RS4
A-3000		

CAUTION

- ♦ Refer to the BIS monitor operation manual and set the SQI value above 15.
 - ♦ When using the BIS monitor, 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.
 - ♦ When using the BIS monitor, securely connect the connection cable to the serial or status connector of the main unit or the STATUS II connector of the HP-800.
-

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

CAUTION

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

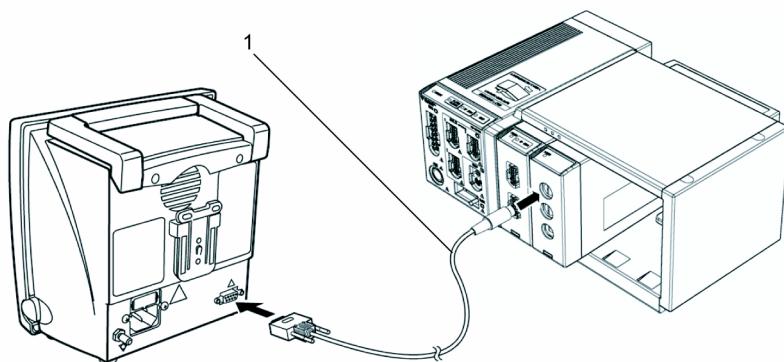
Connecting to the Main Unit:

- 1 Use the BIS connection cable (CJ0-03RS4) to connect the serial port, status port on the DSC-8500 and serial port on the BIS monitor.

Connecting to the Multiport Module:

- 1 Use the BIS connection cable (CJ-407RI-70BIS) to connect the Status II connector on the HP-800 and serial port on the BIS monitor.
(The illustration is example of connection with HP-800.)

1 CJ-407RI-70BIS

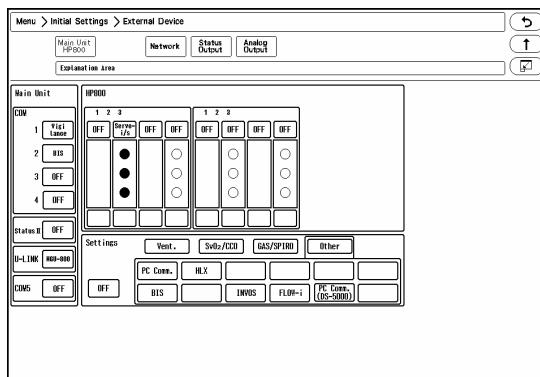


External Device Setup

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

- 1** Press the [Menu], [Initial Settings], [External Device], [Main Unit/HP-800] 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

- If the same function is set to multiple ports, the system processing may take time.
- For the HP-800 and the main port, the setting needs to be different.
- If the setting is performed for the HP-800, the setting will be stored on the HP-800 which will allow to use the HP-800 on other slot of the input box or used with the other DS-8500 system.
- Make sure to power cycle the main unit when the HP-800 setting is changed.

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.

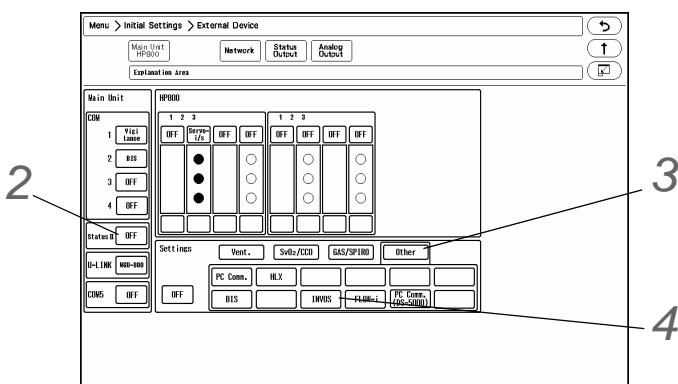
Connecting to the INVOS

- Connect the INVOS 5100C to the serial connector or status connector on the left side of the DSC-8500 or to the HP-800 using the connection cable.

External Device Setup

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

- Press the [Menu], [Initial Settings], [External Device], [Main Unit/HP-800] keys.
▶ The screen to set the connecting device type for each port will be displayed.



- Select the port to connect the INVOS.

- Press the [Other] key.

- Press the [INVOS] key.

NOTE

- If the same function is set to multiple ports, the system processing may take time.
- For the HP-800 and the main port, the setting needs to be different.
- If the setting is performed for the HP-800, the setting will be stored on the HP-800 which will allow to use the HP-800 on other slot of the input box or used with the other DS-8500 system.
- When the HP-800 setting is changed, restart the main unit.

FLOW-i Data Input

By connecting the FLOW-i Anesthesia Delivery System (MAQUET) to the DS-8500 system, the numeric data, waveform data of the FLOW-i can be monitored.

Anesthesia System	Connection Cable	
	For Status II Connector	For Serial Connector
FLOW-i	CJ-402RI-70SVi (x1)	CJ-502 (x1)

The software version of FLOW-i that can be connected to DS-8500 system is as follows.

- System Software Version 02 (FCI Protocol Version 0004)
- System Software Version 03 (FCI Protocol Version 0005)

**WARNING**

- The alarm data of FLOW-i cannot be monitored.
- The alarms will not be generated on the DS-8500 system.

**CAUTION**

- The operation of anesthesia system should be performed by well-trained and authorized personnel.
- When connecting the DS-8500 system and the anesthesia system, use only the specified connection cable.
- Make sure that the anesthesia system is connected to the specified connector on the DS-8500 system.
- When connecting the cable, make sure that the main power of this equipment and the anesthesia system is turned OFF.

Connection with the FLOW-i

**CAUTION**

- Only one anesthesia system can be connected to each DS-8500 system. Do not connect more than one anesthesia systems.
- The anesthesia system and Multigas Unit (MGU-800, MGU-810 series) cannot be connected simultaneously.

- The anesthesia system and ventilator cannot be connected simultaneously.

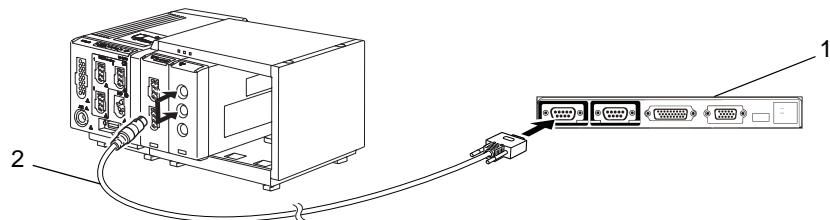
1

Connect the FLOW-i to Status II connector on the DS-8500, or Status II connector A or B on the HP-800. (The illustration is example of connection with the HP-800.)

1 Input/Output Port of

FLOW-i

2 CJ-402RI-70SVi



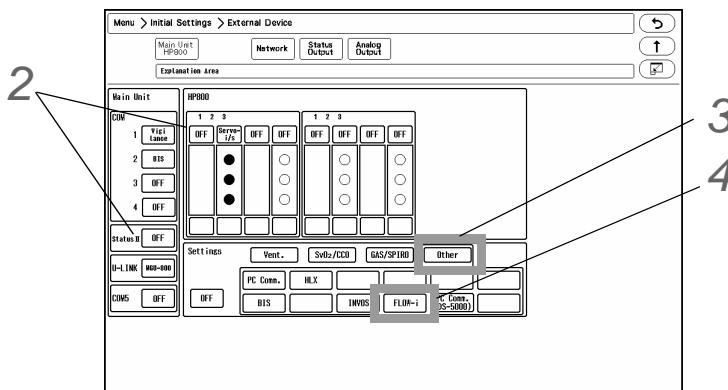
External Device Setup

To monitor the anesthesia data, it is necessary to select the anesthesia system to be connected.

1

Press the [Menu], [Initial Settings], [External Device], [Main Unit/HP-800] keys.

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

**2**

Select the port to connect the FLOW-i.

3

Press the [Other] key.

4

Press the [FLOW-i] key.

NOTE

- If the communication with the FLOW-i is already established through the corresponding port, it is necessary to disconnect the communication in order to change the selection. Also, FLOW-i and MGU-800/MGU-810 cannot be used simultaneously. The FLOW-i and ventilator cannot be used simultaneously.
- The FLOW-i cannot be set to multiple ports. If the FLOW-i is set to one of the ports, the other port should be set to [OFF].
- If the setting is performed for the HP-800, the FLOW-i setting will be stored on the HP-800 which will allow to use the HP-800 on other slot of the input box or used with the other DS-8500 system.
- Make sure to power cycle the main unit when the HP-800 setting is changed.

Setup for the External Device Connection

This section explains about the external device connection setup.

External Device Setup

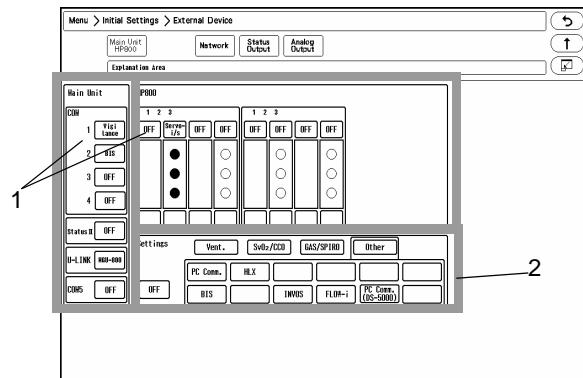
- 1** Press the [Menu], [Initial Settings], [External Device] keys.

► The external device connection setup menu will be displayed.

- 1 Select the connecting port for main unit or HP-800.

- 2 Select the connecting equipment from the displayed selection.

By selecting [Vent.], [SvO₂/CCO], [GAS/SPIRO], [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 to 4	Vigilance, PiCCO, PC Comm., HLX, BIS, INVOS, FLOW-i, PC Comm. (DS-5000)
Status II	SV-900, SV-300, Servo i/s, PB, Evita, Vigilance, PiCCO, BIS, INVOS, FLOW-i
U-LINK	MGU-800, MGU-810
HP-800	SV-900, SV-300, Servo i/s, PB, Evita, Vigilance, PiCCO, BIS, INVOS, FLOW-i

NOTE

- Only Vigilance, BIS, INVOS can be set to multiple ports.
- If the same function is set to multiple ports, the system processing may take time.
- For the HP-800 and the main port, the setting needs to be different.
- Ventilator and MGU-810 cannot be set at the same time.
- Vigilance and PiCCO cannot be set at the same time.
- FLOW-i and MGU-800/810 cannot be set at the same time.
FLOW-i and ventilator cannot be set at the same time.
- By performing the setting for the HP-800, the setting stored on the HP-800 can be used by inserting the HP-800 to other slot of the input box or connecting it to other DS-8500 system. Make sure to power cycle the main unit when the HP-800 setting is changed.
- When [HLX] is selected, perform telemetry setup (channel ID, etc.) on the telemeter setup screen.

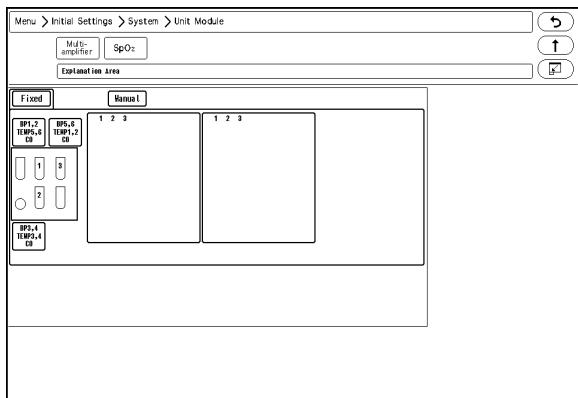
Unit Module Setup

□ Multiparameter Connector Setup

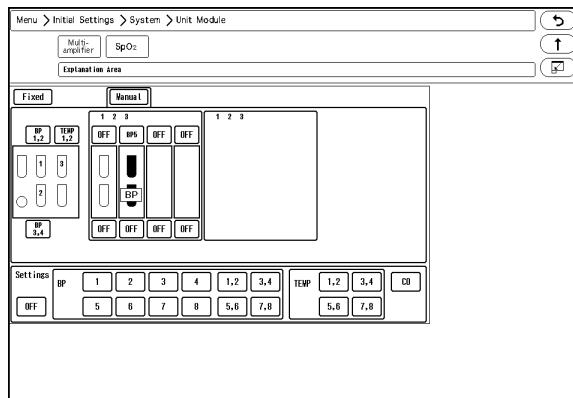
On the multiamplifier setup screen, the parameter to measure on each multiparameter connector can be set. If the Input Box is not connected, connecting the relay cable to the multiparameter connector on the HS-8000 series Super Unit will automatically set the measuring parameter. If the Input Box is connected with the HM-800 Multi Module, it is necessary to set the measuring parameters manually.

- 1** Press the [Menu], [Initial Settings], [System], [Unit Module] keys.

► The multiamplifier setup screen will be displayed.



When [Fixed] is selected



When [Manual] is selected

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

► [Fixed]: The parameter will be automatically fixed according to the actual cable connection. This selection is possible only when the Super Unit (HS-8000) is used.

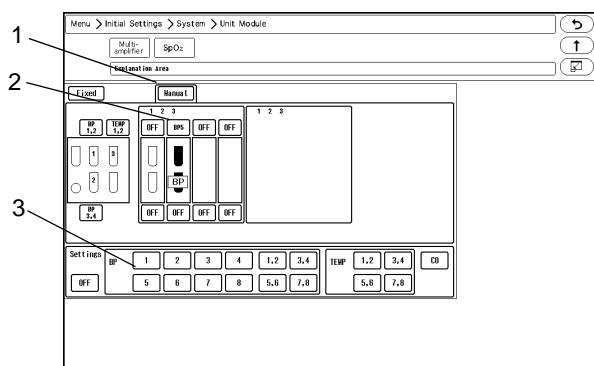
► [Manual]: BP and TEMP channels can be assigned to any connectors.

When IB-8004 is connected to the DS-8500 system, [Manual] will be automatically selected.

(☞ Operation Manual "Multiparameter Connector Setup for BP, TEMP, CO Measurement" P7-107)

Example:

To assign BP5 to multiparameter connector 1 for the HM-800 Multi Module inserted to slot 2 of the IB-8004-1.



- 1 Press the [Manual] key.
- 2 Select the multiparameter connector location. The selected location will be displayed in blue.
- 3 Assign the parameter to the selected location. In this case, select [5] for "BP".
The parameter will be assigned to the selected connector.

⚠ CAUTION

- The same parameter cannot be set to more than one connectors.
- By setting [OFF] for one of the connector, it will become selectable on another connector.
- If the parameter assigned to the multiparameter connector and the connected relay cable does not match, the connector location will be displayed in red and the connected relay cable type will be displayed.

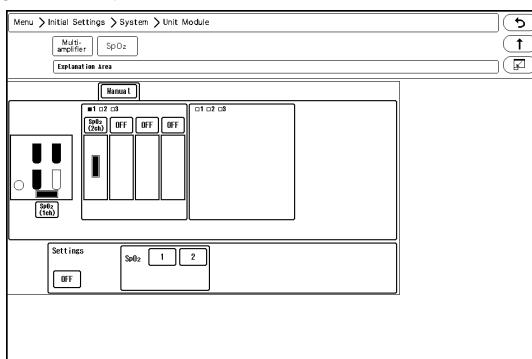
□ SpO₂ Connector Setup

When using the SpO₂ Module (HG-810, HG-820), it is necessary to set the SpO₂ channel manually.

1 Press the [Menu], [Initial Settings], [System], [Unit Module], [SpO₂] keys.

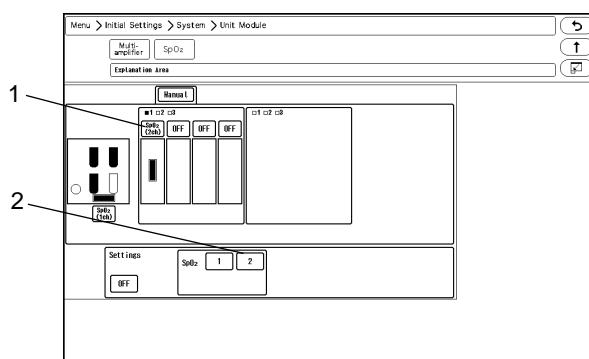
► The SpO₂ connector setup screen will be displayed.

2 SpO₂ channel can be assigned to any module.



Example:

To measure 1 channel of SpO₂ on the Super Unit, 2 channels of SpO₂ on the HG-810/HG-820



- 1 Select the input box slot location. The selected location will be displayed in blue.
- 2 Assign the channel to the selected location. In this case, select [2] for "SpO₂".
2 channels of SpO₂ will be assigned to the HG-810/HG-820.

⚠ CAUTION

- It is not possible to set the second channel only.

- ♦ If the channel setting is duplicated, one of the setting will be turned OFF.

□ Software Upgrade for Unit/Module

The software of the unit or module can be upgraded on the "Module Install" screen.

1

Press the [Menu], [Maintenance], [Module Install] keys.

- The "Module Install" screen will be displayed.

NOTE

- ♦ Users should not perform the software update for the unit or module. To update the software, refer to our service representative.

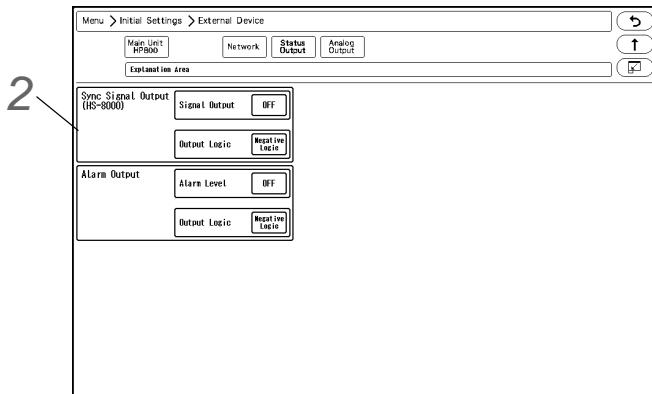
Synchronized Signal Output

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

1

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

- The status output setup screen will be displayed.



2

Set the synchronized signal output.

- 1 Press the key for "Sync. 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.

REFERENCE

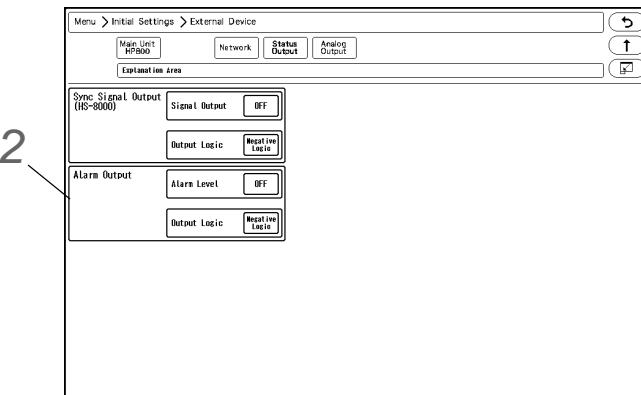
- ♦ Refer to the "HS-8000 Super Unit Operation Manual" for connector pin assignments of the output signal.

Alarm Output Setup

The alarm can be output from the status input/output connector or I/O connector (optional) on the Main Unit (DSC-8500 Series).

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

► The status output setup screen will be displayed.



- 2** Select the alarm to output.

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

► The dropdown list will be displayed.

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

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

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

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

► [APNEA]: Apnea alarm will be output.

► [OFF]: Alarm will not be output.

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

► The dropdown list will be displayed.

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

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

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

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

NOTE

- Refer to "Status I/O Signal (Status II Connector)" P6-34 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

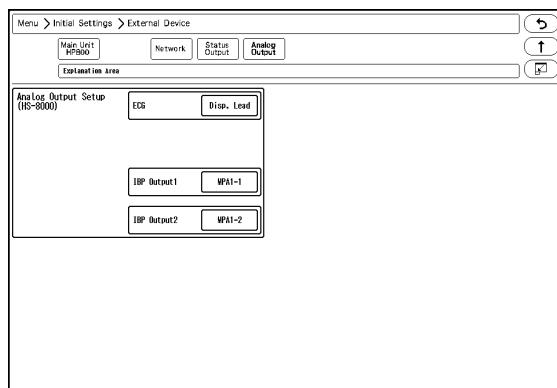
The Super Unit (HS-8000) is capable to output the analog HR and BP waveform.

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

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

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

► The analog output setup screen will be displayed.



- 2** Set the ECG waveform lead.

- 1** Press the key for "ECG".

► The dropdown list will be displayed.

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

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

► The subwindow will be displayed.

- 4** Select from [I]/[II]/[III]/[aVR]/[aVL]/[aVF]/[V1]/[V2]/[V3]/[V4]/[V5]/[V6].

- 3** Select the IBP waveform to output from the Super Unit.

- 1** Press the key for "IBP Output 1" or "IBP Output 2".

► The dropdown list will be displayed.

- 2** Select from [MPA1-1]/[MPA1-2]/[MPA2-1]/[MPA2-2]/[MPA3-1]/[MPA3-2].

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

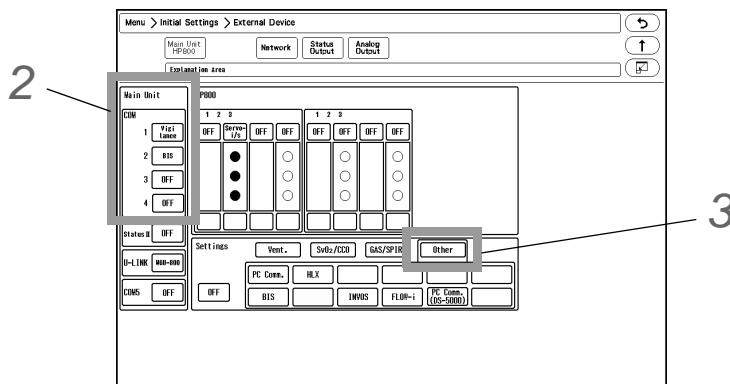
- 1 Connect the accessory cable for system connection to the serial port (COM1 to 4) on the main unit.

External Device Setup

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

- 1 Press the [Menu], [Initial Settings], [External Device], [Main Unit/HP-800] keys.

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



- 2 Select the port (COM 1 to 4) to connect the PC.

- 3 Press the [Other] key.

- 4 Select [PC Comm.] or [PC Comm. (DS-5000)].

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)

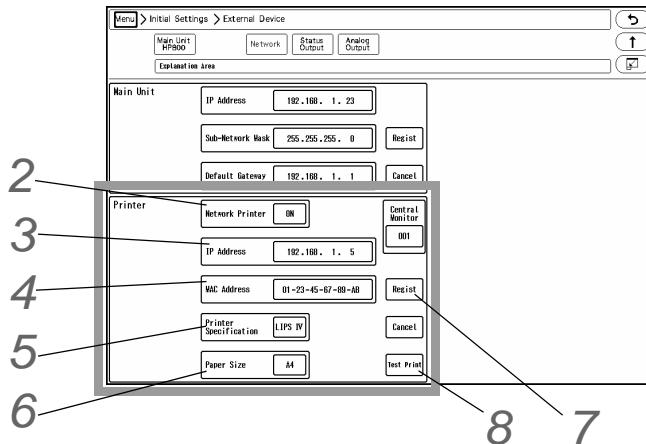
Laser Printer Setup

□ 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.

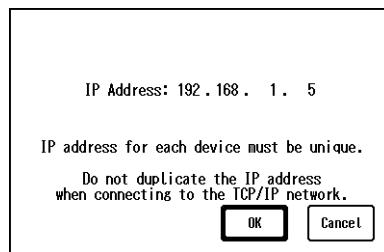
- 5 Select the printer specification.

- ▶ [LIPS IV]: Select when LIPS IV laser printer (Canon) is used.
- ▶ [ESC/page]: Select when ESC/page laser printer (Epson) is used.
- ▶ [PCL5]: Select when PCL5 laser printer (HP) 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.



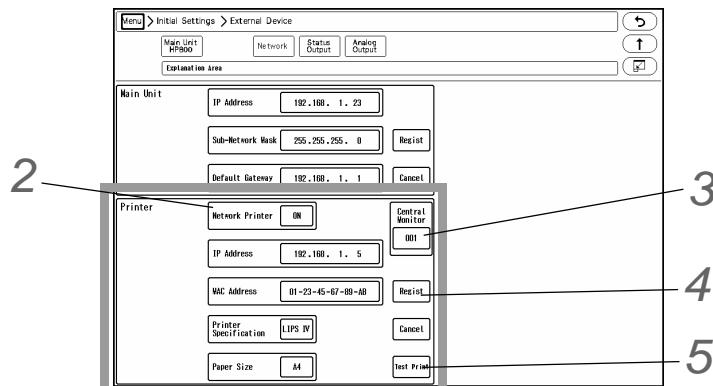
- If the output characters are garbled, printer specification may be incorrectly selected. Refer to the operation manual of the printer and check the printer specification.

□ 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.



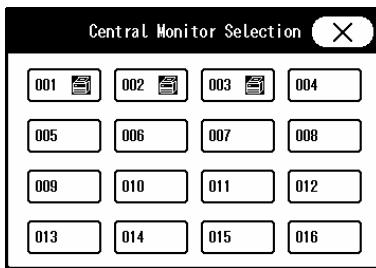
2 Select [DS-LAN] for "Network Printer".

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, and then press the [OK] key on the displayed confirmation window.

► 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, TEMP, ST, Height/Weight, etc.
	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 mouse operation, window minimizing settings, etc.
External Device	Main Unit/HP-800	Settings for external device connectors such as serial port, Status II connector, U-Link 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.
	Unit/Module	Settings for multiamplicifier connector, SpO ₂ channel.
	Other	Settings for AC filter, extended display unit, HS-8000 Data Transfer, Numeric Data External Output
User Mode Registration	-	Registration of 9 main modes and 6 sub modes for monitoring. Registration of 6 modes for extended display unit.
Admin. 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

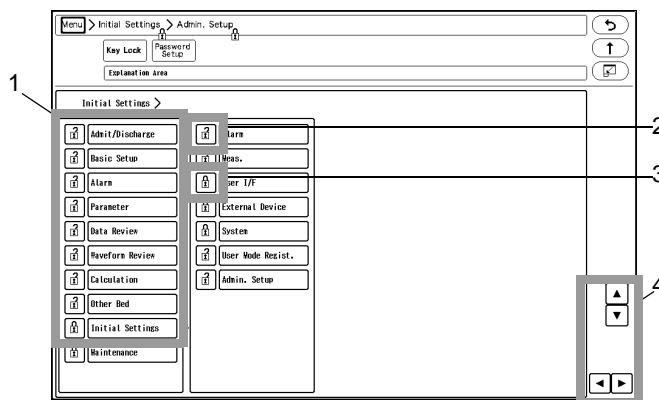
- To display the administrator setup menu, a password is required. There are 3 levels of password with different operation authorization. With higher level password, the lower level settings can be changed.
- For details of the password, contact Fukuda Denshi service representative.

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 item 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.

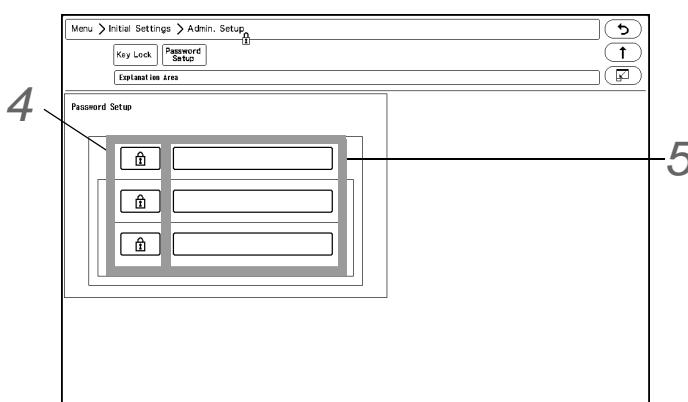
- For details of the password, contact Fukuda Denshi Service Representative.

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.



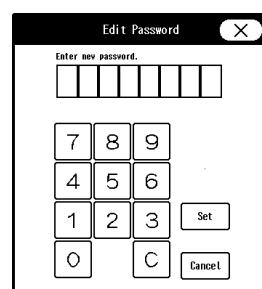
4 Enter the password.

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 [Set] 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.

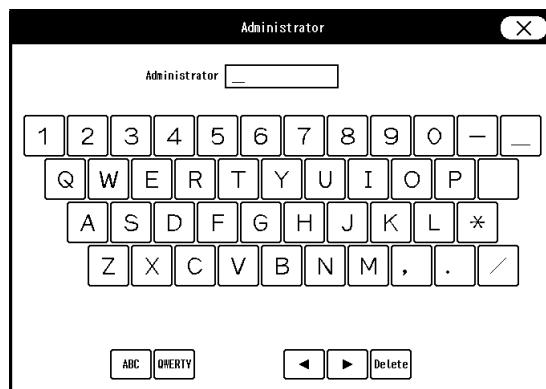
5 Set the administrator name.

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

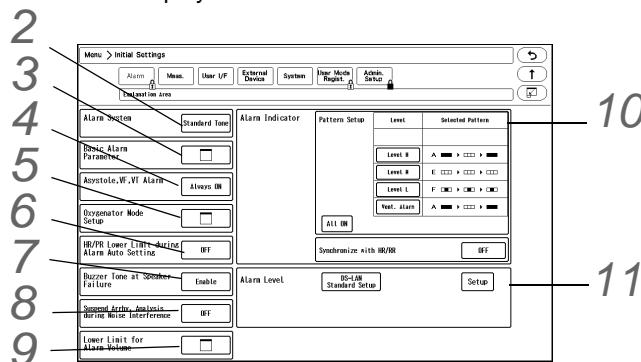
- Maximum of 8 characters can be set for the administrator name.

Alarm Related Setup

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

1 Press the [Menu], [Initial Settings] 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.

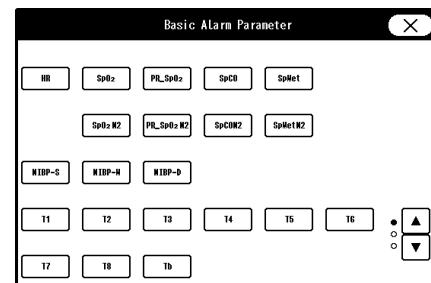
2 Select from [Fukuda Tone] / [Melodic Tone] / [Standard Tone].

- ▶ [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 "Oxygenator Mode Setup".

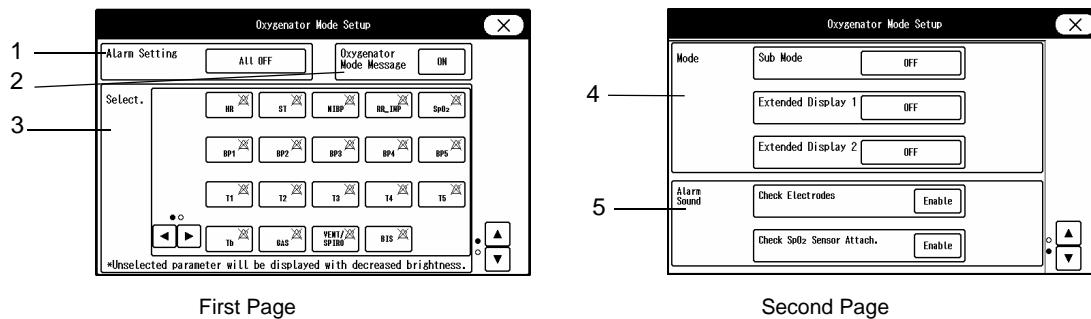
⚠ WARNING

- The oxygenator mode is intended to prevent alarms during cardiopulmonary bypass surgery. Pay special attention when using this mode as the alarm generation will not be the same as to the standard monitoring mode.
- If the "Alarm Setting" under the Oxygenator Mode Setup is set to [All OFF], all vital alarm will not generate regardless of the alarm setting of each parameter. Also, if [Sel. Parameter] is set, vital alarm for unselected parameter will not generate. Pay attention to not miss any significant change of the patient's vital sign as the alarms will not be generated during the Oxygenator Mode.

- Once the cardiopulmonary bypass is finished, make sure to cancel the Oxygenator Mode and return to the standard monitoring mode.

CAUTION

- If the NIBP alarm is turned OFF under the Oxygenator Mode, NIBP auto mode measurement and NIBP measurement at alarm occurrence will not be performed.



- Set the alarm operation during oxygenator mode.
 - [All OFF]: All parameter and arrhythmia alarm will be OFF regardless of the alarm setting.
 - [Sel. Parameter]: Only the alarms for the parameters selected on the "Select." window will generate.
 - [No Change]: The alarm operation will be the same with the standard monitoring mode.
- Select whether or not to display messages on the waveform display area during the oxygenator mode.
 - [ON]: Messages will be displayed.
 - [OFF]: Messages will not be displayed.

NOTE

- The messages on the information display area will be displayed even if this setting is set to OFF.

- Select the parameters to be monitored during Oxygenator Mode.
 - Unselected parameters will be displayed with decreased brightness on the home display.
 - If [Sel. Parameter] is set for "Alarm Setting", the alarm for unselected parameter will not be generated.
- Set the display mode (Sub Mode/Extended Display 1/Extended Display 2) during Oxygenator Mode.
 - If [OFF] is selected, the display mode will not switch during the oxygenator mode.
 - When returning to the standard monitoring mode, it will return to the display mode used before switching to the Oxygenator Mode.
- Select whether to enable or disable the <ECG Check Electrodes> alarm and <SpO₂ Check Sensor Attach.> alarm during oxygenator mode.
 - If [Disable] is selected, alarms will not generate during the oxygenator mode.

6 Set the "HR/PR Lower Limit during Alarm Auto Setting".

- OFF: 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.

7 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

- If a buzzer tone is generated at alarm generation, it can be silenced by pressing the [Alarm Silence] key.

8 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.

9 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.

10 Set the alarm indicator operation.**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.

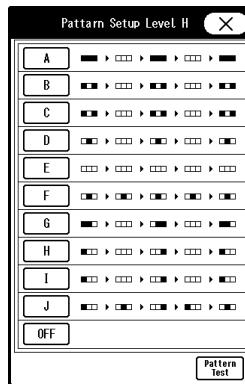
Alarm Indicator Flashing Pattern

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

* (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.

11 Set the "Alarm Level".

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

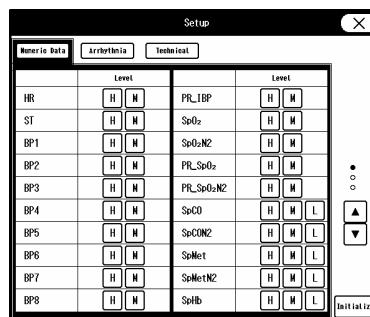
Press the [Setup] key to display the alarm level setup window.

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] / [OFF] for each parameter.

NOTE

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

CAUTION

- If [OFF] is set for the alarm level, alarm will not be generated.

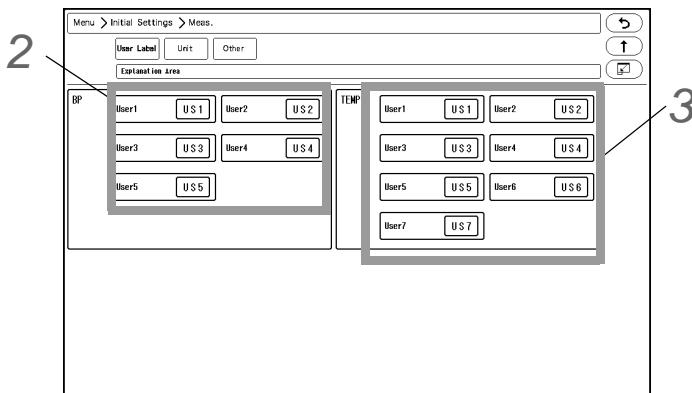
Measurement Related Setup

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.

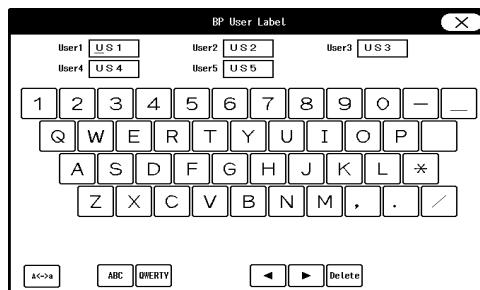
► The user label setup screen will be displayed.



- 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.

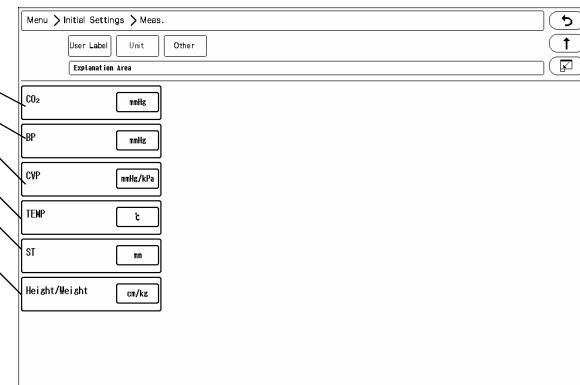
Measurement Unit

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 CO₂
Select the CO₂ unit from [mmHg]/[kPa]/[%].
- 2 BP
Select the BP and NIBP unit from [mmHg]/[kPa].
- 3 CVP
When the BP label is CVP (Central Venous Pressure), select the unit from [mmHg/kPa]/[cmH₂O].
- 4 TEMP
Select the TEMP unit from [°C]/[°F].
- 5 ST
Select the ST unit from [mV]/[mm].
- 6 Height/Weight
Select the Height/Weight unit from [cm/kg]/[in/lb].



- 2 Select the unit for each parameter.

NOTE

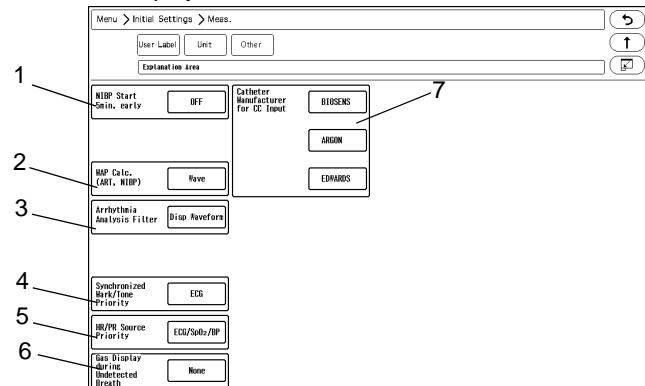
- When the BP, CVP unit is changed, the tabular/graphic trend data with the previous measurement unit will be deleted. Also, when the unit is changed, it is necessary to perform the alarm setup for the new measurement unit.

Other Setup

On the other settings menu, other measurement related settings 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.

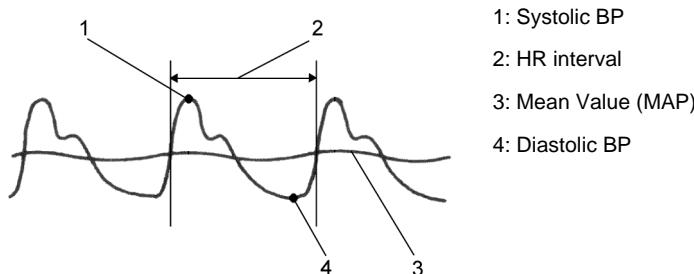
NOTE

- ◆ This setting will be disabled when [Meas.] is set for "Periodic Measurement Starting Time" on the NIBP setup menu.

- 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 mean BP from the following calculation. Mean BP (MAP) = (Systolic BP + Diastolic BP x 2) / 3

[Wave]: The following measurement will be performed.



- 3 Sets the "Arrhythmia Analysis Filter".

[Disp. Waveform]: The filter selected on admit/discharge menu or ECG setup menu 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 Priority".

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

[ECG]: The synchronizing priority will be set in the order of ECG > SpO₂-1 > SpO₂-2 > BP. The synchronized tone will be set to [ON].

[SpO₂]: The synchronizing priority will be set in the order of SpO₂-1 > SpO₂-2 > 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>SpO₂-1>SpO₂-2>BP.

- 6 Set the "GAS Display during Undetected Breath".

▶ [None]: When a respiration is not detected, inspiratory and expiratory data will become invalid and bar marks will be displayed instead.

▶ [Insp. Only]: When a respiration is not detected, only the inspiratory data will become valid and bar marks will be displayed for expiratory data.

- 7 Set the "Catheter Manufacturer for CC Input".
Press one of the keys, and enter the manufacturer name on the displayed window.
(Max. 8 characters)

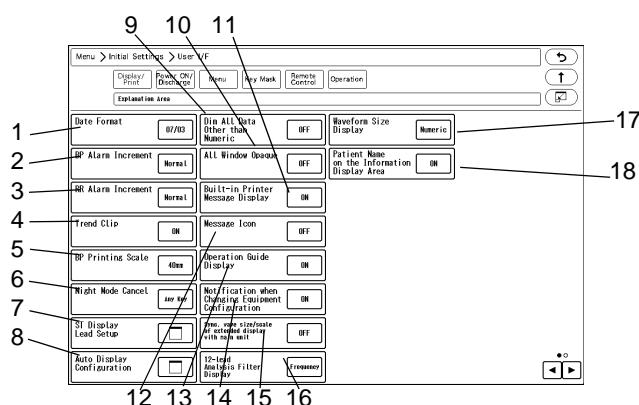
User I/F

Display/Print Setup

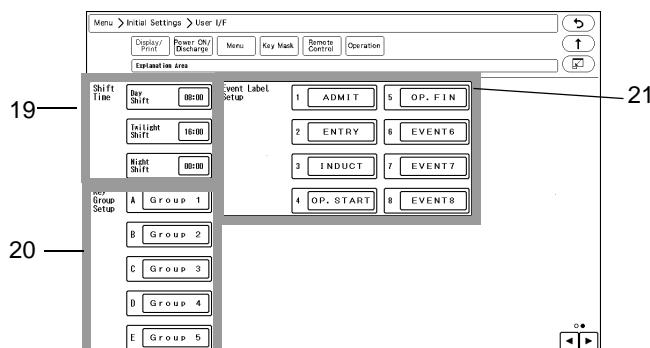
On the display/print setup menu, initial settings for display/print can be performed.

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

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



First Page



Second Page

- 1 The selected 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 7kPa	0.2kPa increment	0.1kPa increment
7.5 to 40.0kPa	0.5kPa increment	

- 3 Select the RR alarm increment from [Normal] or [Small].
[Normal]: increment of 5 (used for the software version up to 7.2)
[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 8 waveform.

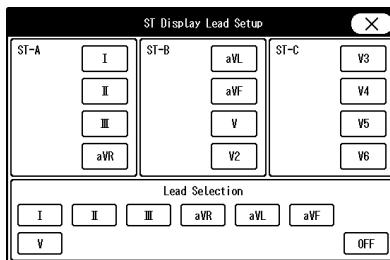
- 6 Select the procedure to cancel the night mode when [No Change]/[Darker]/[Dark] is set.

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

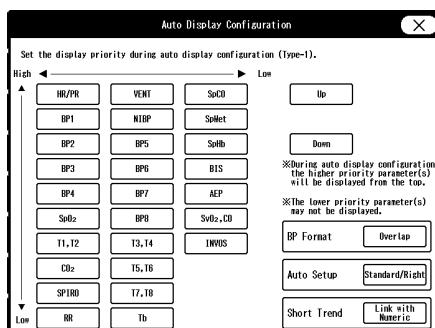
[Night Mode Key]: The night mode can be cancelled by pressing the [Night Mode] key on the user key or on the menu screen.

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

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



- 8 "BP Format" ([Overlap] / [Separate]), "Auto Setup" ([Standard/Right] / [Standard/Left]), and "Short Trend" ([Link with Numeric] / [Link with Waveform]) 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 [ON]: The built-in printer status will be displayed on the home display.

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

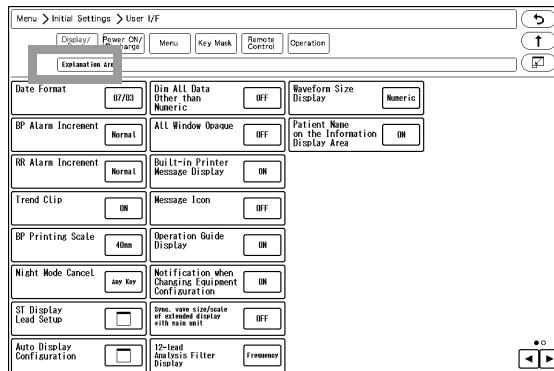
- 12 Select [ON]/[OFF] for "Message Icon".

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 Operation Guide Display

[ON]: Operation guide message will be displayed in the window message area.
 [OFF]: Operation guide message will not be displayed.



14 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.

15 Select [ON]/[OFF] for "Sync wave size/scale of extended display with main unit".

[ON]: Changing the waveform size/scale displayed on the main unit will also change the waveform size/scale on the extended display unit.
 [OFF]: Changing the waveform size/scale displayed on the main unit will not change the waveform size/scale on the extended display unit.

16 Select the display type for the 12-lead analysis filter.

The filter display type on the 12-lead analysis display/printing will change with this selection.
 [Frequency]: The set frequency (ex. [25Hz]) will be displayed.
 [Filter Type]: The filter type (ex. [MF_ST], [DF_WK]) will be displayed.

17 The waveform size display on the home display can be selected 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.

18 Select ON/OFF for "Patient Name on the Information Display Area" .

[ON] : Patient name will be displayed on the information display area.
 [OFF] : Patient name will not be displayed on the information display area.

19 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

20 8 user keys can be registered for each group. The label for the key group can be also set.

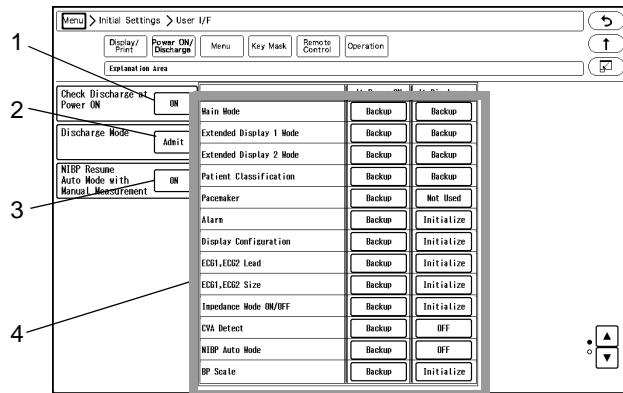
21 8 event labels (Surgery, etc.) can be registered. By setting [Event] on the user key, the registered event label can be printed at any time.

Power ON/Discharge

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

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

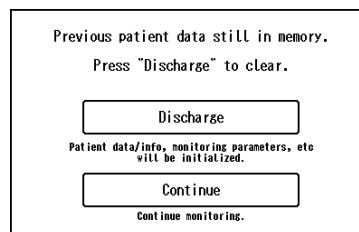
► The following screen will be displayed.



- 1 The trend data and tabular 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. Whether or not to display the discharge confirmation window if previous data remains at power ON can be selected.

[OFF]: The discharge confirmation window will not be displayed and monitoring will be immediately started.

[ON]: The discharge confirmation window will be displayed if previous data remains when the power is turned ON.

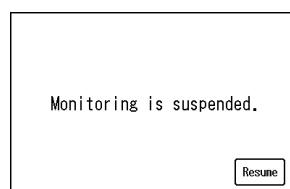


- 2 Monitoring condition after the patient has discharged can be selected.

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

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

[Standby]: When a patient is discharged, <Monitor will enter into standby mode.> message will be displayed for 10 seconds, and automatically enters into standby mode. Pressing the [Cancel] key will cancel the process to enter into standby mode.



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 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.
Extended Display 1 Mode	Current Mode Extended Display 1 Mode 1 to 3	The setting will be initialized to the selected mode.
Extended Display 2 Mode	Current Mode Extended Display 2 Mode 1 to 3	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.
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.
	2.5 min	NIBP auto mode will be set to 2.5 min. interval.
	5 min	NIBP auto mode will be set to 5 min. interval.
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].

NOTE

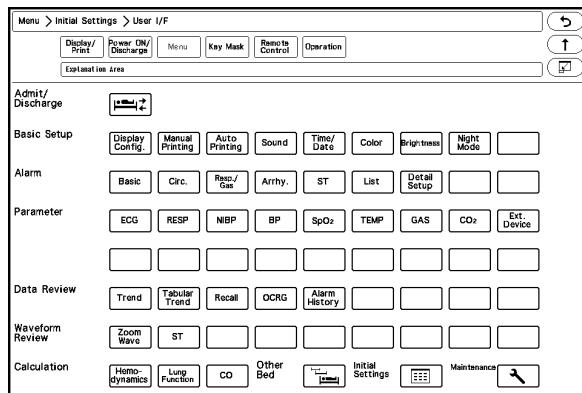
- The operation after the power is turned ON will be according to the setting made on [Initial Settings] > [User I/F] > [Power ON/Discharge]. However, if the power was turned OFF for less than 30 seconds, the setting before the power was turned OFF will remain.
- If the "Main Mode" setting is other than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

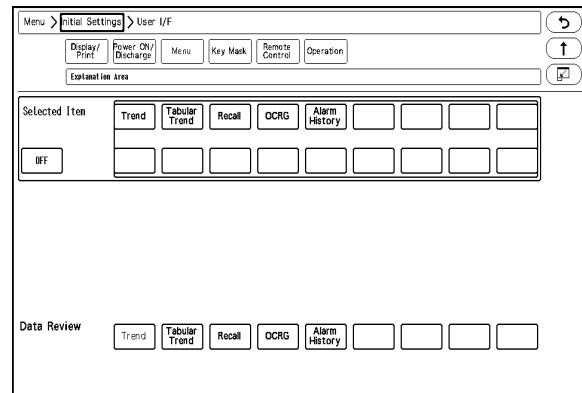
- 1** Press the [Menu], [Initial Settings], [User I/F], [Menu] keys.

▶ 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.

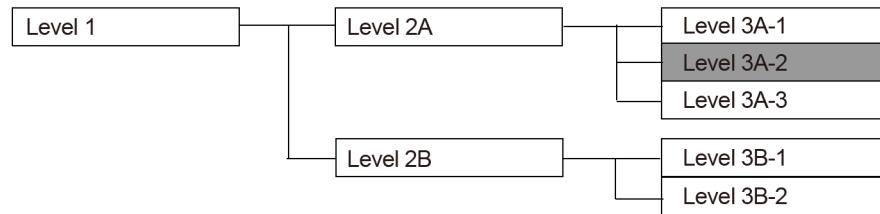
NOTE

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

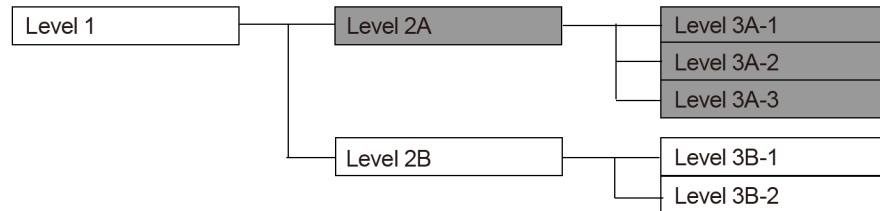
The setup items are in tree structure.

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

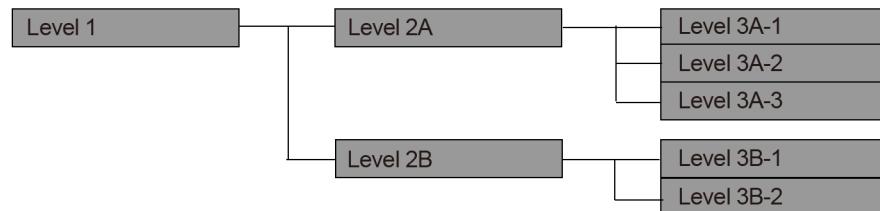
For the following tree structure, if "Level 3A-2" is masked, only this item will be masked.



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

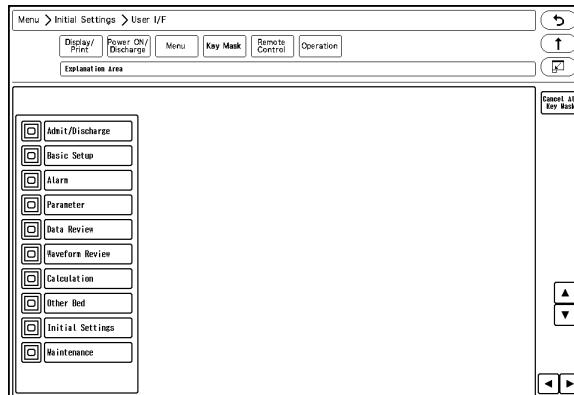


If "Level 1" is masked, the masked items will be as follows.



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

► The key mask setup screen will be displayed.

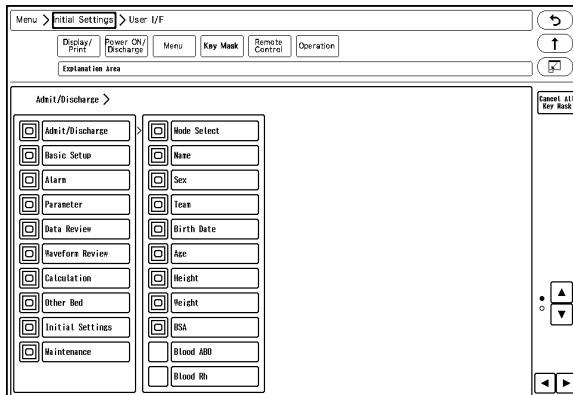


2 Select the item to perform the setting.

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.

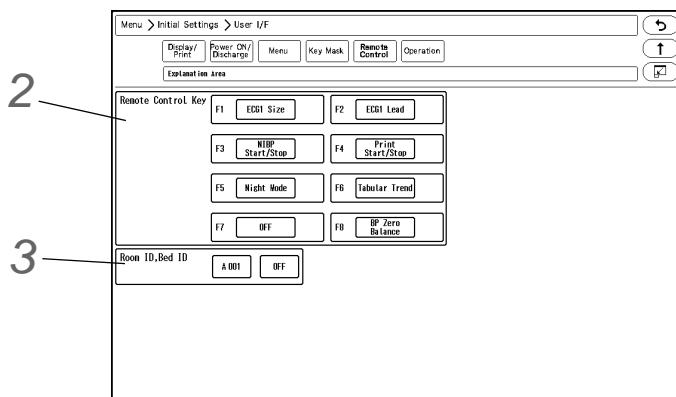
4 Press for the item to display.

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.

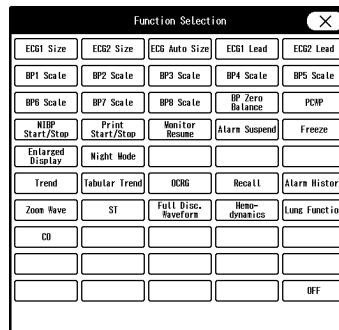
► The remote control setup screen will be displayed.



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 **(X)**.

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 10-electrode: I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6, I
ECG Auto Size	Automatically adjusts the ECG size to 10mm. The automatic adjustment is effective only when the key is pressed.
BP1 (to BP8) Scale	Switches the BP1 (to 8) scale each time the key is pressed. The scales will differ depending on the label. (☞ Operation Manual "BP Parameter Setup" P7-30)
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.
Enlarged Display	The home display layout will switch between "Standard" and "Large".
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 Disclosure Waveform	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.
OFF	Turns OFF the key operation.

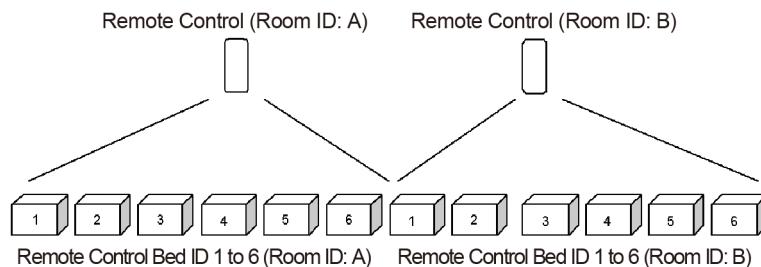
3 Set the Room ID/Bed ID.

CAUTION

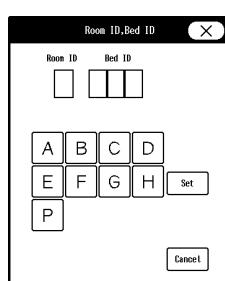
- ◆ Do not set the same remote control bed ID to more than one monitors on the same floor. Otherwise, it may cause to remote control more than one monitor at the same time.
- ◆ After the remote control setup, check that the remote control unit is properly operating.

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.

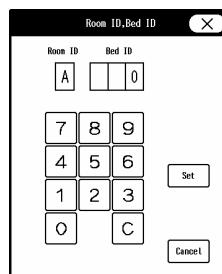


- 1 Press the key for "Room ID, Bed ID".
▶ The dropdown list will be displayed.
- 2 Select from [ON] or [OFF].
▶ [ON]: The Room ID/Bed ID setup will be enabled.
▶ [OFF]: The Room ID/Bed ID setup will be disabled.
- 3 Press the [A 000] key.
▶ The "Room ID, Bed ID" window will be displayed.



- 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.

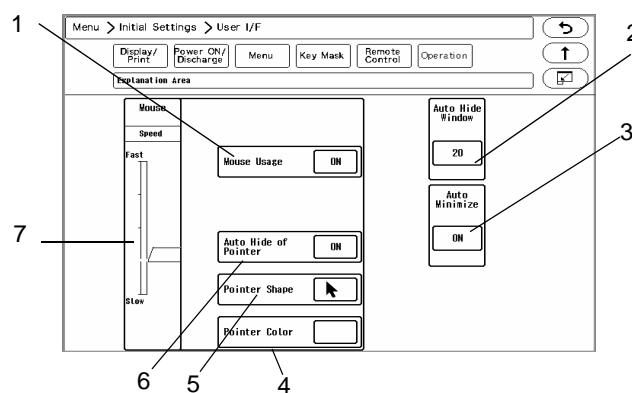
- ▶ [Set]: The entered Room ID/Bed ID will be set.
- ▶ [Cancel]: The entered Room ID/Bed ID will be cancelled.

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 Mouse (optional) can be used for monitor operation.
[ON]: Mouse operation will be enabled when connected.
[OFF]: Mouse operation will be disabled even if connected.
- 2 Window display can be automatically closed after fixed duration.
[OFF]: Window display will not automatically close.
[5] to [60]: If no operation was performed for set duration, the window display will automatically close. However, the windows for "Data Review", "Waveform Review", "Calculation", "Initial Settings" will not automatically close.

- 3 When "Auto Hide Window" is enabled, whether or not to minimize the window instead of closing the window can be selected.

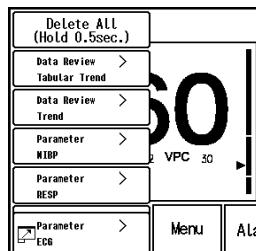
[ON]: The window will be minimized after the set duration for "Auto Hide Window".

[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 8 windows can be minimized. If exceeded, the oldest window will be deleted.

- 4 The color of the mouse pointer can be selected from black or white.

- 5 The pointer shape can be selected from standard/large.

- 6 Select ON/OFF for "Auto Hide of Pointer".

[ON]: Automatically hides the pointer if the mouse is not used for 5 minutes. By moving or clicking the mouse, the pointer will be displayed again.

[OFF]: Pointer will not be automatically hidden.

- 7 Select the moving speed of the pointer from 5 levels.

System Setup

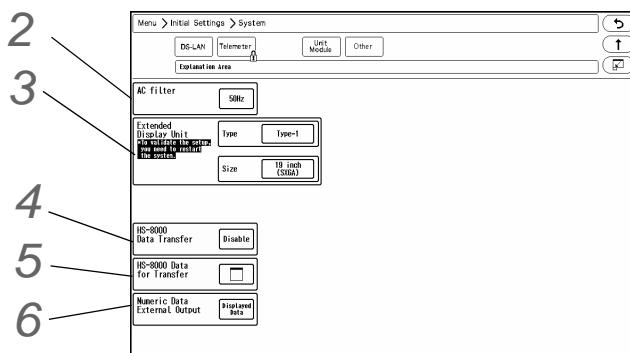
On the system setup menu, system related setup can be performed.

REFERENCE

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

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

- The system setup menu 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 "Extended Display Unit".

REFERENCE

- ♦ For "Extended Display Unit" setup, contact our service representative.

- 4** Set the "HS-8000 Data Transfer".

- 1** Press the key for "HS-8000 Data Transfer".

► The dropdown list will be displayed.

- 2** Select from [Enable] or [Disable].

► [Enable]: The data transfer function will be enabled.

► [Disable]: The data transfer function will be disabled.

⚠ CAUTION

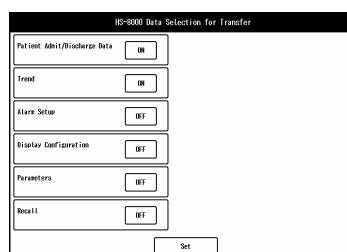
- ♦ If the data transfer function is enabled and alarm sound suspend function is ON, the alarm sound will be automatically suspended for 5 minutes when the Super Unit is connected.

- 5** Set the "HS-8000 Data for Transfer".

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

- 1** Press the key for "HS-8000 Data for Transfer".

► The "HS-8000 Data Selection for Transfer" screen will be displayed.



- 2** Select [ON]/[OFF] for each item.

► [ON]: Data will be transferred when connected to the Super Unit.

► [OFF]: Data will not be transferred.

- 3** Press the [Set] key to finalize the setup.

⚠ CAUTION

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

6 Select whether to output only the displayed data or output all data to the extended display unit and central monitor.

The numeric data to be output during DS-LAN, HLX, 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.

⚠ WARNING

- When [All Data] is selected, alarm will not generate on the extended display unit/central monitor if the corresponding parameter is not displayed on the display unit (LC-8015/LC-8019).

For the parameters which requires alarm monitoring on the extended display unit/central monitor, make sure to display those on the display unit.

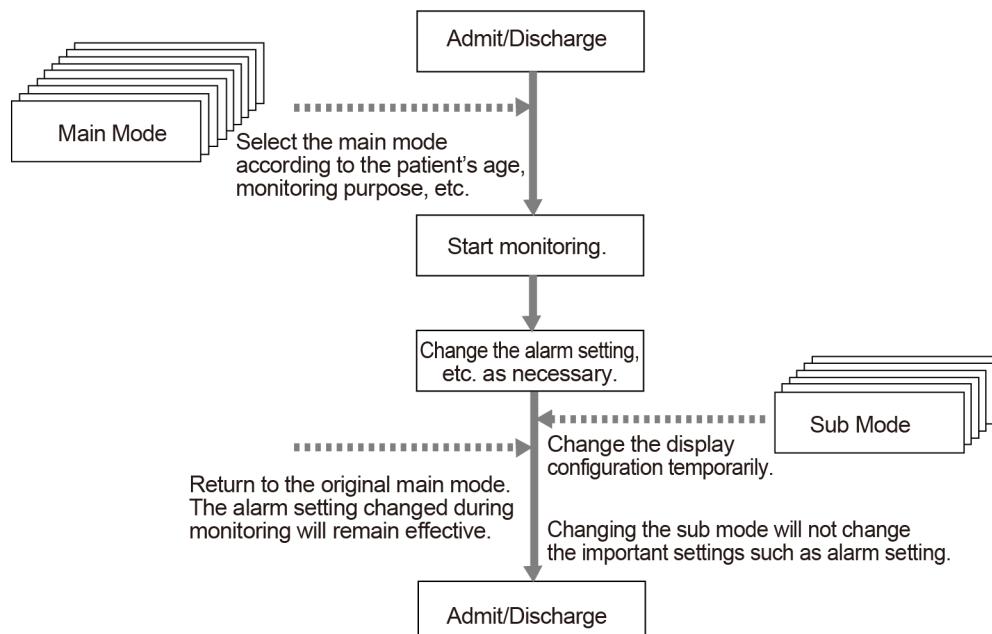
User Mode Registration

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. Also, for temporarily changing the display configuration, 6 sub modes of display configuration can be registered.

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. The sub modes can be used when temporarily changing the display configuration such as when checking the 12-lead ECG, etc.



□ 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
- ♦ Parameter
- ♦ Graphic/Tabular Trend Display
- ♦ Synchronized Mark/Tone
- ♦ RR Alarm/Apnea Source

□ Items that can be registered for the Sub Mode

The following items can be registered for the sub mode.

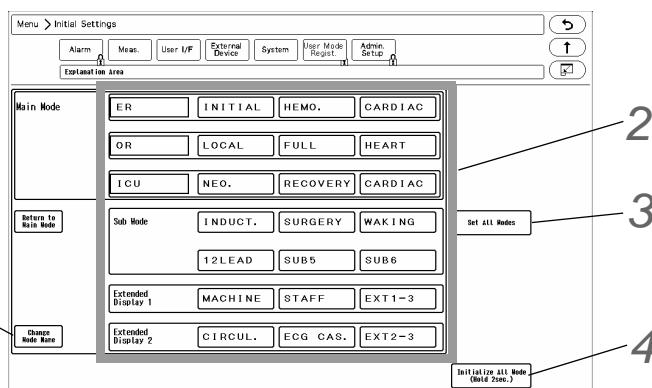
- ♦ Mode Name
- ♦ Display Configuration

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.

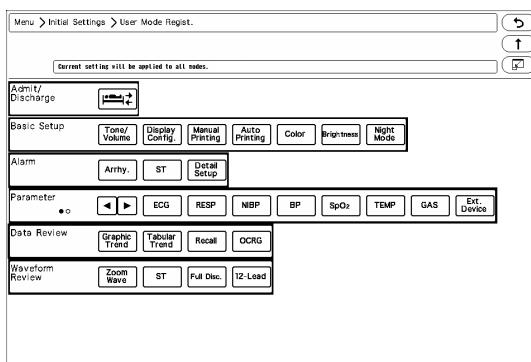
NOTE

- ◆ 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.

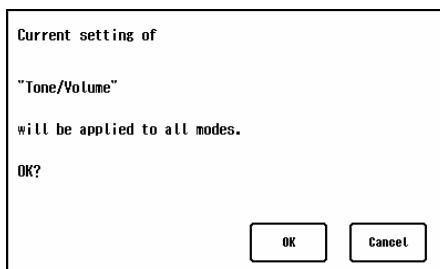
1 Press the [Set All Modes] key.

- ▶ 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)	6-33
RS-232C Connector Output Signal	6-33
Status I/O Signal (Status II Connector)	6-34

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, EtCO ₂	Yes
Asystole, VF, VT Alarm	Always ON, ON/OFF	Always ON	Yes
HR/PR Lower Limit during Alarm Auto Setting	OFF, 30bpm, 40bpm	OFF	Yes
Buzzer Tone at Speaker Failure	Enable, Disable	Disable	Yes
Suspend Arrhy. Analysis during Noise Interference	ON, OFF	OFF	Yes
Oxygenator Mode Setup	Alarm Setting	All OFF, Sel. Parameter, No Change	All OFF
	Oxygenator Mode Message	ON, OFF	ON
	Parameter Selection	BP1-8, T1-8, Tb	Yes
	Mode: Sub Mode	OFF, INDUCT., SURGERY, WAKING, 12LEAD, SUB5, SUB6	OFF
	Mode: Extended Display 1	OFF, MACHINE, STAFF, EXT1-3	OFF
	Mode: Extended Display 2	OFF, CIRCUL., ECG CAS., EXT2-3	OFF
	Alarm Sound: Check Electrodes	Enable, Disable	Enable
	Alarm Sound: Check SpO ₂ Sensor Attach.	Enable, Disable	Enable
Lower Limit for Alarm Volume	Vital Alarm: Urgent	11 levels	1
	Vital Alarm: Caution		1
	Vital Alarm: Status		1
	Ventilator Alarm		1
	Status Alarm: Urgent		1
	Status Alarm: Caution		1
	Status Alarm: Status		1

Item		Details	Default	Backup
Alarm Indicator Setup	Level S ^{*1}	Pattern A to J, OFF	Pattern A	Yes
	Level H		Pattern A	Yes
	Level M		Pattern E	Yes
	Level L		Pattern F	Yes
	Ventilator Alarm		Pattern A	Yes
	Synchronize with HR/RR		Sync. to HR, Sync. to RR, OFF	OFF
Alarm Level ^{*2}		DS-LAN Standard Setup, User Setup	DS-LAN Standard Setup	Yes
Numeric Data	HR	S, H, M	M	Yes
	ST	H, M	M	Yes
	BP1 to 8	H, M	M	Yes
	PR_IBP	H, M	M	Yes
	SpO ₂ -1, SpO ₂ -2	H, M	M	Yes
	PR_SpO ₂ -1, PR_SpO ₂ -2	H, M	M	Yes
	NIBP	H, M	M	Yes
	TEMP1 to 8	H, M, L	L	Yes
	Tb	H, M, L	L	Yes
	RR	H, M, L	M	Yes
	APNEA	H, M, L	H	Yes
	CO ₂ In ^{*3}	H, M	M	Yes
	CO ₂ Et ^{*3}	H, M	M	Yes
	O ₂ In ^{*3}	H, M	M	Yes
	O ₂ -Exp ^{*3}	H, M	M	Yes
	N ₂ O In ^{*3}	H, M	M	Yes
	N ₂ O Exp ^{*3}	H, M	M	Yes
	Agent In ^{*3}	H, M	M	Yes
	Agent Exp ^{*3}	H, M	M	Yes
	MAC ^{*3}	H, M	M	Yes
	SpCO1, 2	H, M, L	L	Yes
	SpMet1, 2	H, M, L	L	Yes
	SpHb1, 2	H, M, L	L	Yes
	PEAK ^{*3}	H, M, L	L	Yes
	PEEP ^{*3}	H, M, L	L	Yes
	MV	H, M, L	M	Yes
	BIS ^{*4}	H, M, L	M	Yes

Item		Details	Default	Backup
Arrhythmia	Asystole	S, H	H	Yes
	VF	S, H	H	Yes
	VT	S, H	H	Yes
	Slow VT	H	H	Yes
	Tachy	S, H	H	Yes
	Brady	S, H	H	Yes
	Run	H, M	M	Yes
	Bigeminy	H, M, L	L	Yes
	Trigeminy	H, M, L	L	Yes
	Pause	H, M, L	M	Yes
	Couplet	H, M, L	L	Yes
	Frequent	H, M, L	L	Yes
Technical	GAS Mixed Agents Detection	M, L, N	N	Yes
	SpO ₂ -1 Low Perfusion SpO ₂ -2 Low Perfusion	L, N	L	Yes
	Check NIBP cuff, hose	M, L, N	L	Yes
	NIBP meas. failed.(**-**)	M, L, N	L	Yes
	Check System Conn.	L, N	N	Yes
	Check DS-LAN Comm	L, N	L	Yes
	Some parameters are not displayed due to the display layout setting.	L, N, OFF	N	Yes
	Check Electrodes	H, M, L	L	Yes
	Check SpO ₂ Sensor Attach.	H, M, L	L	Yes
	HS-8000 Check Conn.	M, L	M	Yes
	IB-8000 Check Conn.	M, L	M	Yes

*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.

*3: When the numeric data acquired from FLOW-i is displayed, the alarms cannot be set. Also, these alarms will not generate.

Initial Settings (Measurement)

Item	Details	Default	Backup	
NIBP Start 5 min. early	ON, OFF	OFF	Yes	
MAP Calculation	Waveform, Calculation	Waveform	Yes	
Arrhythmia Analysis Filter	Disp Waveform, Fixed	Disp. Waveform	Yes	
Synchronized Mark/Tone Priority	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	
Gas Display during Undetected Breath	None, Insp. Only	None	Yes	
BP User Label	Label 1	3 alphanumeric characters	Yes	
	Label 2			
	Label 3			
	Label 4			
	Label 5			
TEMP User Label	Label 1	3 alphanumeric characters	Yes	
	Label 2			
	Label 3			
	Label 4			
	Label 5			
	Label 6			
	Label 7			
Measurement Unit	CO ₂	mmHg, kPa, %	mmHg	Yes
	BP	mmHg, kPa	mmHg	Yes
	CVP	mmHg/kPa, cmH ₂ O	mmHg/kPa	Yes
	TEMP	°C, °F	°C	Yes
	ST	mm, mV	mm	Yes
	Height/Weight	cm/kg, in/lb	in/lb	Yes
Catheter Manufacturer for CC Input	Manufacturer 1	8 alphanumeric characters	BIOSENS	Yes
	Manufacturer 2		ARGON	
	Manufacturer 3		EDWARDS	

Initial Settings (User I/F)

Display/Print

Item	Details	Default	Backup
Date	07/19, Jul.19, 19.Jul	07/19	Yes
BP Alarm Increment	Normal, Small	Normal	Yes
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

Display/Print

Item	Details	Default	Backup
ST Display Lead Setup (A to C)	4 leads for each pattern of A to C I to V6, OFF	ST-A: I, II, III, aVR ST-B: aVL, aVF, V1, V2 ST-C: V3, V4, V5, V6	Yes
Auto Display Configuration	BP Format	Overlap, Separate	Separate
	Auto Setup	Standard/Right, Standard/Left	Standard/Right
	Display Priority	HR/PR, VENT, SpCO, BP1, NIBP, SpMet, BP2, BP5, SpHb, BP3, BP6, BIS, BP4, BP7, SpO ₂ , BP8, SvO ₂ /CO, T1/T2, T3/T4, INVOS, CO ₂ , T5/T6, SPIRO, T7/T8, RR, Tb	HR/PR, BP1, BP2, BP3, BP4, SpO ₂ , T1/T2, CO ₂ , SPIRO, RR, VENT, NIBP, BP5, BP6, BP7, BP8, T3/T4, T5/T6, T7/T8, Tb, SpCO, SpMet, SpHb, BIS, SvO ₂ /CO, INVOS
Dim All Data Other than Numeric	ON, OFF	OFF	Yes
All Window Opaque	ON, OFF	OFF	Yes
Built-in Printer Message Display	ON, OFF	OFF	Yes
Message Icon	ON, OFF	OFF	Yes
Operation Guide Display	ON, OFF	ON	Yes
Notification when Changing Equipment Configuration	ON, OFF	ON	Yes
Sync. wave size/scale of extended display with main unit	ON, OFF	OFF	Yes
12-Lead Analysis Filter Display	Frequency, Filter Type	Frequency	Yes
Waveform Size Display	Numeric, Bar	Numeric	Yes
Patient Name on the Information Display Area	ON, OFF	ON	Yes
Shift Time	Day Shift	Selectable Time	08:00
	Twilight Shift		16:00
	Night Shift		00:00

Display/Print

Item		Details	Default	Backup
Key Group Setup	Label A to E	8 alphanumeric characters	Blank *	Yes
	A to E	Up to 8 user keys can be registered to each group (Home, Key Lock, Menu, Mode Select, Alarm Silence, Admit/Disch., Alarm Suspend, Rapid Discharge, NIBP Start/Stop, HR/PR Source, NIBP Cont., BP Zero, Print Start/Stop, Scale, Monitor Suspend, Night Mode, SpO ₂ Display ON/OFF, CO ₂ Display ON/OFF, Freeze, GAS Display ON/OFF, Auto Display Config., ST, Enlarged Display, Cardiac Output, 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, OCRG, Manual Printing, Display Config., Time/Date, Stopwatch)	None	Yes
Event Label Setup	Event 1	8 alphanumeric characters	Event 1	Yes
	Event 2		Event 2	Yes
	Event 3		Event 3	Yes
	Event 4		Event 4	Yes
	Event 5		Event 5	Yes
	Event 6		Event 6	Yes
	Event 7		Event 7	Yes
	Event 8		Event 8	Yes

*: 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, Standby	Admit	Yes
NIBP Resume Auto Mode with Manual Measurement		ON, OFF	ON	Yes
At Power ON Backup/Initialize	Patient Classification	Backup, Adult, Child, Neonate	Backup	Yes
	Mode	Backup, Current Mode, Mode 1 to 9	Backup	Yes
	Extended Display 1	Backup, Mode 1 to 3	Backup	Yes
	Extended Display 2	Backup, Mode 1 to 3	Backup	Yes
	Pacemaker	Backup, Not Used	Backup	Yes
	Alarm	Backup, Initialize	Backup	Yes
	Display Configuration	Backup, Initialize	Backup	Yes

Power ON/ Discharge

Item		Details	Default	Backup
At Power ON Backup/Initialize	ECG1, ECG2 Lead	Backup, Initialize	Backup	Yes
	ECG1/ECG2 Size	Backup, Initialize	Backup	Yes
	Impedance Mode ON/OFF	Backup, Initialize	Backup	Yes
	CVA Detect	Backup, OFF	Backup	Yes
	NIBP Auto Mode	Backup, OFF OFF->2.5 min. OFF->5 min. 2.5 min., 5 min.	Backup	Yes
	BP Scale	Backup, Initialize	Backup	Yes
	SpO ₂ Averaging	Backup, Initialize	Backup	Yes
	CO ₂ Scale	Backup, Initialize	Backup	Yes
	EtCO ₂ Peak Duration	Backup, 10 sec.	Backup	Yes
At Discharge Backup/Initialize	Patient Classification	Backup, Adult, Child, Neonate	Backup	Yes
	Mode	Backup, Current Mode, Mode 1 to 9	Backup	Yes
	Extended Display 1	Backup, Mode 1 to 3	Backup	Yes
	Extended Display 2	Backup, Mode 1 to 3	Backup	Yes
	Pacemaker	Backup, Not Used	Not Used	Yes
	Alarm	Backup, Initialize	Initialize	Yes
	Display Configuration	Backup, Initialize	Initialize	Yes
	ECG1, ECG2 Lead	Backup, Initialize	Initialize	Yes
	ECG1/ECG2 Size	Backup, Initialize	Initialize	Yes
	Impedance Mode ON/OFF	Backup, Initialize	Initialize	Yes
	CVA Detect	Backup, OFF	OFF	Yes
	NIBP Auto Mode	Backup, OFF OFF->2.5 min. OFF->5 min. 2.5 min., 5 min.	OFF	Yes
	BP Scale	Backup, Initialize	Initialize	Yes
	SpO ₂ Averaging	Backup, Initialize	Initialize	Yes
	CO ₂ Scale	Backup, Initialize	Initialize	Yes
	EtCO ₂ Peak Duration	Backup, 10 sec.	10 sec.	Yes

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, GAS, CO ₂ , Ext. Device	ECG, RESP, NIBP, BP, SpO ₂ , TEMP, GAS, CO ₂ , Ext. Device	Yes
	Data Review	OFF, Trend, Tabular Trend, Recall, OCRG, Alarm History	Trend, Tabular Trend, Recall, OCRG, Alarm History	Yes
	Waveform Review	OFF, Zoom, ST	Zoom, ST	Yes
	Calculation	OFF, Hemodynamics, Lung Function, CO	Hemodynamics, Lung Function, CO	Yes
	Initial Settings	Initial Settings	Initial Settings	Yes
	Maintenance	Maintenance	Maintenance	Yes

Key Mask

Item		Details	Default	Backup
Key Mask	Menu Items	ON/OFF	All ON	Yes
	Admit/Discharge Items	ON/OFF	All ON	Yes
	Alarm>Circulatory Items	ON/OFF	All ON	Yes
	Alarm>Respiratory/Gas Items	ON/OFF	All ON	Yes
	Alarm>Arrhythmia Items	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 8 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, Enlarged Display, OFF	F1: ECG1 Size F2: ECG1 Lead F3: NIBP Start/Stop F4: Print Start/Stop F5: Night Mode F6: Tabular Trend F7: Trend F8: BP Zero Balance	Yes
	Room ID/Bed ID*	Room ID: A,B,C,D,E,F,G,H,P 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
Mouse Setup	Mouse Usage	ON, OFF	ON	Yes
	Auto Hide of Pointer	ON, OFF	ON	Yes
	Pointer Shape			Yes
	Pointer Color	White, Black	White	Yes
	Moving Speed	5 levels	Bottom Level	Yes
Window	Auto Hide Window	OFF, 5, 10, 20, 30, 60 sec.	60 sec.	Yes
	Auto Minimize	ON, OFF	ON	Yes

 Initial Settings (External Device)

Item		Details	Default	Backup
Main Unit, HP-800	COM1	OFF, SV-900, SV-300, Servo-i/s, PB, Evita, Vigilance, PiCCO, MGU-800, MGU-810, PC Comm., HLX, BIS, INVOS, FLOW-i, PC Comm. (DS-5000) [#]	OFF *	Yes
	COM2		OFF *	Yes
	COM3		OFF *	Yes
	COM4		OFF *	Yes
	Status II		OFF *	Yes
	U-LINK		OFF *	Yes
	COM5		OFF *	Yes
Network	Main Unit	IP Address	Numerics (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	Numerics (0 to 9)	0.0.0.0
		MAC Address	Alphanumerics (0 to 9, A to F)	00.00.00.00.00.00
		Printer Specification	LIPS IV, ESC/page, PCL5	LIPS IV
		Paper Size	A4, Letter	Letter
		Central Monitor	001 to 016	001
Status Output Setup	Sync. Signal Output	HR, RR	OFF *	Yes
	Output Logic	Positive Logic, Negative Logic	Negative Logic*	Yes
	Alarm Output	OFF, APNEA, Level H, Level H,M, Level H,M,L	Level H*	Yes
Analog Output Setup	ECG	Disp. Lead, Selected Lead	Disp. Lead	Yes
	IBP Output 1	MPA1-1, MPA1-2, MPA2-1, MPA2-2, MPA3-1, MPA3-2	MPA1-1	Yes
	IBP Output 2		MPA1-2	Yes

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

NOTE

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

Initial Settings (System)

Item		Details	Default	Backup
DS-LAN	DS-LAN Setup	DS-LAN (10Mbps), DS-LAN (100Mbps)	DS-LANII (10Mbps)	Yes
	Room ID	4 alphanumeric characters	BED-	Yes
	Bed ID	3 numerics	0	Yes
	DS-LAN Pat. ID Transmission Start Position	1st to 20th character	1st character	Yes
	Synchronize Hemodynamic Data with the Central Monitor	ON, OFF	ON	Yes
	CO ₂ (mmHg) Upper Limit of Transmission	No limit, 99mmHg	99mmHg	Yes
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 telemetry transmitter module	Yes
	Group ID	00 to 63	00 *	Yes
	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	Yes
Unit Module	Multiamplifier	Fixed, Manual	Fixed 1: BP1,2,TEMP5,6 , CO 2: BP5,6, TEMP1,2 , CO 3: BP3,4, TEMP3,4 , CO	Yes
	SpO ₂	Settings for 1ch, 2ch	1ch: HS, 2ch: OFF	Yes
Other Setup	AC Frequency	50Hz, 60Hz	50Hz	Yes
	[Search Patient ID]	Enable, Disable	Disable	Yes
	Extended Display Unit	Type1, Type2 Size 19 inch (SXGA), 15 inch (XGA) (LC-8015: 15 inch) (19 inch only for Type 1)	Type1	Yes
			19 inch (SXGA)	
	HS-8000 Data Transfer	Enable, Disable	Disable	Yes
	HS-8000 Data for Transfer	ON, OFF	Patient Admit/Discharge Data: ON Trend: ON Alarm Setup: OFF Display Configuration: OFF Parameters: OFF Recall: OFF	Yes
	Numeric Data External Output	Displayed Data, All Data	Displayed Data	Yes

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	Site Name	8 characters	ER	Yes
			OR	
			ICU	
Sub Mode* ²	Mode Name	8 characters	Initial	Yes
			Hemodynamics	
			Cardiac	
			Local	
			Full	
			Heart	
			Neo.	
			Recovery	
			Cardiac	
Extended Display 1	Mode Name	8 characters	Induct.	Yes
			Surgery	
			Waking	
Extended Display 2	Mode Name	8 characters	12-Lead	Yes
			Sub Mode 5	
			Sub Mode 6	
Extended Display 1	Mode Name	8 characters	Machine	Yes
			Staff	
			Extended 1 Mode 3	
Extended Display 2	Mode Name	8 characters	Circ.	Yes
			ECG Cascade	
			Extended 2 Mode 3	

*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)

*2: For Sub Mode, Extended Display 1, Extended Display 2, the following settings can be registered.

- ♦ Display Configuration
Refer to the section on "Basic Setup" for the settings of each mode.

Main Mode (Mode 1)

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Initial		Yes
Layout	Numeric Data/Bottom 2 rows		
Numeric Data	Bottom: HR, SpO ₂ , RR_IMP, BP1, NIBP, CO ₂	Bottom: HR, SpO ₂ , NIBP, BP1, CO ₂ , RR_IMP	
Waveform	ECG1, SpO ₂ , BP1, CO ₂ , RESP	ECG1, SpO ₂ , BP1, CO ₂ , RESP	
User Key	Numeric Data Area 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. NIBP List, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	- Menu, Alarm Silence, Admit/ Disch., BP Zero, NIBP Start/ Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home Menu, Alarm Silence, Trend, Tabular Trend, Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home
Short Trend	Display	OFF	
	Display Duration	15 min.	
	Short Trend	Link with Numeric	
	Short Trend Scale	Trend	
	Display Parameter	OFF	
	Reference Line Function	Disable	
	Cursor Function	Disable	
	Cursor Linkage	Tabular Trend	
	Short Trend Overlap	All OFF	
	Data Resolution	5 sec.	
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	Reversed	
Detail Setup (Waveform)	Grid	OFF	
	Thickness	Regular	
	Clip	OFF	
	Fill CO ₂ Waveform	OFF	
	Fill O ₂ Waveform	OFF	
	Fill Agent Waveform	OFF	
	ST Wave	Ref.	
	ST Short Trend	Fill	
	BP Overlap 1	BP1 to 4	
	BP Overlap 2	N/A	
	BP Overlap 3	N/A	
	RR Overlap 1	CO ₂ , O ₂ , Agent	
	RR Overlap 2	N/A	
	RR Overlap 3	N/A	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	

Main Mode (Mode 2)

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Hemodynamics		Yes
Layout	Large/Right&Bottom	Standard/Right&Bottom	
Numeric Data	Right: HR, SpO ₂ , NIBP, BP1, BP2, BP3, CO ₂ , SvO ₂ /CO Bottom: RR_IMP	Right: HR, SpO ₂ , NIBP, BP1, BP2, BP3, CO ₂ , RR_IMP, SvO ₂ /CO Bottom: NIBP, NIBP List	
Waveform	ECG1, SpO ₂ , BP Overlap 1, CO ₂ , RESP	ECG1, SpO ₂ , BP Overlap 1, CO ₂ , RESP	
User Key	<p>Numeric Data Area</p> <p>User Key Down 1/2</p> <p>User Key Down 2/2</p>	<p>Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont. Next to RR_IMP: NIBP List</p> <p>Menu, Alarm Silence, Admit/Disch., BP Zero, Scale, Alarm Setup (All), Trend, Tabular Trend, Recall, Print Start/Stop, User Key Up/Down, Home</p> <p>Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home</p>	<p>Next to NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont.</p> <p>Menu, Alarm Silence, Admit/Disch., BP Zero, Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home</p> <p>Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home</p>
Short Trend		Same as Main Mode (Mode 1)	
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	Reversed	
Detail Setup (Waveform)	Grid	OFF	
	Thickness	Regular	
	Clip	OFF	
	Fill CO ₂ Waveform	OFF	
	Fill O ₂ Waveform	OFF	
	Fill Agent Waveform	OFF	
	ST Wave	Ref.	
	ST Short Trend	Fill	
	BP Overlap 1	BP1 to 4	
	BP Overlap 2	N/A	
	BP Overlap 3	N/A	
	RR Overlap 1	CO ₂ , O ₂ , Agent	
	RR Overlap 2	N/A	
	RR Overlap 3	N/A	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	

Main Mode (Mode 3)

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Cardiac		Yes
Layout	12-Lead		
Numeric Data	Right: HR, SpO ₂ , NIBP, BP1, CO ₂ , RR_IMP	Right: HR, SpO ₂ , NIBP, BP1, CO ₂ , RR_IMP	
Waveform	ECG12 Lead, BP1, SpO ₂ , CO ₂ , RESP	ECG12 Lead	
User Key	Numeric Data Area	Below HR: 12-Lead Print, Cancel Printing, 12L Analysis Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont.	Below HR: 12-Lead Print, Cancel Printing, 12L Analysis Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont.
		User Key Down 1/2 Menu, Alarm Silence, Admit/Disch., BP Zero, Scale, Alarm Setup (All), Trend, Tabular Trend, Recall, NIBP List, Print Start/Stop, User Key Up/ Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home
		User Key Down 2/2 Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home
Short Trend	Same as Main Mode (Mode 1)		
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	Reversed	
Detail Setup (Waveform)	Grid	ON	
	Thickness	Regular	
	Clip	OFF	
	Fill CO ₂ Waveform	OFF	
	Fill O ₂ Waveform	OFF	
	Fill Agent Waveform	OFF	
	ST Wave	Ref.	
	ST Short Trend	Fill	
	BP Overlap 1	BP1 to 4	
	BP Overlap 2	N/A	
	BP Overlap 3	N/A	
	RR Overlap 1	CO ₂ , O ₂ , Agent	
	RR Overlap 2	N/A	
	RR Overlap 3	N/A	
Block Cascade		Waveform Quantity: 2 Waveform: ECG1, ECG2	

Main Mode (Mode 4)

Item		Default (19 inch)	Default (15 inch)	Backup
Item		Local		Yes
Layout		Numeric Data/Bottom 2 rows		
Numeric Data		Bottom: HR, SpO ₂ /PR, BP1, CO ₂ , RR_IMP, NIBP, NIBP List, TEMP1/2	Bottom: HR, SpO ₂ , BP1, CO ₂ , RR_IMP, NIBP, NIBP List, TEMP1/2	
Waveform		ECG1, SpO ₂ , BP1, CO ₂ , RESP	ECG1, SpO ₂ , BP1, CO ₂ , RESP	
User Key	Numeric Data Area	-	-	
	User Key Down 1/2	Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont. NIBP List, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, User Key Up/ Down, Home	
User Key Down 2/2		Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home	Menu, Alarm Silence, Trend, Tabular Trend, Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	
Short Trend		Same as Main Mode (Mode 1)		
Detail Setup (Numeric Data)	Alarm Limit Display	Graph		
	At Alarm Occurrence	3D		
Detail Setup (Waveform)	Grid	ON		
	Thickness	Regular		
	Clip	OFF		
	Fill CO ₂ Waveform	OFF		
	Fill O ₂ Waveform	OFF		
	Fill Agent Waveform	OFF		
	ST Wave	Ref.		
	ST Short Trend	Fill		
	BP Overlap 1	BP1 to 4		
	BP Overlap 2	N/A		
	BP Overlap 3	N/A		
	RR Overlap 1	CO ₂ , O ₂ , Agent		
	RR Overlap 2	N/A		
	RR Overlap 3	N/A		
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2		

Main Mode (Mode 5)

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Full		Yes
Layout	Large/Right&Bottom	Standard/Right&Bottom	
Numeric Data	Right: HR, SpO ₂ , PR, NIBP, BP1, BP2, BP3, GAS, SvO ₂ /CO Bottom: BIS, TEMP1/2, RR_IMP	Right: HR, SpO ₂ , NIBP, BP1, BP2, GAS, SvO ₂ /CO Bottom: BIS, TEMP1/2	
Waveform	ECG1, SpO ₂ , BP1, BP Overlap 1, CO ₂ , Agent, O ₂ , RESP	ECG1, SpO ₂ , BP1, BP2, CO ₂	
User Key	Numeric Data Area	Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont. Next to RR_IMP: NIBP List	Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont.
		Menu, Alarm Silence, Admit/Disch., BP Zero, Scale, Alarm Setup (All), Trend, Tabular Trend, Recall, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home
	User Key Down 1/2	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home
		Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home
Short Trend	Same as Main Mode (Mode 1)		
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	3D	
Detail Setup (Waveform)	Grid	OFF	
	Thickness	Regular	
	Clip	OFF	
	Fill CO ₂ Waveform	OFF	
	Fill O ₂ Waveform	OFF	
	Fill Agent Waveform	OFF	
	ST Wave	Ref.	
	ST Short Trend	Fill	
	BP Overlap 1	BP1 to 4	
	BP Overlap 2	N/A	
	BP Overlap 3	N/A	
	RR Overlap 1	CO ₂ , O ₂ , Agent	
	RR Overlap 2	N/A	
	RR Overlap 3	N/A	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	

Main Mode (Mode 6)

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Heart		Yes
Layout	Large/Right&Bottom	Standard/Right&Bottom	
Numeric Data	Right: HR, SpO ₂ /PR, NIBP, BP1, BP2, BP3, BP4, BP5, BP6, GAS Bottom: BIS, TEMP1/2, NIBP, NIBP List	Right: HR, SpO ₂ , NIBP, BP1, BP2, BP3, BP4, GAS Bottom: BIS, TEMP1/2	
Waveform	ECG1, SpO ₂ , BP1, BP Overlap 1, BP5, BP6, CO ₂ , Agent	ECG1, SpO ₂ , BP1, BP2, CO ₂	
User Key	<p>Numeric Data Area</p> <p>User Key Down 1/2</p> <p>User Key Down 2/2</p>	<p>Next to NIBP Data: NIBP Auto Mode</p> <p>Menu, Alarm Silence, Admit/Disch., BP Zero, Scale, Alarm Setup (All), Trend, Tabular Trend, Recall, NIBP Start/Stop, Print Start/Stop, User Key Up/Down, Home</p> <p>Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home</p>	<p>Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont.</p> <p>Menu, Alarm Silence, Admit/Disch., BP Zero, Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home</p> <p>Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home</p>
Short Trend	Same as Main Mode (Mode 1)		
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	3D	
Detail Setup (Waveform)	Grid	OFF	
	Thickness	Regular	
	Clip	OFF	
	Fill CO ₂ Waveform	OFF	
	Fill O ₂ Waveform	OFF	
	Fill Agent Waveform	OFF	
	ST Wave	Ref.	
	ST Short Trend	Fill	
	BP Overlap 1	BP1 to 4	
	BP Overlap 2	N/A	
	BP Overlap 3	N/A	
	RR Overlap 1	CO ₂ , O ₂ , Agent	
	RR Overlap 2	N/A	
	RR Overlap 3	N/A	
Block Cascade		Waveform Quantity: 2 Waveform: ECG1, ECG2	

Main Mode (Mode 7)

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Neo.		Yes
Layout	Standard/Right	Standard/Right&Bottom	
Numeric Data	Right: HR, SpO ₂ , NIBP, BP1, CO ₂ , Agent, RR_IMP, TEMP1/2	Right: HR, SpO ₂ , NIBP, BP1, CO ₂ , Agent, RR_IMP, TEMP1/2 Bottom: NIBP, NIBP List	
Waveform	ECG1, SpO ₂ , BP1, CO ₂ , Agent, RESP	ECG1, SpO ₂ , BP1, CO ₂ , Agent, RESP	
User Key	Numeric Data Area	Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont.	Next to NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont.
	User Key Down 1/2	Menu, Alarm Silence, Admit/Disch., BP Zero, Scale, Alarm Setup (All), Trend, Tabular Trend, Recall, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home
	User Key Down 2/2	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home
Short Trend		Same as Main Mode (Mode 1)	
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	Reversed	
Detail Setup (Waveform)	Grid	ON	
	Thickness	Regular	
	Clip	OFF	
	Fill CO ₂ Waveform	OFF	
	Fill O ₂ Waveform	OFF	
	Fill Agent Waveform	OFF	
	ST Wave	Ref.	
	ST Short Trend	Fill	
	BP Overlap 1	BP1 to 4	
	BP Overlap 2	N/A	
	BP Overlap 3	N/A	
	RR Overlap 1	CO ₂ , O ₂ , Agent	
	RR Overlap 2	N/A	
	RR Overlap 3	N/A	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	

Main Mode (Mode 8)

Item	Default (19 inch)	Default (15 inch)	Backup	
Item	Recovery		Yes	
Layout	Large/Right&Bottom	Standard/Right&Bottom		
Numeric Data	Right: HR, SpO ₂ , NIBP, BP1, BP2, BP3, GAS, SvO ₂ /CO Bottom: BIS, TEMP1/2, RR_IMP	Right: HR, SpO ₂ , NIBP, BP1, BP2, GAS, SvO ₂ /CO Bottom: BIS, TEMP1/2		
Waveform	ECG1, SpO ₂ , BP1, BP Overlap 1, CO ₂ , Agent, RESP	ECG1, SpO ₂ , BP1, BP2, CO ₂ , Agent		
User Key	Numeric Data Area	Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont. Next to RR_IMP: NIBP List		
		Menu, Alarm Silence, Admit/Disch., BP Zero, Scale, Alarm Setup (All), Trend, Tabular Trend, Recall, Print Start/Stop, User Key Up/Down, Home		
	User Key Down 1/2	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home		
		Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home		
Short Trend	Same as Main Mode (Mode 1)			
Detail Setup (Numeric Data)	Alarm Limit Display	Graph		
	At Alarm Occurrence	Reversed		
Detail Setup (Waveform)	Grid	ON		
	Thickness	Regular		
	Clip	OFF		
	Fill CO ₂ Waveform	OFF		
	Fill O ₂ Waveform	OFF		
	Fill Agent Waveform	OFF		
	ST Wave	Ref.		
	ST Short Trend	Fill		
	BP Overlap 1	BP1 to 4		
	BP Overlap 2	N/A		
	BP Overlap 3	N/A		
	RR Overlap 1	CO ₂ , O ₂ , Agent		
	RR Overlap 2	N/A		
	RR Overlap 3	N/A		
Block Cascade		Waveform Quantity: 2 Waveform: ECG1, ECG2		

Main Mode (Mode 9)

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Cardiac		Yes
Layout	12-Lead		
Numeric Data	Right: HR, SpO ₂ , TEMP1/2, NIBP, BP1, CO ₂ , RR_IMP	Right: HR, SpO ₂ , TEMP1/2, NIBP, BP1, CO ₂ , RR_IMP	
Waveform	ECG12 Lead, BP1, SpO ₂ , CO ₂ , RESP	ECG12 Lead	
User Key	Numeric Data Area	Below HR: 12-Lead Print, Cancel Printing, 12L Analysis Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont.	Below HR: 12-Lead Print, Cancel Printing, 12L Analysis Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont.
	User Key Down 1/2	Menu, Alarm Silence, Admit/Disch., BP Zero, Scale, Alarm Setup (All), Trend, Tabular Trend, Recall, NIBP List, Print Start/Stop, User Key Up/ Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home
	User Key Down 2/2	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home
Short Trend		Same as Main Mode (Mode 1)	
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	Reversed	
Detail Setup (Waveform)	Grid	OFF	
	Thickness	Regular	
	Clip	OFF	
	Fill CO ₂ Waveform	OFF	
	Fill O ₂ Waveform	OFF	
	Fill Agent Waveform	OFF	
	ST Wave	Ref.	
	ST Short Trend	Fill	
	BP Overlap 1	BP1 to 4	
	BP Overlap 2	N/A	
	BP Overlap 3	N/A	
	RR Overlap 1	CO ₂ , O ₂ , Agent	
	RR Overlap 2	N/A	
	RR Overlap 3	N/A	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	

Sub Mode (Mode 1)

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Induct.		Yes
Layout	Numeric Data/Bottom 2 rows		
Numeric Data	Bottom: HR, SpO ₂ , RR_IMP, BP1, NIBP, CO ₂	Bottom: HR, SpO ₂ , NIBP, BP1, CO ₂ , RR_IMP	
Waveform	ECG1, SpO ₂ , BP1, CO ₂ , RESP	ECG1, SpO ₂ , BP1, CO ₂ , RESP	
User Key	Numeric Data Area 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. NIBP List, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home	- Menu, Alarm Silence, Admit/ Disch., BP Zero, NIBP Start/ Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home Menu, Alarm Silence, Trend, Tabular Trend, Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home
Short Trend	Display Display Duration Short Trend Short Trend Scale Display Parameter Reference Line Function Cursor Function Cursor Linkage Short Trend Overlap Data Resolution	OFF 15 min. Link with Numeric Trend OFF Disable Disable Tabular Trend All OFF 5 sec.	
Detail Setup (Numeric Data)	Alarm Limit Display At Alarm Occurrence	Graph 3D	
Detail Setup (Waveform)	Grid Thickness Clip Fill CO ₂ Waveform Fill O ₂ Waveform Fill Agent Waveform ST Wave ST Short Trend BP Overlap 1 BP Overlap 2 BP Overlap 3 RR Overlap 1 RR Overlap 2 RR Overlap 3 Block Cascade	OFF Regular OFF OFF OFF OFF Ref. Fill BP1 to 4 N/A N/A CO ₂ , O ₂ , Agent N/A N/A Waveform Quantity: 2 Waveform: ECG1, ECG2	

Sub Mode (Mode 2)

Item	Default (19 inch)	Default (15 inch)	Backup	
Item	Surgery		Yes	
Layout	Large/Right&Bottom	Standard/Right&Bottom		
Numeric Data	Right: HR, SpO ₂ /PR, NIBP, BP1, BP2, BP3, GAS, SvO ₂ /CO Bottom: BIS, TEMP1/2, RR_IMP	Right: HR, SpO ₂ /PR, NIBP, BP1, BP2, GAS, SvO ₂ /CO Bottom: BIS, TEMP1/2		
Waveform	ECG1, SpO ₂ , BP1, BP Overlap 1, CO ₂ , Agent, O ₂ , RESP	ECG1, SpO ₂ , BP1, BP2, CO ₂		
User Key	Numeric Data Area	Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont. Next to RR_IMP: NIBP List		
		Menu, Alarm Silence, Admit/ Disch., BP Zero, Scale, Alarm Setup (All), Trend, Tabular Trend, Recall, Print Start/Stop, User Key Up/Down, Home		
		Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home		
Short Trend	Same as Sub Mode (Mode 1)			
Detail Setup (Numeric Data)	Alarm Limit Display	Graph		
	At Alarm Occurrence	3D		
Detail Setup (Waveform)	Grid	OFF		
	Thickness	Regular		
	Clip	OFF		
	Fill CO ₂ Waveform	OFF		
	Fill O ₂ Waveform	OFF		
	Fill Agent Waveform	OFF		
	ST Wave	Ref.		
	ST Short Trend	Fill		
	BP Overlap 1	BP1 to 4		
	BP Overlap 2	N/A		
	BP Overlap 3	N/A		
	RR Overlap 1	CO ₂ , O ₂ , Agent		
	RR Overlap 2	N/A		
	RR Overlap 3	N/A		
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2		

Sub Mode (Mode 3)

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Waking		Yes
Layout	Large/Right	Standard/Right	
Numeric Data	Right: HR, SpO ₂ /PR, NIBP, BP1, BP2, TEMP1/2, RR_IMP	Right: HR, SpO ₂ /PR, NIBP, BP1, BP2, TEMP1/2, RR_IMP	
Waveform	ECG1, SpO ₂ , BP Overlap 1, RESP	ECG1, SpO ₂ , BP Overlap 1, RESP	
User Key	Numeric Data Area	Below NIBP Data: NIBP Auto Mode, NIBP Start/Stop User Key Down 1/2 Menu, Alarm Silence, Admit/ Disch., BP Zero, Scale, Alarm Setup (All), Trend, Tabular Trend, Recall, Print Start/Stop, User Key Up/Down, Home	Below NIBP Data: NIBP Auto Mode, NIBP Start/Stop User Key Down 1/2 Menu, Alarm Silence, Admit/ Disch., BP Zero, Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home
	User Key Down 2/2	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/ Stop, User Key Up/Down, Home	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home
Short Trend		Same as Sub Mode (Mode 1)	
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	3D	
Detail Setup (Waveform)	Grid	OFF	
	Thickness	Regular	
	Clip	OFF	
	Fill CO ₂ Waveform	OFF	
	Fill O ₂ Waveform	OFF	
	Fill Agent Waveform	OFF	
	ST Wave	Ref.	
	ST Short Trend	Fill	
	BP Overlap 1	BP1 to 4	
	BP Overlap 2	N/A	
	BP Overlap 3	N/A	
	RR Overlap 1	CO ₂ , O ₂ , Agent	
	RR Overlap 2	N/A	
	RR Overlap 3	N/A	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	

Sub Mode (Mode 4)

Item		Default (19 inch)	Default (15 inch)	Backup	
Item		12-Lead		Yes	
Layout		12-Lead			
Numeric Data		Right: HR, SpO ₂ , NIBP, BP1, CO ₂ , RR_IMP	Right: HR, SpO ₂ , NIBP, BP1, CO ₂ , RR_IMP		
Waveform		ECG12 Lead, BP1, SpO ₂ , CO ₂ , RESP	ECG12 Lead		
User Key	Numeric Data Area	Below HR: 12-Lead Print, Cancel Printing, 12L Analysis Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont.	Below HR: 12-Lead Print, Cancel Printing, 12L Analysis Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont.		
		Menu, Alarm Silence, Admit/Disch., BP Zero, Scale, Alarm Setup (All), Trend, Tabular Trend, Recall, NIBP List, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home		
		Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home		
Short Trend		Same as Sub Mode (Mode 1)			
Detail Setup (Numeric Data)	Alarm Limit Display	Graph			
	At Alarm Occurrence	3D			
Detail Setup (Waveform)	Grid	OFF			
	Thickness	Regular			
	Clip	OFF			
	Fill CO ₂ Waveform	OFF			
	Fill O ₂ Waveform	OFF			
	Fill Agent Waveform	OFF			
	ST Wave	Ref.			
	ST Short Trend	Fill			
	BP Overlap 1	BP1 to 4			
	BP Overlap 2	N/A			
	BP Overlap 3	N/A			
	RR Overlap 1	CO ₂ , O ₂ , Agent			
	RR Overlap 2	N/A			
	RR Overlap 3	N/A			
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2			

Sub Mode (Mode 5)

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Sub Mode 5		Yes
Layout	Numeric Data/Bottom 2 rows		
Numeric Data	Bottom: HR, SpO ₂ , RR_IMP, BP1, NIBP, CO ₂	Bottom: HR, SpO ₂ , NIBP, BP1, CO ₂ , RR_IMP	
Waveform	ECG1, SpO ₂ , BP1, CO ₂ , RESP	ECG1, SpO ₂ , BP1, CO ₂ , RESP	
User Key	Numeric Data Area	-	
	User Key Down 1/2	Menu, Alarm Silence, Admit/ Disch., BP Zero, NIBP Start/ Stop, NIBP Auto Mode, NIBP Cont. NIBP List, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home	
	User Key Down 2/2	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	
Short Trend		Same as Sub Mode (Mode 1)	
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	3D	
Detail Setup (Waveform)	Grid	OFF	
	Thickness	Regular	
	Clip	OFF	
	Fill CO ₂ Waveform	OFF	
	Fill O ₂ Waveform	OFF	
	Fill Agent Waveform	OFF	
	ST Wave	Ref.	
	ST Short Trend	Fill	
	BP Overlap 1	BP1 to 4	
	BP Overlap 2	N/A	
	BP Overlap 3	N/A	
	RR Overlap 1	CO ₂ , O ₂ , Agent	
	RR Overlap 2	N/A	
	RR Overlap 3	N/A	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	

Sub Mode (Mode 6)

Item	Default (19 inch)	Default (15 inch)	Backup	
Item	Sub Mode 6		Yes	
Layout	Numeric Data/Bottom 2 rows			
Numeric Data	Bottom: HR, SpO ₂ , RR_IMP, BP1, NIBP, CO ₂	Bottom: HR, SpO ₂ , NIBP, BP1, CO ₂ , RR_IMP		
Waveform	ECG1, SpO ₂ , BP1, CO ₂ , RESP	ECG1, SpO ₂ , BP1, CO ₂ , RESP		
User Key	Numeric Data Area	-		
	User Key Down 1/2	Menu, Alarm Silence, Admit/ Disch., BP Zero, NIBP Start/ Stop, NIBP Auto Mode, NIBP Cont. NIBP List, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home		
	User Key Down 2/2	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home		
Short Trend	Same as Sub Mode (Mode 1)			
Detail Setup (Numeric Data)	Alarm Limit Display	Graph		
	At Alarm Occurrence	3D		
Detail Setup (Waveform)	Grid	OFF		
	Thickness	Regular		
	Clip	OFF		
	Fill CO ₂ Waveform	OFF		
	Fill O ₂ Waveform	OFF		
	Fill Agent Waveform	OFF		
	ST Wave	Ref.		
	ST Short Trend	Fill		
	BP Overlap 1	BP1 to 4		
	BP Overlap 2	N/A		
	BP Overlap 3	N/A		
	RR Overlap 1	CO ₂ , O ₂ , Agent		
	RR Overlap 2	N/A		
	RR Overlap 3	N/A		
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2		

Extended Display 1 Mode 1

Item		Default (19 inch)	Default (15 inch)	Backup	
Item		Machine		Yes	
Layout		Large/Right			
Numeric Data		Right: HR, SpO ₂ , BP1, BP2, BP3, BP4, GAS			
Waveform		ECG1, SpO ₂ , BP1, BP2, BP3, BP4			
User Key	Numeric Data Area	-	-		
	User Key Down 1/2	Extended 1 Mode 1, Extended 1 Mode 2, Extended 1 Mode 3, Trend, Tabular Trend, Display Config. (Extended 1), Display Config. (Extended 2), Home			
	User Key Down 2/2	-	-		
Short Trend	Display	OFF			
	Display Duration	15 min.			
	Short Trend	Link with Numeric			
	Display Parameter	OFF			
Detail Setup (Numeric Data)	Alarm Limit Display	Graph			
	At Alarm Occurrence	3D			
Detail Setup (Waveform)	Grid	ON			
	Thickness	Regular			
	Clip	OFF			
	Fill CO ₂ Waveform	OFF			
	Fill O ₂ Waveform	OFF			
	Fill Agent Waveform	OFF			
	ST Wave	Ref.			
	ST Short Trend	Fill			
	BP Overlap 1	BP1 to 4			
	BP Overlap 2	N/A			
	BP Overlap 3	N/A			
	RR Overlap 1	CO ₂ , O ₂ , Agent			
	RR Overlap 2	N/A			
	RR Overlap 3	N/A			
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2			

Extended Display 1 Mode 2

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Staff		Yes
Layout	Numeric Data/Bottom 2 rows		
Numeric Data	Bottom: HR, SpO ₂ , TEMP1/2, RR_IMP, BP1, NIBP, NIBP List	Bottom: HR, SpO ₂ , TEMP1/2, RR_IMP, BP1, NIBP, NIBP List	
Waveform	ECG1 Cascade, SpO ₂ , BP1, RESP	ECG1 Cascade, SpO ₂ , BP1, RESP	
User Key	Numeric Data Area	-	-
	User Key Down 1/2	Extended 1 Mode 1, Extended 1 Mode 2, Extended 1 Mode 3, Trend, Tabular Trend, Display Config. (Extended 1), Display Config. (Extended 2), Home	Extended 1 Mode 1, Extended 1 Mode 2, Extended 1 Mode 3, Trend, Tabular Trend, Display Config. (Extended 1), Display Config. (Extended 2), Home
	User Key Down 2/2	-	-
Short Trend		Same as Extended Display 1 Mode 1	
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	3D	
Detail Setup (Waveform)	Grid	ON	
	Thickness	Regular	
	Clip	OFF	
	CO ₂ Wave Fill	OFF	
	O ₂ Wave Fill	OFF	
	Agent Wave Fill	OFF	
	ST Wave	Ref.	
	ST Short Trend	Fill	
	BP Overlap 1	BP1 to 4	
	BP Overlap 2	N/A	
	BP Overlap 3	N/A	
	RR Overlap 1	CO ₂ , O ₂ , Agent	
	RR Overlap 2	N/A	
	RR Overlap 3	N/A	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	

Extended Display 1 Mode 3

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Extended 1 Mode 3		Yes
Layout	Numeric Data/Bottom 2 rows		
Numeric Data	Bottom: HR, SpO ₂ , RR_IMP, BP1, NIBP, CO ₂	Bottom: HR, SpO ₂ , NIBP, BP1, CO ₂ , RR_IMP	
Waveform	ECG1, SpO ₂ , BP1, CO ₂ , RESP	ECG1, SpO ₂ , BP1, CO ₂ , RESP	
User Key	Numeric Data Area	-	-
	User Key Down 1/2	Extended 1 Mode 1, Extended 1 Mode 2, Extended 1 Mode 3, Trend, Tabular Trend, Display Config. (Extended 1), Display Config. (Extended 2), Home	Extended 1 Mode 1, Extended 1 Mode 2, Extended 1 Mode 3, Trend, Tabular Trend, Display Config. (Extended 1), Display Config. (Extended 2), Home
	User Key Down 2/2	-	-
Short Trend		Same as Extended Display 1 Mode 1	
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	3D	
Detail Setup (Waveform)	Grid	ON	
	Thickness	Regular	
	Clip	OFF	
	Fill CO ₂ Waveform	OFF	
	Fill O ₂ Waveform	OFF	
	Fill Agent Waveform	OFF	
	ST Wave	Ref.	
	ST Short Trend	Fill	
	BP Overlap 1	BP1 to 4	
	BP Overlap 2	N/A	
	BP Overlap 3	N/A	
	RR Overlap 1	CO ₂ , O ₂ , Agent	
	RR Overlap 2	N/A	
	RR Overlap 3	N/A	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	

Extended Display 2 Mode 1

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Circ.		Yes
Layout	Standard/Right	12-Lead	
Numeric Data	Right: HR, ST+VPC, SpO ₂ , NIBP, BP1, TEMP1/2, RR_IMP	Right: HR, ST+VPC, SpO ₂ , NIBP, BP1, TEMP1/2, RR_IMP	
Waveform	ECG1, ECG2, ECG3, ECG4, ECG5, ECG6, ECG7, ECG8, ECG9, ECG10, ECG11, ECG12, RESP	ECG12 Lead	
User Key	Numeric Data Area	-	
	User Key Down 1/2	Extended 2 Mode 1, Extended 2 Mode 2, Extended 2 Mode 3	
	User Key Down 2/2	-	
Short Trend	Display	OFF	
	Display Duration	15 min.	
	Short Trend	Link with Numeric	
	Display Parameter	OFF	
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	3D	
Detail Setup (Waveform)	Grid	ON	
	Thickness	Regular	
	Clip	OFF	
	CO ₂ Wave Fill	OFF	
	O ₂ Wave Fill	OFF	
	Agent Wave Fill	OFF	
	ST Wave	Ref.	
	ST Short Trend	Fill	
	BP Overlap 1	BP1 to 4	
	BP Overlap 2	N/A	
	BP Overlap 3	N/A	
	RR Overlap 1	CO ₂ , O ₂ , Agent	
	RR Overlap 2	N/A	
	RR Overlap 3	N/A	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	

Extended Display 2 Mode 2

Item		Default (19 inch)	Default (15 inch)	Backup	
Item		Circ.		Yes	
Layout		Standard/Right			
Numeric Data		Right: HR, ST+VPC, SpO ₂ , NIBP, BP1, TEMP1_2, RR_IMP	Right: HR, ST+VPC, SpO ₂ , NIBP, BP1, TEMP1_2, RR_IMP		
Waveform		ECG1 Cascade, RESP			
User Key	Numeric Data Area	-	-		
	User Key Down 1/2	Extended 2 Mode 1, Extended 2 Mode 2, Extended 2 Mode 3	Extended 2 Mode 1, Extended 2 Mode 2, Extended 2 Mode 3		
	User Key Down 2/2	-	-		
Short Trend		Same as Extended Display 2 Mode 1			
Detail Setup (Numeric Data)	Alarm Limit Display	Graph			
	At Alarm Occurrence	3D			
Detail Setup (Waveform)	Grid	ON			
	Thickness	Regular			
	Clip	OFF			
	Fill CO ₂ Waveform	OFF			
	Fill O ₂ Waveform	OFF			
	Fill Agent Waveform	OFF			
	ST Wave	Ref.			
	ST Short Trend	Fill			
	BP Overlap 1	BP1 to 4			
	BP Overlap 2	N/A			
	BP Overlap 3	N/A			
	RR Overlap 1	CO ₂ , O ₂ , Agent			
	RR Overlap 2	N/A			
	RR Overlap 3	N/A			
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2			

Extended Display 2 Mode 3

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Extended 2 Mode 3		Yes
Layout	Numeric Data/Bottom 2 rows		
Numeric Data	Bottom: HR, SpO ₂ , RR_IMP, BP1, NIBP, CO ₂	Bottom: HR, SpO ₂ , NIBP, BP1, CO ₂ , RR_IMP	
Waveform	ECG1, SpO ₂ , BP1, CO ₂ , RESP	ECG1, SpO ₂ , BP1, CO ₂ , RESP	
User Key	Numeric Data Area	-	-
	User Key Down 1/2	Extended 2 Mode 1, Extended 2 Mode 2, Extended 2 Mode 3	Extended 2 Mode 1, Extended 2 Mode 2, Extended 2 Mode 3
	User Key Down 2/2	-	-
Short Trend	Same as Extended Display 2 Mode 1		
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	
	At Alarm Occurrence	3D	
Detail Setup (Waveform)	Grid	ON	
	Thickness	Regular	
	Clip	OFF	
	Fill CO ₂ Waveform	OFF	
	Fill O ₂ Waveform	OFF	
	Fill Agent Waveform	OFF	
	ST Wave	Ref.	
	ST Short Trend	Fill	
	BP Overlap 1	BP1 to 4	
	BP Overlap 2	N/A	
	BP Overlap 3	N/A	
	RR Overlap 1	CO ₂ , O ₂ , Agent	
	RR Overlap 2	N/A	
	RR Overlap 3	N/A	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	

 Administrator Setup

Item	Details	Default	Backup
Key Lock	OFF, red key, yellow key, green key for each item	Red key for the following items Initial Settings>System>Telemeter Maintenance Other settings: OFF	Yes
Password Setup	Administrator name: 8 characters each	Blank	Yes
	Password: 8 characters each	Red Key: 11111111 Yellow Key: 22222222 Green Key: 33333333	Yes

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	
2	NC	Not connected	
3	TxD	Serial Transmission Data Output	RS232C
4	GND_ISO	Isolation Ground	
5	RxD	Serial Reception Data Input	RS232C
6	+5V	+5V Power Supply Input	+5V power supply (150mA)
7	NC	Not connected	
8	NC	Not connected	

COM2 Connector

No.	Signal Type	Note	Signal Level
1	RESET	Reset	
2	NC	Not connected	
3	TxD	Serial Transmission Data Output	RS232C
4	GND_ISO	Isolation Ground	
5	RxD	Serial Reception Data Input	RS232C
6	+5V	+5V Power Supply Input	+5V power supply (150mA)
7	NC	Not connected	
8	NC	Not connected	

COM3 Connector

No.	Signal Type	Note	Signal Level
1	RESET	Reset	
2	DIG_L	Digital Output LOAD	TTL (Extended Function)
3	TxD	Serial Transmission Data Output	RS232C
4	GND_ISO	Isolation Ground	
5	RxD	Serial Reception Data Input	RS232C
6	+5V Power	+5V Power Supply Input	+5V Power Supply (150mA)
7	DIG_D	Digital Output DATA	TTL (Extended Function)
8	DIG_C	Digital Output CLK	TTL (Extended Function)

□ COM4 Connector (Alarm External Input)

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

□ COM5 Connector (Reserved)

No.	Signal Type	Note	Signal Level
1	COM_RST	Reset Output	Open Collector Output
2	NC	Not connected	
3	TxD	Serial Transmit Data Output	RS232C
4	GND	GND	
5	RxD	Serial Reception Data Input	RS232C
6	+5V	+5V Power	+5V power supply (150mA)
7	NC	Not connected	
8	NC	Not connected	

Status I/O Signal (Status II Connector)

No.	Signal Type	Note	Signal Level
1	ALARM_OUT1	Alarm Output1	Logic TTL
2	ALARM_OUT2+	Alarm Output2+ (Isolation)	Photo MOS Relay Contact
3	TxD	Serial Transmission Data Output	RS232C*
4	RxD/ALARM1	Serial Reception Data Input/ALARM1 Input	RS232C* / Logic
5	ALARM2_IN+	Alarm Input 2 (Isolation)	Logic Input
6	ALARM2_IN-	Alarm Input 2 Return (Isolation)	
7	+5V	+5V Power Supply Input	+5V Power Supply (150mA)
8	ALARM_OUT2-	Alarm Output2- (Isolation)	Photo MOS Relay Contact
9	GND_ISO	Isolation Ground	

*:If isolation is necessary for RS-232C and status connector, use alarm input 2 and output 2.

Chapter 7 Replacement Parts

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Disposing the Equipment.....	7-2

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.
- The display unit utilizes LED for the backlight. Since this LED deteriorates by the life cycle, the display may become dark or may not light by the long term use. In such case, contact your nearest service representative.

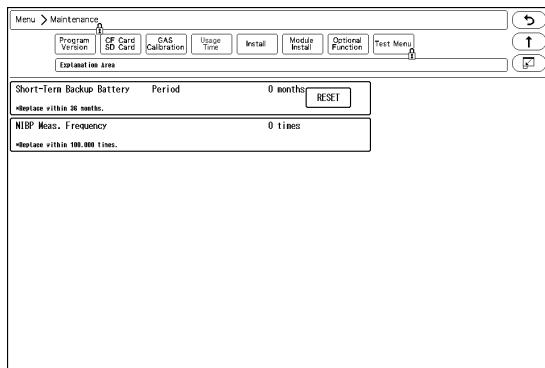
Periodic Replacement Parts	Periodic Replacement Period:
DSC-8500 series (Main Unit)	
Short-Term Backup Battery	3 years The usable life of the short-term backup battery will shorten if the power of the equipment is frequently turned ON and OFF. When the <DSC-8500 Check Short-Term Battery> message is displayed, make sure to replace the short-term backup battery.
HS-8000 series (Super Unit)	
NIBP Unit	100,000 times of measurement
HCP-800/HCP-810	
CO ₂ Unit	30,000 hours
MGU-800/MGU-810 Series	
Water Trap	1 month
DRYLINE™ Receptacle	1 year

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 measurement frequency for each part will be displayed.

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

► The displayed value will reset.

CAUTION

- ♦ When resetting, set the rotary switch on the main unit to "C".
- ♦ After resetting, return the rotary switch to original position.
- ♦ For details, please refer to our 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 Unit

- ♦ The display unit utilizes LED for the backlight. Since this LED deteriorates by the life cycle, the display may become dark, scintillate, or may not light by the long term use. In such case, contact your nearest service representative.
- ♦ Although the LCD utilizes highly accurate picture elements, occasionally, there may be a few pixels which do not light or constantly light. However, this will not affect monitoring operation.
- ♦ Due to its material characteristic, the touch panel expands/contracts depending on the temperature/humidity. When the touch panel is left unused for a while, or when the ambient temperature is low, the surface film of the touch panel may expand, but this is not an abnormal condition.
This expansion will be reduced in few hours or half a day after the power is turned ON.
- ♦ The surface of the touch panel is susceptible to scratches, therefore do not scratch or rub it using a hard item.

Storing the Equipment and Recording Paper

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 display unit of the DS-8500 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

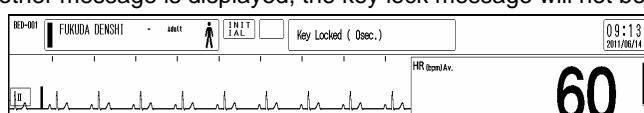
- ◆ Never use strong-acidic cleaning solution.
- ◆ A special coating is applied to the surface of the touch panel. Do not wipe the surface with a cloth or gauze with coarse texture. Wipe the surface with a soft cleaning cloth provided as optional accessory or with an eyeglass cleaning cloth.

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" P10-7)
- ◆ If the touch panel was 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.

Fan Filter

The main unit incorporates a fan. Check it periodically and when it gets dusty, clean the filter. The filter can be detached. Make sure to attach it properly after cleaning.



CAUTION

- After cleaning the filter with neutral detergent, dry it completely before attaching. If the moisture is remained on the filter, it may damage the equipment.
- After cleaning the filter, make sure to reattach it to the equipment. If the equipment is used without the filter, it may damage the equipment.

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

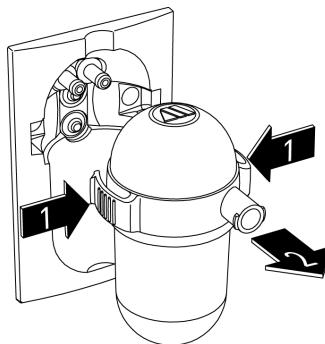
- ♦ Do not sterilize the airway adapter using autoclave methods.
- ♦ Do not reuse / re-sterilize disposable airway adapter.

Water Trap (Multigas Unit)

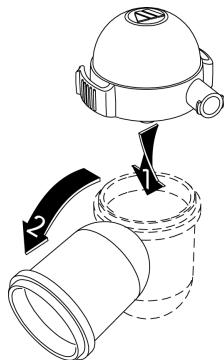
- ♦ The water trap on the MGU-800/810 series receives fluids from the sampling tube connected to the patient.
- ♦ When connecting to a new patient, empty and clean the reservoir with the following antiseptic solution.
 - ♦ Ethanol :70%
 - Isopropanol: 70%
 - Methanol: 70%
- ♦ Hypochlorite (e.g. CloroxTM)
- ♦ Glutaraldehyde (e.g. CidexTM)
- ♦ Chlorhexidine/ethanol (e.g. HibitaneTM)
- ♦ After washing with antiseptic solution or neutral detergent, make sure to rinse the reservoir well in water and dry it completely before reattaching.
- ♦ When the sampling tube or water trap gets completely occluded with water, "GAS Check Sample Line" alarm message will generate.
- ♦ Emptying interval (half full, worst case) is 17 hours (@ 200mL/min, 37°C) for adult and 20 hours (@ 120mL/min, 37°C) for neonate under environment of 100% humidity.

1

While pressing on the locked part on the side of the water trap, pull to remove from the holder.



2 Turn the reservoir part and the filter part to separate.

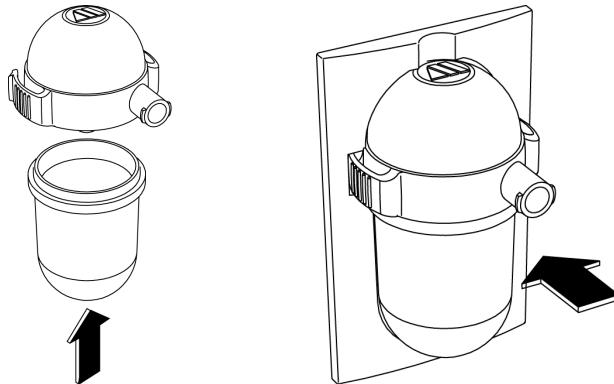


3 Empty the reservoir and clean with antiseptic solution.

⚠️ WARNING

- The contents of the water trap should be handled as a potential infection hazard.

4 Reattach the water trap to the Multigas Unit.



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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.

Gas Measurement Accuracy Check Procedure (MGU-800/MGU-810)

This section describes about the procedure of gas measurement accuracy check.

CAUTION

- ♦ Perform gas measurement accuracy check when the multigas unit is connected.
- ♦ Warm up the Multigas unit sufficiently before updating the checked date of gas measurement accuracy. To acquire maximum measurement accuracy, 10 minutes of warm up is required after the power is turned ON.
- ♦ If the gas measurement accuracy check is performed using a low pressure gas, the accuracy of gas measurement will be reduced. Make sure to perform gas measurement accuracy check using the specified calibration gas before its expiration date.

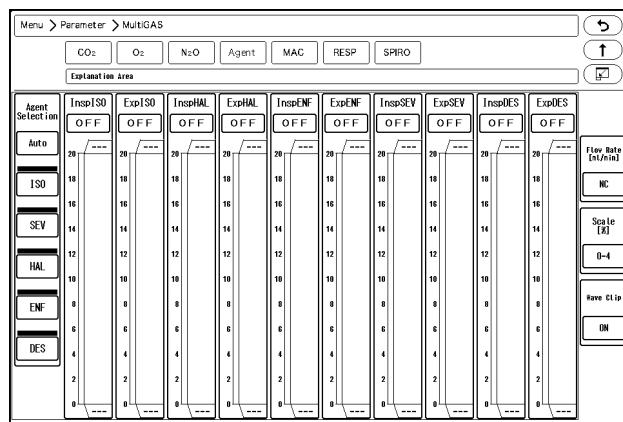
NOTE

- ♦ The gas measurement accuracy check for the multigas unit should be conducted every 12 months. The last checked date will be displayed on the calibration screen. During the check procedure, gas measurement and other gas function cannot be used.
- ♦ To correct the gas measurement drift, zero calibration is necessary. The automatic zeroing is performed periodically, but it is also possible to perform zeroing manually.
- ♦ Zeroing should be performed with the transducers opened to air.
- ♦ During the check procedure, the pressure display on the calibration gas regulator should be in the range displayed in green.

1

Attach the water trap for adult/child to the MGU-800/810, and set the "Flow Rate" to 200mL/min.

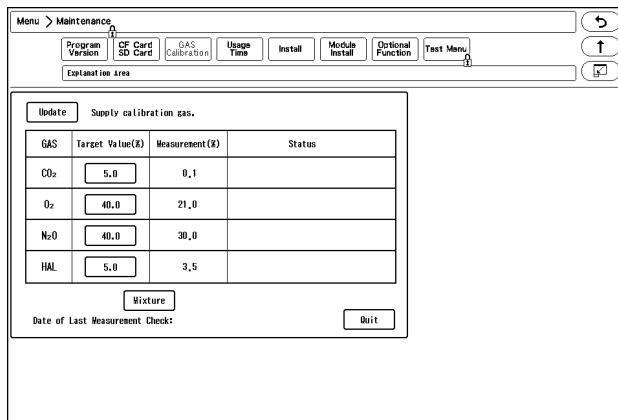
- ▶ Press the [Menu], [Gas] ("Parameter"), [Agent] keys to display the Agent setup screen, and select [200mL/min] for the "Flow Rate".
- ▶ The "Flow Rate" can be set on the CO₂, O₂, N₂O, Agent setup screen.



2

Press the [Menu], [Maintenance], [Gas Calibration] keys.

- ▶ The "Gas Calibration" screen will be displayed.



- ▶ If the multigas unit is not connected, "Not connected" will be displayed.
- ▶ While the multigas unit is in process of warming up, "Warming Up" message will be displayed, and calibration cannot be started.

NOTE

- ◆ The warming up process will take about 10 minutes from start-up of the gas unit.

- ▶ When the warming up process completes, "Supply calibration gas" message will be displayed.

3 Connect the calibration gas cylinder to multigas unit.

4 Supply the calibration gas, and wait for 30 seconds until the gas measurement value becomes stable.

5 Check the measurement accuracy of each gas.

- ▶ The measurement accuracy criteria of each gas are as follows.

CO₂ 5.0 ±1.1%

O₂ 45.0 ±5.7%

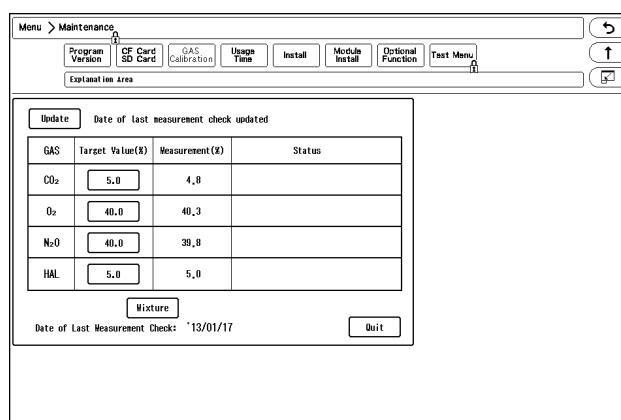
N₂O 45.0 ±5.3%

ISO 5.0 ±0.7%

6 When the measurement accuracy of each gas is within the acceptance criteria, press the [Update] key.

- ▶ "The message, <Date of last measurement check updated> will be displayed.

- ▶ Verify that the date under "Date of Last Measurement Check" is updated.



7

Set the "Flow Rate" to initial value.

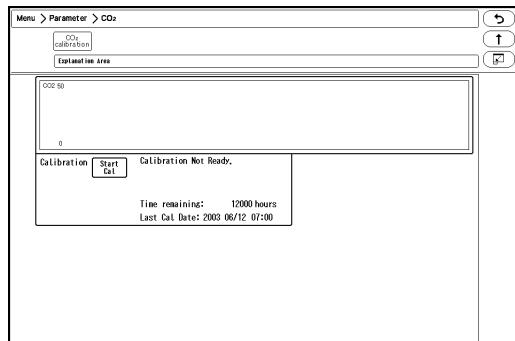
CO₂ Calibration (HCP-800/HCP-810)

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.
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.

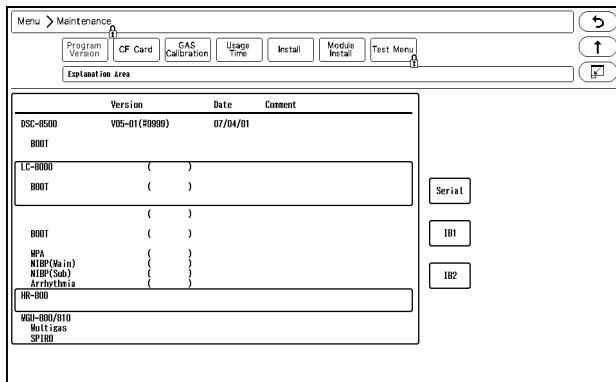
- ◆ When EtCO₂ measurement is not stable or accuracy is degraded compared with other measuring device.
- ◆ When the patient monitor was not used for a while, or when EtCO₂ was not measured for a while.
- ◆ When "HCP-800 Calibration" is displayed on the "Periodic Replacement Parts" screen at power ON.
- ◆ Dispose of calibration gas according to the regulation of each medical institution.

Program Version

On the program version 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 software version, boot version, date, comment required for the DS-8500 system will be displayed.

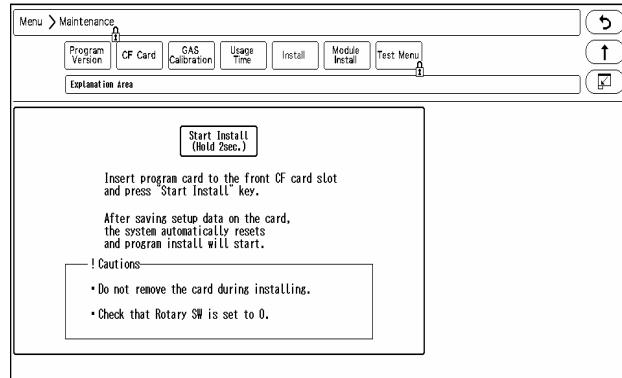
- ◆ DSC-8500 Main Unit Software
 - ◆ Display Unit Software (LC-8019T/LC-8019TC, LC-8015T/LC-8015TC)
 - ◆ HS-8000 Super Unit Software
 - ◆ HR-800 Recorder Unit Software
 - ◆ MGU-800/810 Multigas Unit Module, Spiro Unit Module Software
- [IB1], [IB2]: The information of the IB-8004 and the modules connected to the IB-8004 will be displayed.
- [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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