

DYNASCOPE 8000 Series Patient Monitor

DS-8500 System

Ver. 13

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 13.



This device bears the CE label in accordance with the provisions of Medical Device Directive 93/42/EEC.

This device bears the CE label in accordance with the provisions of RoHS Directive 2011/65/EU.



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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 misuse 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>

This equipment is intended for measuring parameters such as ECG, respiration, NIBP, pulse rate, SpO₂, SpCO, SpMet, pulse wave, temperature, BP, CO, respiration gas (concentration of CO₂, N₂O, volatile anesthetic agent, O₂), spirometry, BIS, brain wave, and monitors patient condition by displaying/printing the measurement data on this equipment or central monitor and generates alarm as required.

This equipment is intended for monitoring one patient. It is not intended for monitoring multiple patients. The 12-lead ECG analysis function is intended for adult and pediatric patients.

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

This equipment is intended to be used by healthcare professionals. Users should have a thorough knowledge of the function and operation before using this equipment. The maintenance of this equipment should be performed by skilled personnel who received a training of possible hazards and measures to avoid those hazards. 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.

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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	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

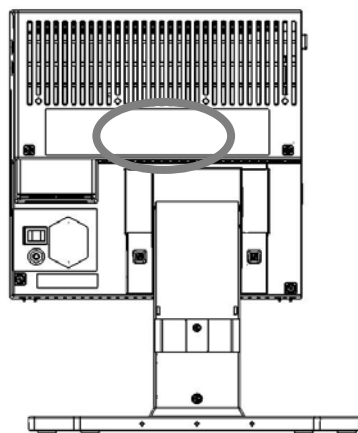
Warning Labels Attached to the Unit

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

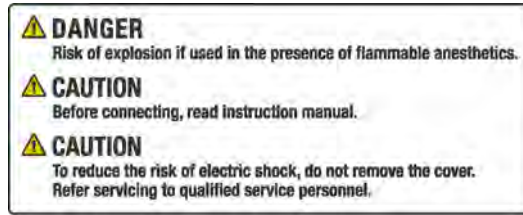
CAUTION

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

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

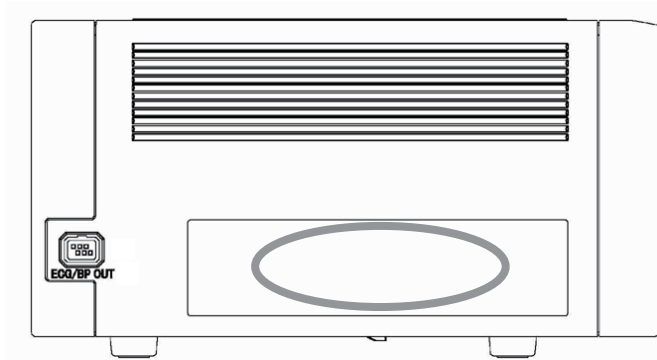


Warning Labels Attached to the Unit

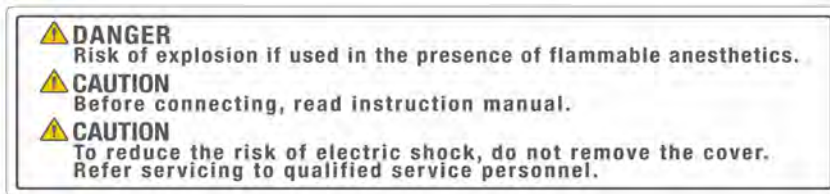


Warning Label

❑ 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
	Follow operating instructions (Warning); indicated in blue. Failure to follow operating instructions could place the patient or operator at risk.
	Follow operating instructions (Information). Indicates the need to refer to the related accompanying documents before operation.
	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.
	Indicates that the equipment is in normal operation.
	Indicates that the equipment is in standby mode.
	Electrostatic Sensitive Part Directly touching this connector part with hands should be avoided.
	Type CF Applied Part with Defibrillation-Proof Indicates the degree of protection against electric shock is Type CF Applied Part with defibrillation-proof.
	Type BF Applied Part with Defibrillation-Proof Indicates the degree of protection against electric shock is Type BF Applied Part with defibrillation-proof.
	Signal Output
	Gas Input
	GAS Output
	Signal Input
	TCP/IP Network Connector
	RS-232C Connector
	Eject: Indicates the switch to remove the recorder paper cassette.
	Date of Manufacture Indicates the date of manufacture.
	Name and Address of Manufacturer Indicates the name and address of manufacturer.
	WEEE (Waste Electrical and Electronics Equipment) Indicates a separate collection for electrical and electronic equipment.
	Indicates that this device bears the CE label in accordance with the provisions of Medical Device Directive 93/42/EEC. The 0086 represents the number of the notified body.
	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.

Symbol	Description
	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 gases 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 "Coordinator"). However, when using such telemetry in a local medical institution, one person can perform both functions.
- ♦ Select a telemetry coordinator who understands the characteristics and functionality of telemetry systems, and is skilled in operating telemetry.
- ♦ When installing telemetry, the Coordinators have to understand the precautions for use of the telemetry in advance.
- ♦ The Coordinator takes responsibility of wireless channel management and transmitter storage for the whole Institution by giving proper instruction.
- ♦ The Coordinator 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 user.
- ♦ The Coordinator assumes responsibility for managing the wireless channels, storing, and managing telemetry.
- ♦ The Coordinator 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 Coordinator 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 Coordinators of the problems. The Coordinators 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 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 electrosurgical 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

The amount of noise interference is considerably different depending on the electrode position and surgery site. 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. If the electrodes are placed in this path, the amount of interference will be quite large. 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 or performance degradation, failure, damage of this equipment.

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

Precautions about Connections to Peripheral Devices

To use the equipment safely and to ensure maximum performance of the equipment, connection of other manufacturer's equipment to this equipment 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, it may be necessary to take measures for connection (use of separation device), power supply (use of isolation power), grounding (additional protective earth). If these measures are not properly taken, a leakage current may flow between the equipments, or the total amount of leakage current may exceed the limit specified on 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.
- To prevent danger of electric shock, always position the peripheral devices away from the patient.
- Network equipment including printer and hub should be located outside the "Patient Environment". If located inside the "Patient Environment", it may result in electric shock to the patient or the operator.
- Combinations of medical equipment with non-medical equipment must comply with IEC 60601-1-1 or IEC 60601-1. Never use a multiple portable socket-outlet or extension cable when connecting the equipments unless it 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 patient classification selection influences the precision of the QRS detection and NIBP measurement. Make sure the proper selection is made.
- ♦ The pacemaker usage setting 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]/[20ms], the pace pulse may be erroneously detected as a QRS complex and HR alarm or asystole alarm may not generate due to incorrect HR (counting pace pulse as QRS complex). Select [OFF], [10ms]/[20ms] only if you are sure that pacing failure will not occur, or when the patient can be constantly monitored.
- ♦ When measuring the SpO₂ of patient with high fever or peripheral circulatory insufficiency, check the sensor attachment periodically and change the attachment site. The temperature of the attachment site will rise due to the sensor heat which may result in burn injury.
- ♦ For the following case, accurate measurement of SpO₂ may not be possible.
 - ♦ Patient with excessive abnormal hemoglobin (COHb, MetHb)
 - ♦ Patient with the pigment injected to the blood
 - ♦ Patient receiving CPR treatment
 - ♦ When a sensor is applied to a limb with NIBP cuff, arterial catheter, or intracatheter
 - ♦ When measuring at site with venous pulse
 - ♦ Patient with body motion
 - ♦ Patient with small pulse
- ♦ When a patient is receiving a photodynamic therapy, measuring SpO₂ on a same site for a long duration may cause blisters from the irradiation light of the SpO₂ sensor. Make sure to periodically change the sensor attachment site.
- ♦ Before the 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 alarm 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 printing, alarm printing and recall waveform for evaluation.
- ♦ The RR/APNEA alarm will not be generated unless the numeric data box corresponded to the selected RR/APNEA alarm source is displayed. Make sure to display the numeric data box for the RR/APNEA alarm source.
- ♦ The SpO₂ respiration measurement function is not intended for use as an APNEA monitor.
- ♦ 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.

- ♦ If the safety of the patient cannot be ensured, do not suspend the alarm or decrease the alarm volume.
- ♦ 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
(HCP-800/HCP-810, HPD-800/HPD-810)

- ♦ Only one of either HCP-800/HCP-810/HPD-800/HPD-810 can be connected.
- ♦ 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.
- ♦ To prevent cross-infection, do not allow the sampling gas to return to the breathing system.
- ♦ To protect the hospital staffs from unnecessary anesthetic agent when using the HCP-800/HCP-810, it is strongly recommended to connect the exhaust hole to the gas exhaust system in the hospital.
- ♦ 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. It could lead to erroneous readings.
- ♦ If too much moisture enters the sampling line (i.e., from ambient humidity or breathing of unusually humid air) when using the HCP-800/HCP-810, <Check Sample Line> will be displayed in the message area. Replace the sampling line once this message is displayed.
- ♦ 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)

- ♦ Make sure to use only the specified Mindray Medical Sweden AB product.
(☞ "Anesthetic Gas Concentration Measurement (Manufactured by Mindray Medical Sweden AB)" P13-7)

- ♦ Be careful not to damage the water trap during operation as bacteria and/or mucus may contaminate the MGU-800/810 series.
- ♦ The airway adapter, sampling line, flow sensor are disposable products that are intended for single patient use only. Do not reuse them on other patients as it may cause cross-infection.
- ♦ To prevent cross-infection, do not allow the sampling gas to return to the breathing system.
- ♦ 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.
- ♦ Do not use the MGU-800/810 series with the flammable anesthetic agents.
- ♦ 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.
- ♦ The sampling line may get clogged by internal condensation.
- ♦ The contents of the water trap should be handled as a potential infection hazard.
- ♦ Do not use adult/pediatric 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.
- ♦ Only combine the SPIRIT Flow Sensors and DRYLINE Water Traps as specified. Other combinations might lead to incorrect measurements.
(☞ "Connecting to the Respiration Circuit" P7-82)
- ♦ 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 function 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.

⚠ WARNING Warnings about the BIS Monitoring (HBX-800)

- ♦ Clinical judgment should always be used when interpreting BIS in conjunction with other available clinical signs. Reliance on BIS alone for intra-operative anesthetic management is not recommended.
- ♦ BIS values should also be interpreted cautiously with certain anesthetic combinations, such as those relying primarily on either ketamine or nitrous oxide/narcotics to produce unconsciousness.
- ♦ As with any monitored parameter, artifacts and poor signal quality may lead to inappropriate BIS values. Potential artifacts may be caused by poor skin contact (high impedance), muscle activity or rigidity, head and body motion, sustained eye movements, improper sensor placement and unusual or excessive electrical interference.

⚠ 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 cause electric shock to the patient and/or operator due to excessive leakage current.
- ◆ 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 threshold level for arrhythmia detection changes with ECG waveform size. Set a proper waveform size for monitoring.
 - ◆ When the ECG waveform size is x1/4, x1/2, or x1, the arrhythmia detection level is 250 μ V.
 - ◆ When the ECG waveform size is x2 or x4, the arrhythmia detection level is 150 μ V.
- ◆ The leads for arrhythmia detection, central monitor display, printing are fixed as ECG1 and ECG2. Set the most appropriate leads with high QRS for ECG1 and ECG2, especially for arrhythmia detection. If the QRS amplitude for the set lead is low, it may cause erroneous arrhythmia detection.
- ◆ In ESIS Mode, artifacts such as electrosurgical noise or EMG can be largely reduced, but QRS amplitude attenuation, waveform distortion, or ST segment change may occur compared with other filter modes.
- ◆ The ESIS mode cannot completely reduce the electrical noise, and may erroneously detect the pacemaker spike. This mode should be selected only when a high frequency noise largely affects the HR measurement.
- ◆ There are some cases when the pacemaker pulse cannot 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 judgments 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

- ♦ Use only the sensor/relay cable specified by Fukuda Denshi. Otherwise, it may cause measurement error. If the sensor is damaged, stop using it.
- ♦ 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 apply the sensor too tight. At the same time, check the blood flow constantly so that congestion is not

generated at the peripheral site.

- ♦ Do not use tape to attach the sensor.
- ♦ Even attachment for a short duration may inhibit the blood flow and generate compression necrosis or burn injury. Also, blood flow inhibition may prevent correct measurements.
- ♦ 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, premature infant is immature, change the sensor attachment site more frequently depending on the condition.
- ♦ Direct sunlight to the sensor area can cause a measurement error. Place a black or dark cloth over the sensor if using in direct sunlight.
- ♦ When not measuring, unplug the relay cable and sensor from the SpO₂ connector. Otherwise, the outside light may affect to falsely display measurements.
- ♦ The pulse wave is normalized for SpO₂ measurement, and does not indicate perfused blood volume. Check proper probe attachment by observing the pulse wave.
- ♦ Precautions for Reusable Sensors
The light-emitting part of the sensor should be over the root of the fingernail or as instructed per the related sensor instruction manual. Do not insert the finger too far into the sensor as it may hurt the patient. For details, refer to the 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 details, refer to the 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 or lead to cross-infection.
- ♦ 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)

- ♦ The disposable airway adapter should be opened just before use.
- ♦ Do not reuse the disposable airway adapter. If sterilized, it will become unusable.
- ♦ 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.
- ♦ Dispose of calibration gas according to the regulation of each medical institution.


⚠ CAUTION Precautions about the BIS Monitoring (HBX-800 BISx I/F Unit)

- ♦ The conductive parts of sensors and connectors should not contact other conductive parts, including earth.
- ♦ To reduce the hazard of burns in the high-frequency surgical neutral electrode connection, the BIS sensor should not be located between the surgical site and the electrosurgical unit return electrode.
- ♦ The BIS sensor must not be located between defibrillator pads when a defibrillator is used on a patient connected to the patient monitor.
- ♦ Continuous impedance checking may need to be disabled if the 1 nA, 128 Hz impedance check signal interferes with other equipment (e.g., evoked potential monitors).
- ♦ Considerations when using Electro-Convulsive Therapy (ECT) equipment during BIS monitoring: Place ECT electrodes as far as possible from the BIS sensor to minimize the effect of interference. Certain ECT equipment may interfere with the proper function of the BIS monitoring system.


⚠ 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 level, the alarm message for the newer alarm will be displayed.

- ♦ The arrhythmia alarm message other than Tachy, Brady, Ext Tachy, Ext Brady will continue to be displayed for 30 seconds after the alarm is resolved.
- ♦ When "LEAD OFF", "Check Electrodes" is displayed, HR alarm or arrhythmia alarm will not function. If this condition is left unresolved, a sudden change of the patient may not be noticed. Take prompt action when the lead-off condition is detected.
- ♦ For the HPD-800/HPD-810 Gas Unit I/F and HCP-800/HCP-810 CO₂ Gas Unit, the upper EtCO₂ alarm will not generate if the upper limit is set to 100 mmHg/13.4 kPa and above as the measurement range is 0 to 99 mmHg / 0 to 13.3 kPa.
- ♦ 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 bedside monitor will be output to the network with a maximum delay of 1 second, and to the central monitor with a total delay of 2.5 seconds.
- ♦ If the NIBP alarm is turned OFF under the Oxygenator Mode, NIBP auto mode measurement and NIBP measurement at alarm occurrence will not be performed.
- ♦ If the same or similar equipments with different alarm settings are used in the same facility or same department, pay attention not to misjudge the alarms.

 **CAUTION** Precautions about the System Setup

- ♦ When the waveform and numeric data display for each parameter is set to OFF, the alarm and trend input will be also suspended.
- ♦ If the HR/PR source is set to [BP], and if BP waveform/numeric data is set to [Disp. OFF], the PR value will not be displayed.
- ♦ If the HR/PR source is set to [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 ID to multiple monitors in the same floor. Otherwise, the remote control operation may control multiple 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 with NIBP measurement, periodic printing, trend, NIBP list data, and age calculation from the birth date.
- ♦ If the time/date is changed, the time/date for all the saved patient data (trend, list, recall, etc.) will also change. The printed time/date before changing and the displayed time/date 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 Unit Data Monitoring (MGU-800/MGU-810 Series)

- ♦ When the multigas unit (MGU-800/MGU-810 series) and HPD-800/HPD-810, HCP-800/HCP-810 are simultaneously used, the CO₂ concentration measurement will be performed by the equipment selected for the "CO₂ Source Priority" under ([Menu] > "Parameter" [CO₂]).
- ♦ The MGU-800/MGU-810 series require warm up of about 10 minutes to correctly measure the data.
- ♦ If the power supply is interrupted due to power failure, etc., MGU-800/810 series multigas unit will initialize and enter into warm-up mode even if the power interruption is within 30 seconds.
- ♦ About the Gas Calibration

The gas calibration will automatically start when the MGU-800/810 series multigas unit is connected. After the warm-up completes, gas calibration will be performed every 4 hours during stable operation. During warm-up, gas calibration interval will become shorter than during normal operation. During gas calibration, measurement data will not be updated. Calibration gas is not required during gas calibration.


- ♦ Dispose of calibration gas according to the regulation of each medical institution.
- ♦ Make sure the sampling line and flow sensor is securely connected to prevent any leakage.
- ♦ The gas leakage inside or outside the equipment will cause measurement error. Make sure to check for leakage before usage.
- ♦ An environment with alcoholic vapor may adversely affect the measurement readings.
- ♦ CO₂, N₂O or anesthetic agent in the atmosphere around the MGU-800/810 series may adversely affect the measurement readings.
- ♦ 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 accuracy check is performed using a low pressure gas, the accuracy of gas measurement will be reduced. Make sure to perform the accuracy check using the specified calibration gas before its expiration date.
- ♦ If the error persists, refer to your nearest service representative.
- ♦ About the 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. 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.

- ♦ To clean the touch panel, use an optional cleaning cloth, eyeglass cleaning cloth, soft cotton cloth, or non-woven cloth (pulp, rayon, polyethylene, etc.).
- ♦ Clean the equipment frequently so stains can be removed easily.
- ♦ To prevent injury, it is recommended to wear gloves when cleaning the equipment.
- ♦ Pay attention not to 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 equipment with abrasive or chemical cleaner.
- ♦ When disinfecting the entire room using a spray solution, pay close attention not to get any solution into the equipment or connectors.
- ♦ Use only neutral detergent to clean the equipment. The surface resin coating may damage, resulting in discoloration, scratches, and malfunction.
Example:
chemical cloth, scrub brush, abrasive, polishing powder, hot water, volatile solvent and chemicals (cleanser, thinner, benzene, benzol, and synthetic detergent for house and furniture), or sharp-edged tools
- ♦ Do not open the housing.
- ♦ Do not allow alcohol or other liquids to enter 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

- ♦ If performing 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 default setting of bed ID is "000". If connected to a wired network with the bed ID unchanged, monitoring on the central monitor will not be possible.
- ♦ When connecting to a wired network, make sure that there are no other bedside monitors with the same ID. If there is more than one bedside monitor with the same bed ID, the duplicated bedside monitors cannot be monitored on the central monitor.
- ♦ When connected to the DS-LAN II network, set the bed ID in the range from "001" to "048" .
- ♦ When connected to the DS-LAN III network, set the bed ID in the range from "001" to "100" .
- ♦ The alarms that can be notified to the central monitor depend on the model type and software version of the central monitor. For details, refer to the operation manual of the central monitor.
- ♦ 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 setting 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. The alarm limit setup from the central monitor cannot be performed either.
 - ♦ On the DS-LAN II network, the following arrhythmia alarms will not be transmitted.
TACHY, BRADY, COUPLET, PAUSE, TRIGEMINY, TRIPLET, EXT TACHY, EXT BRADY, R on T, MULTIFORM, VENT RHYTHM, SVT, IRREGULAR RR, PROLONGED RR, S FREQUENT, S COUPLET, VPC, SVPC, PACER NOT CAPTURE, PACE NOT PACING
 - ♦ On the DS-LAN II network, arrhythmia alarm of "SLOW VT" will be transmitted as "VT" .

- ♦ On the DS-LAN II network, waveform, numeric data, and alarm of BP7, BP8, TEMP3 to 8 will not be transmitted. (These can be transmitted on the DS-LAN III network). 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 100 mmHg or above will be transmitted as 99 mmHg.
- ♦ 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 to the DS-LAN network.
- ♦ When connected to the wired network, the time/date will synchronize 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.
- ♦ The ST display will be distorted on the central monitor 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 monitored RR and APNEA will be the same for the central monitor and the DS-8500 System.

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 Tone/Volume 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 guaranteed 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 equipment under electromagnetic environment complies with IEC 60601-1-2:2007.

 **CAUTION**

Do not use any unauthorized equipment or cables as they may not comply with the EMC standard.

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 device complies with the Safety Standard 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.

Also, if this equipment is installed close to, or stacked with other equipment, malfunction may occur. Make sure to verify that the equipment operates properly in a used location.

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	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.
Harmonic Emissions IEC 61000-3-2	Class A	
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
<p>Conducted RF IEC 61000-4-6</p> <p>Radiated RF IEC 61000-4-3</p>	<p>3Vrms 150kHz to 80MHz</p> <p>3V/m 80MHz to 2.5GHz</p>	<p>3Vrms</p> <p>3V/m</p>	<p>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</p> <p>$d = 1.2 \sqrt{P}$</p> <p>$d = 1.2 \sqrt{P}$ 80MHz to 800MHz $d = 2.3 \sqrt{P}$ 800MHz to 2.5GHz</p> <p>Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey^{*1}, should be less than the compliance level in each frequency range^{*2}. Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
<p>Note 1: At 80MHz and 800MHz, the separation distance for the higher frequency range applies.</p> <p>Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p> <p>*1: Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast can not be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the DS-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.

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

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

Chapter 1 Installation of the Unit

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Chapter 1 Installation of the Unit


Precautions for Installing the Equipment

This section describes the environmental condition to use this equipment.

 **CAUTION**

- ◆ The installation of this equipment should be performed by our service representative or a person who is well acquainted with this equipment.
 - ◆ Avoid stacking multiple equipments or placing anything on the equipment during operation.
 - ◆ Install this equipment in a place where power supply cable can be easily disconnected.
 - ◆ If any abnormality is found on the equipment, immediately turn OFF the power, and disconnect the power supply cable from the outlet.
 - ◆ Do not soak or immerse the equipment in liquids.
-

Operating Environment

- ◆ The following environmental conditions should be observed when using the equipment.
 - ◆ Surrounding Temperature: 10°C to 40°C (10°C to 35°C for MGU-800/810 series)
 - ◆ Relative Humidity: 30% to 85% (non-condensing)
 - ◆ Atmospheric Pressure: 70 kPa to 106 kPa
- ◆ This equipment is intended for patient monitoring in NICU, ICU, CCU, surgery, emergency room and ward. Do not use in MRI environment or in a home-care setting.
- ◆ The power source should fulfill the following condition.
 - ◆ Use a hospital grade outlet (3-pin grounded outlet).
 - ◆ Verify power voltage and frequency before connecting to an AC power source.
 - ◆ Use the power source that can provide adequate power to the equipment.
Refer  Operation Manual "Specification" P14-1 for power voltage, frequency, and power consumption.
- ◆ Pay attention to install or store the equipment in proper location. 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
 - ◆ Unstable place with inclination, vibration, or shock
- ◆ Ensure proper ventilation to cool the equipment.
 - ◆ A minimum space of 5 cm is required between vents on the rear side of the main unit 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), DS-8007 system, Multigas Unit (MGU-800/MGU-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 your nearest 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 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 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), DS-8007 System, 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

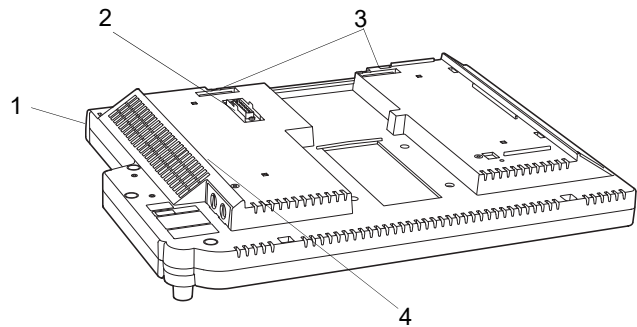
- When turning ON the power for the first time after the display unit and the main unit is connected, the display may scintillate. This is a normal operation of the display unit and not a malfunction.

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



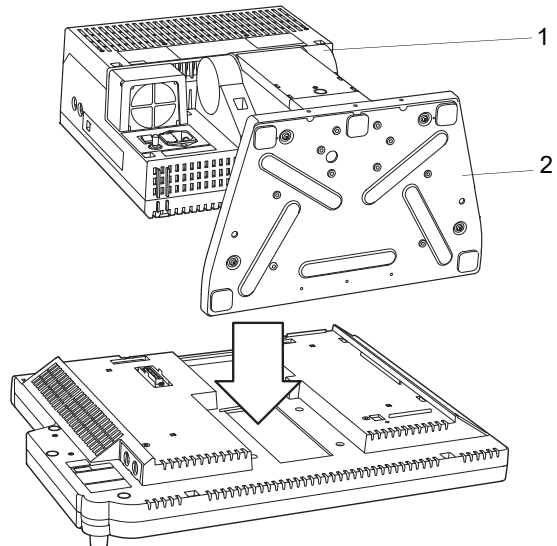
* The figure shown is LC-8019T/TC.

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

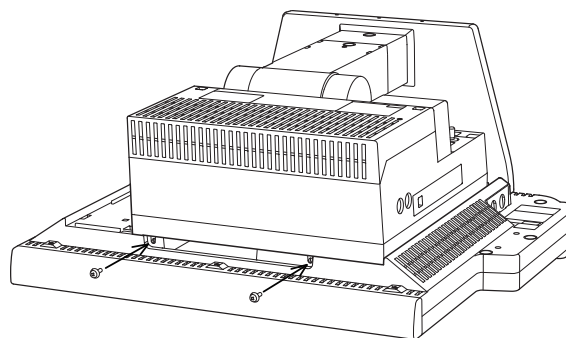
NOTE

- ♦ 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.

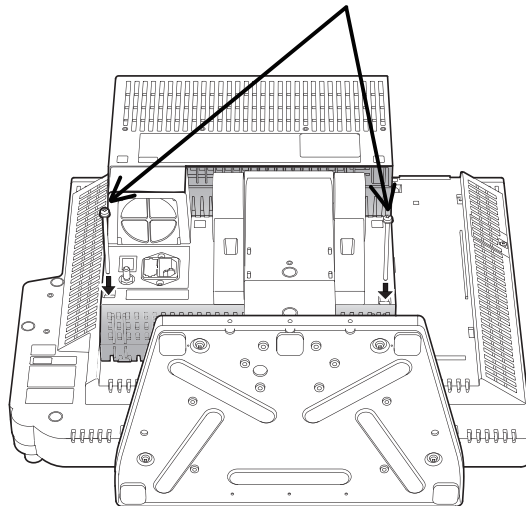
- 1 Main Unit (DSC-8510/8530)
- 2 DS-8500 Main Unit Stand (OAO-44A: option)



- 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).



Connecting the AC Unit and CO₂ Gas Unit

❑ DS-8007 Adapter (DSA-82)

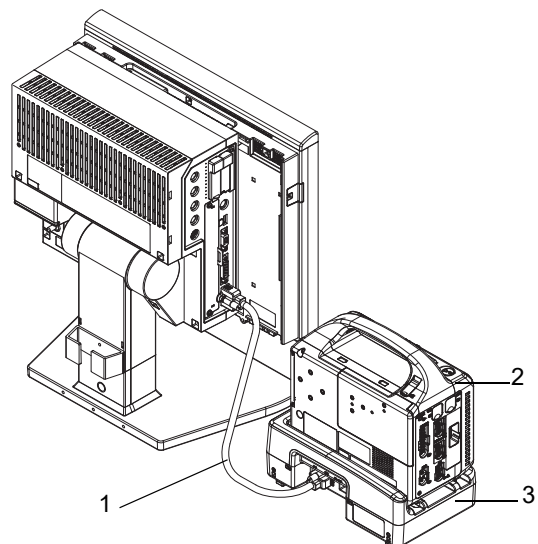
The preparation to connect the DS-8007 series to the host monitor via DSA-82 is explained below.

⚠ WARNING

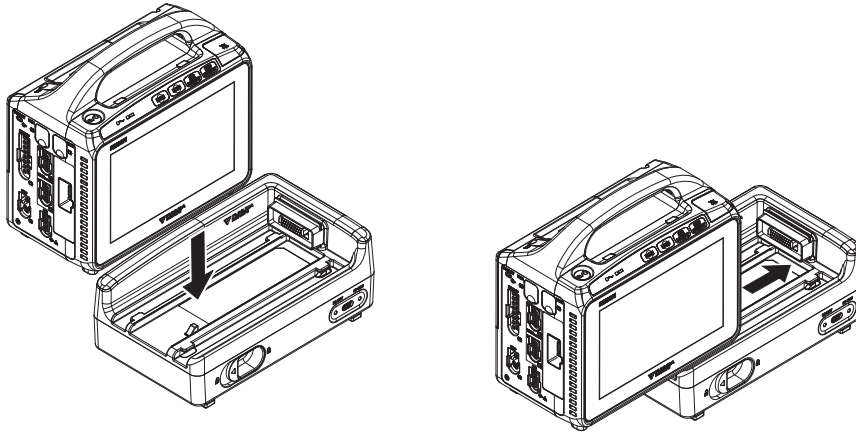
- The power is supplied from the host monitor.
- When the DS-8007 is connected to the host monitor using the DSA-82, a voltage drop may occur depending on the cable connection condition which causes the charging process to temporarily cease or cease before completion.

- 1** Connect the host monitor and the DSA-82 with module connection cable (CJO-08SSxx).

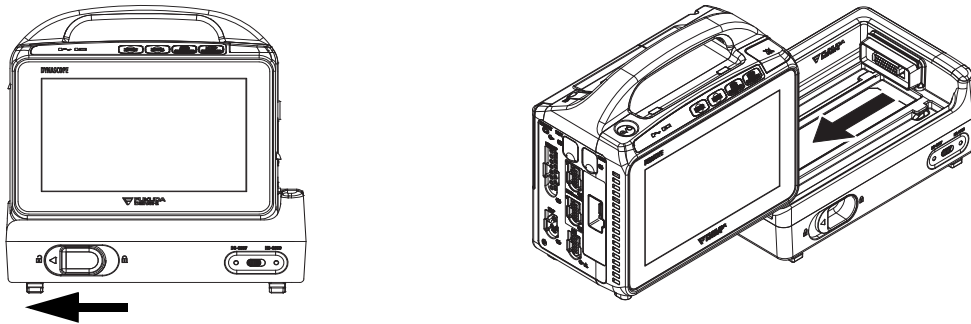
- 1 CJO-08SSxx
- 2 DS-8007
- 3 DSA-82



- 2** Place the DS-8007 on the center of the DSA-82, and slide it along the rail in the arrow direction until it is securely connected.

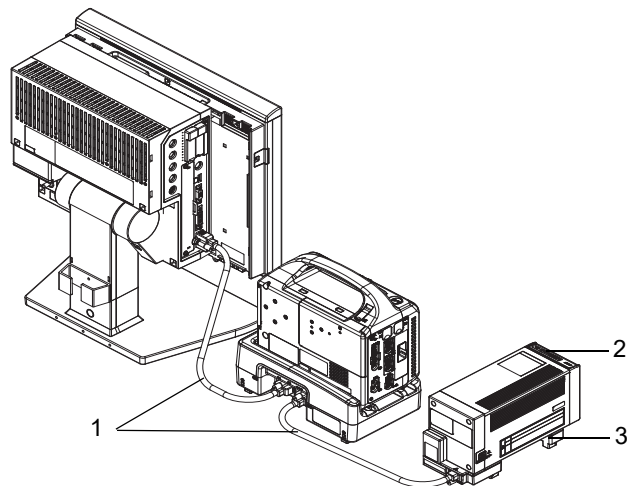


- ▶ When disconnecting the DS-8007, unlock the release lever, and slide the DS-8007 along the rail in the arrow direction.



- 3** By connecting the HS-8000 (HSA-80) to the DS-8007 (DSA-82) using the module connection cable (CJO-08SSxx), the using unit can be switched. The selection of which unit to use on the host monitor can be made by DS-8007/HS-8000 Switch.

- 1 CJO-08SSxx
- 2 HS-8000
- 3 HSA-80



Connecting the Super Unit, Input Box, DS-8007

Connect the main unit and the HS Adapter (HSA-80 series) or DS-8007 Adapter (DSA-82) 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 and HS-8000/DS-8007, main unit and Input Box.

For details of the specification and monitoring performance of the DS-8007 system, refer to the operation manual of the DS-8007 system.

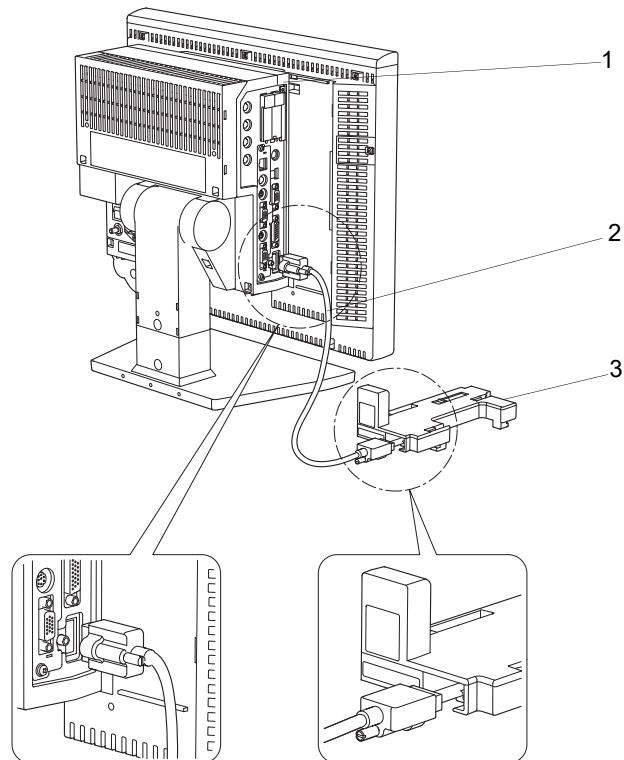
Model	Length
CJO-08SS0.3	0.3m
CJO-08SS1.5	1.5m
CJO-08SS3.5	3.5m
CJO-08SS5	5m
CJO-08SS10	10m

 **CAUTION**

- When connecting the module connection cable, press the connector, tighten the screw with hand and secure it with flat-blade screw driver. If the connection is not secure, contact failure may occur.
- When the DS-8007 is connected to the DS-8500 system using the DSA-82, a voltage drop may occur depending on the cable connection condition which causes the charging process to temporarily cease or cease before completion.

□ Connection of Main Unit and Super Unit

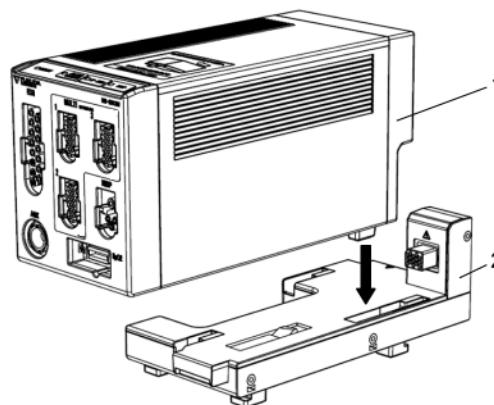
- 1** Connect the main unit (DSC-8500 series) and HS Adapter (HSA-80) using the module connection cable (CJO-08SSxx).



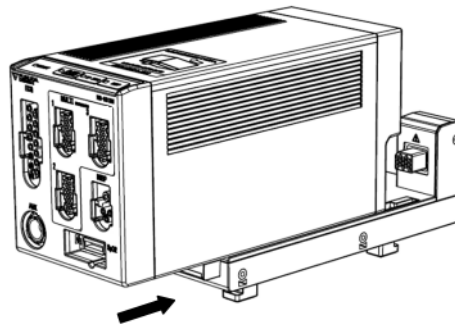
- 1 Main Unit (DSC-8500 series)
- 2 Module Connection Cable (CJO-08SSxx)
- 3 HS Adapter (HSA-80)

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

- 1 HS-8000
- 2 HSA-80



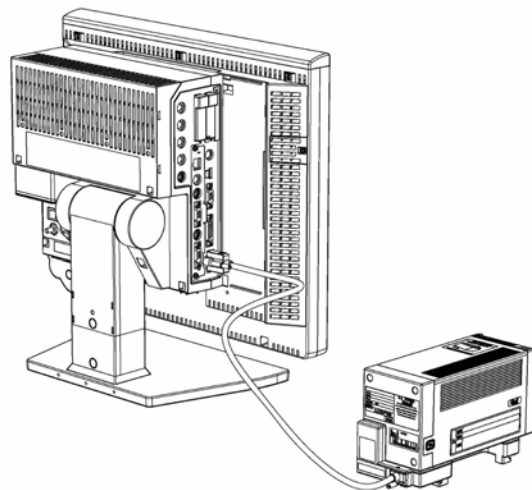
- 3** Slide the HS-8000 backward until it locks with a click sound.



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

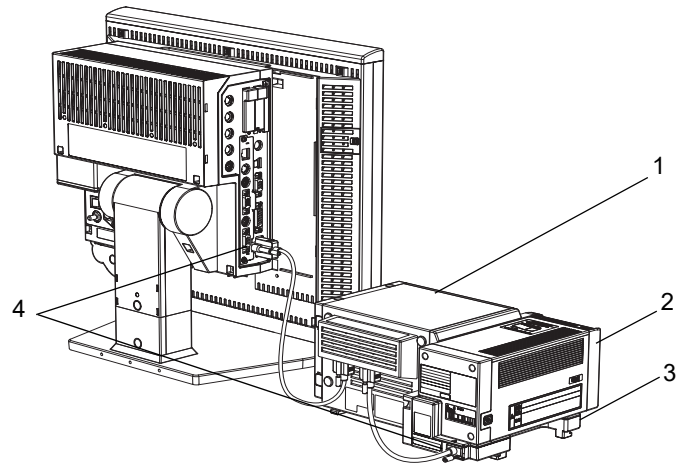
Connecting the Main Unit, Super Unit, and Input Box

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

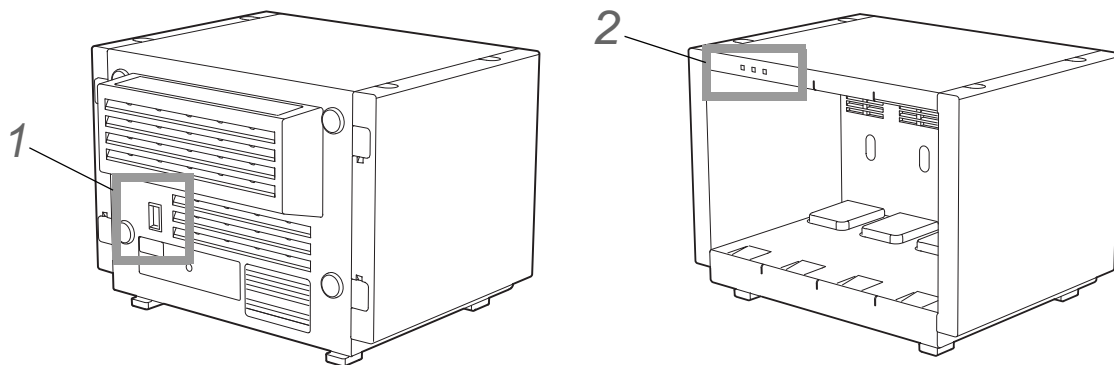


CAUTION

- ♦ 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 the correct ID is set by checking the LAN ID setting indicator on the front side.

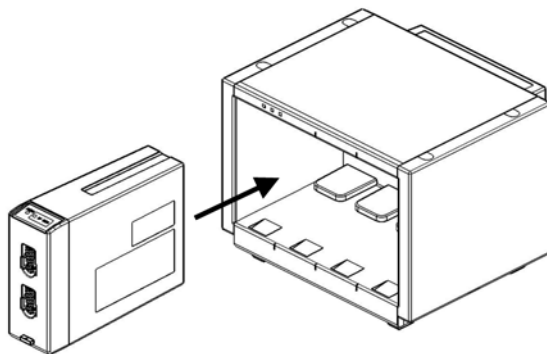
LAN ID Setting Dial	Input Box ID*	LAN-ID Setting Indicator
1	IB1	"1" is lighted.
2	IB2	"2" is lighted.

* 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.



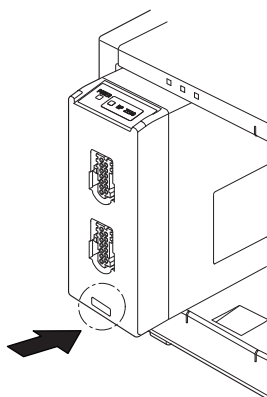
NOTE

- ♦ 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.

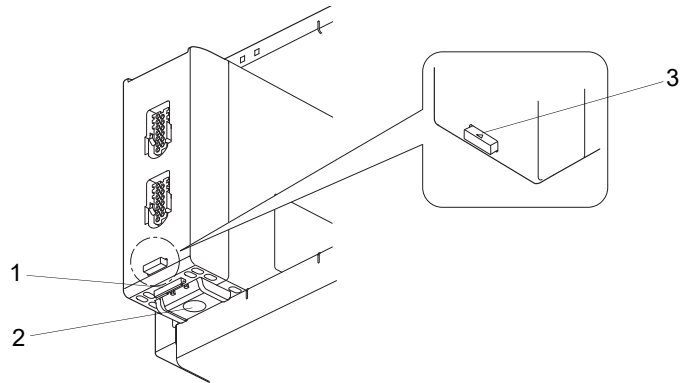
2 Press the release button until it becomes flat.



❑ 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



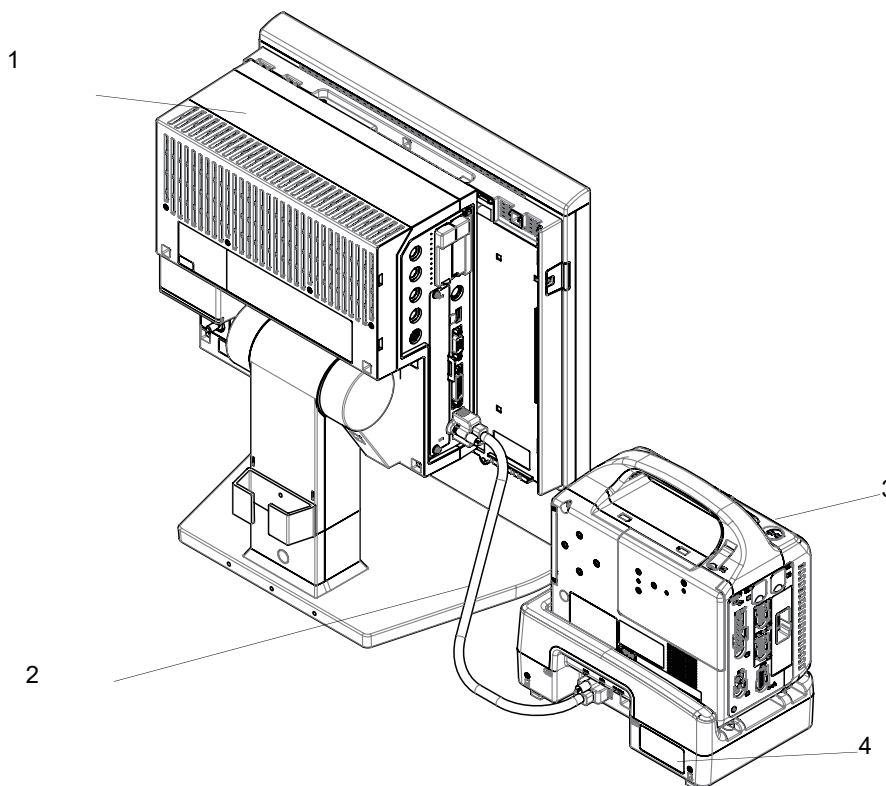
2 Pull out the expansion module by pushing up the lever while the triangle mark on the release button can be seen.

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.

❑ Connecting the Main Unit and the DS-8007

1 Connect the main unit (DSC-8500 series) and DS-8007 Adapter (DSA-82) using the module connection cable (CJO-08SSxx).



- 1 Main Unit (DSC-8500 series)
- 2 Module Connection Cable (CJO-08SSxx)
- 3 DS-8007

4 DS-8007 Adapter (DSA-82)

Connection of Multigas Unit

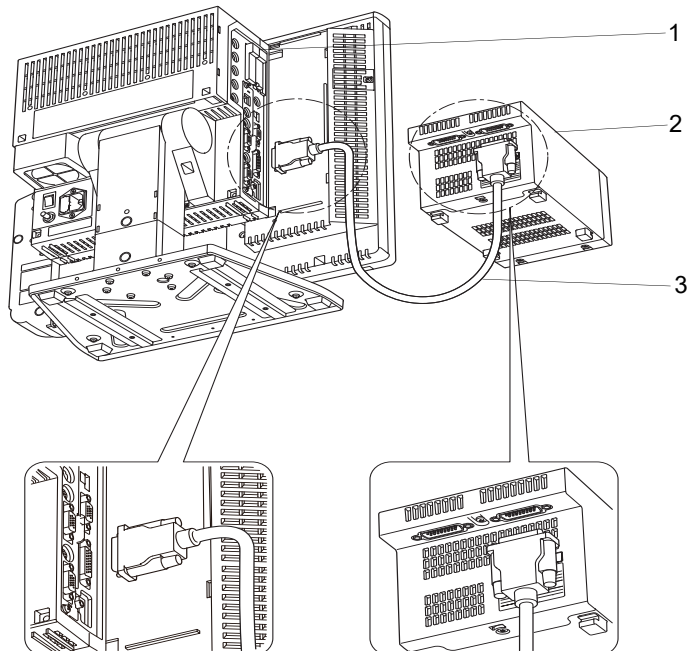
Connect the main unit and the Multigas Unit (MGU-800/810 series).

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

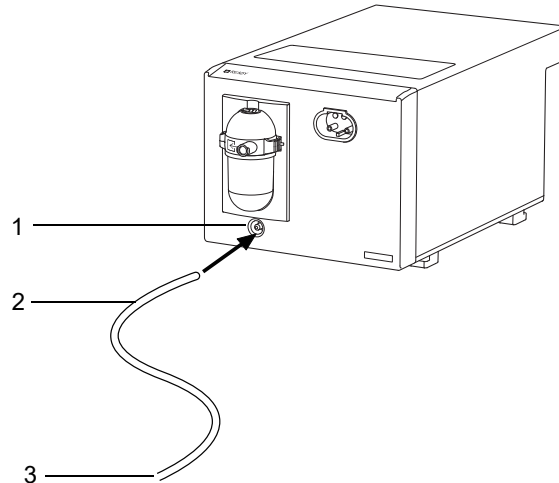
- When connecting the connection cable, make sure to secure the connector with screws. If the connection is not secure, contact failure may occur.
- Do not connect unspecified equipment to the U-LINK connector on the main unit.
- When not connecting the MGU-800/810 series, make sure to select [OFF] for "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



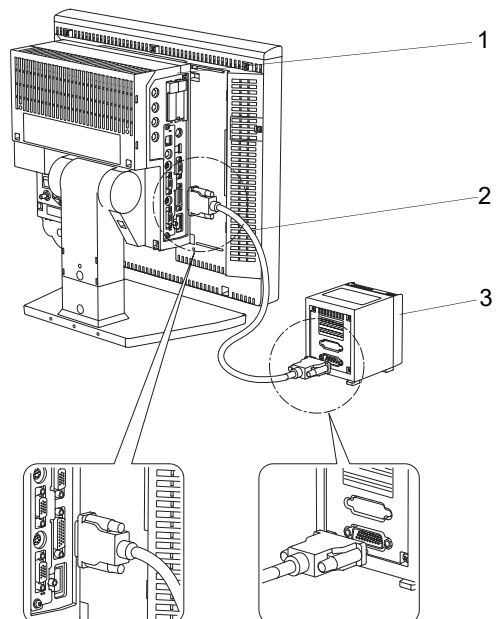
WARNING

- ♦ 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

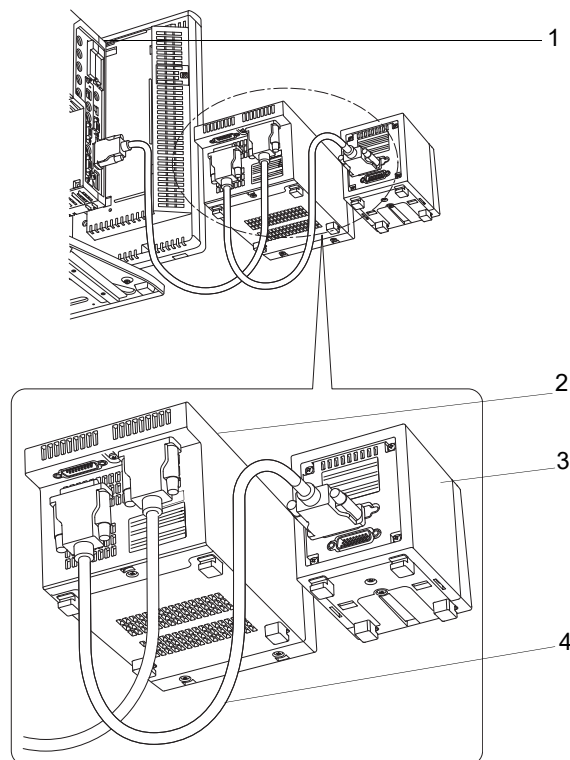


CAUTION

- 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

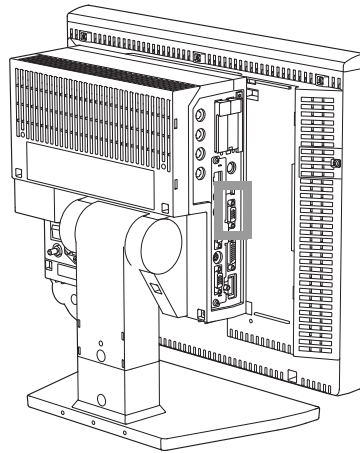
- When connecting the connection cable, make sure to secure the connector with screws. If the connection is not secure, contact failure may occur.
 - Make sure that the power of the DS-8500 is turned OFF when connecting/disconnecting the connection cable.
 - When not connecting the MGU-800/810 series, 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" P4-8)

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

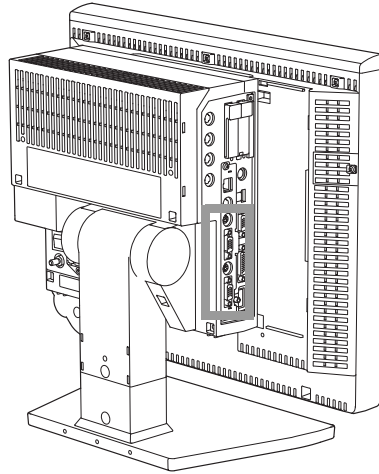
When connected with Display Unit LC-8015T/LC-8015TC

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

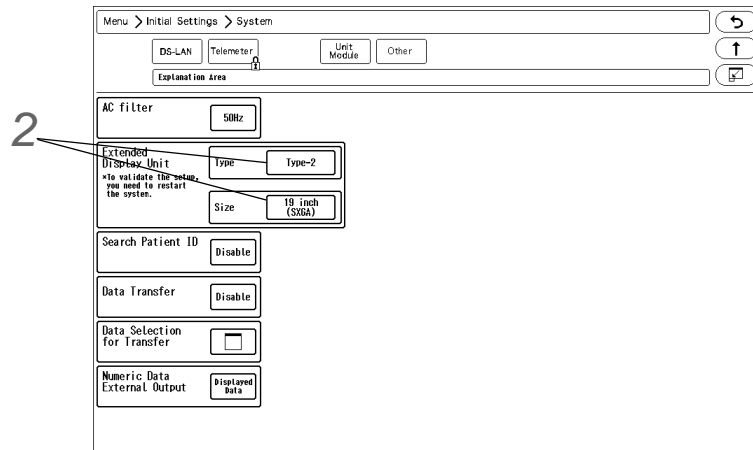
Extended Display Unit Setup

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

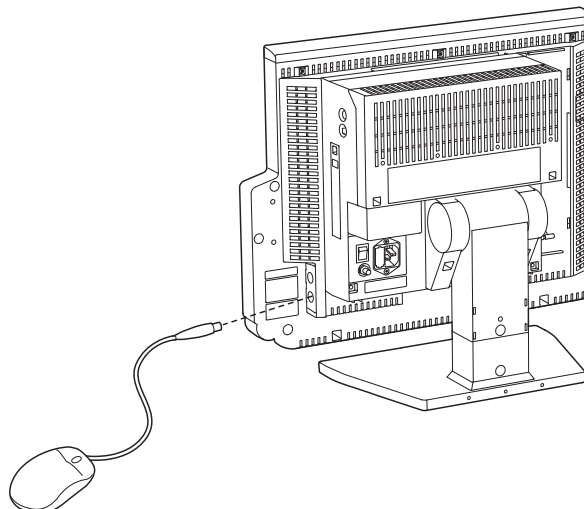
- ♦ The calibration must be performed after connecting the extended display unit. Otherwise it will not function properly.

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.

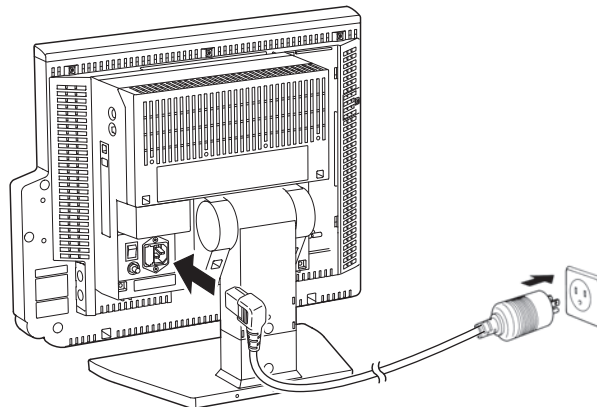
Power Connection of the Main Unit

⚠ 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.
-

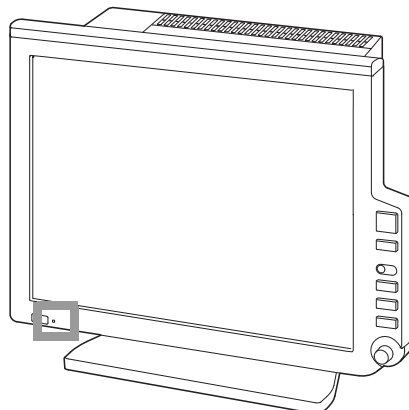
1 Connect the power supply cable (CS-34) to the rear side of the main unit.

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

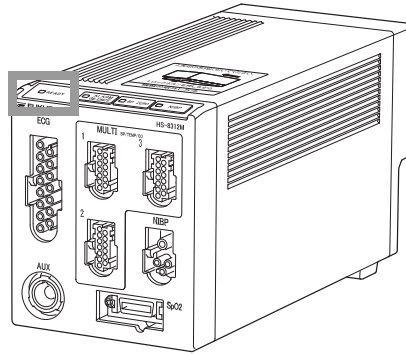


Power Connection of the Super Unit

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.

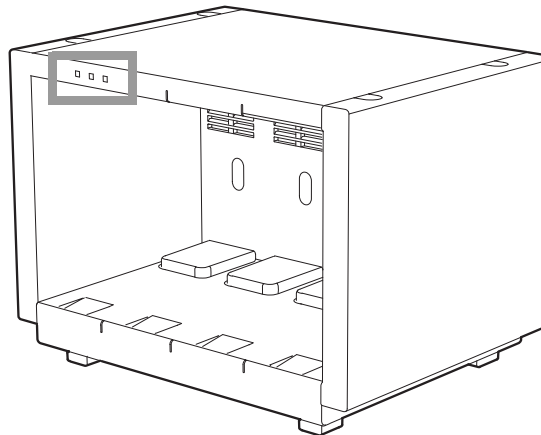
Green: Power is ON and AC power is supplied.

Light OFF: AC power is not supplied



Power Connection of the Input Box

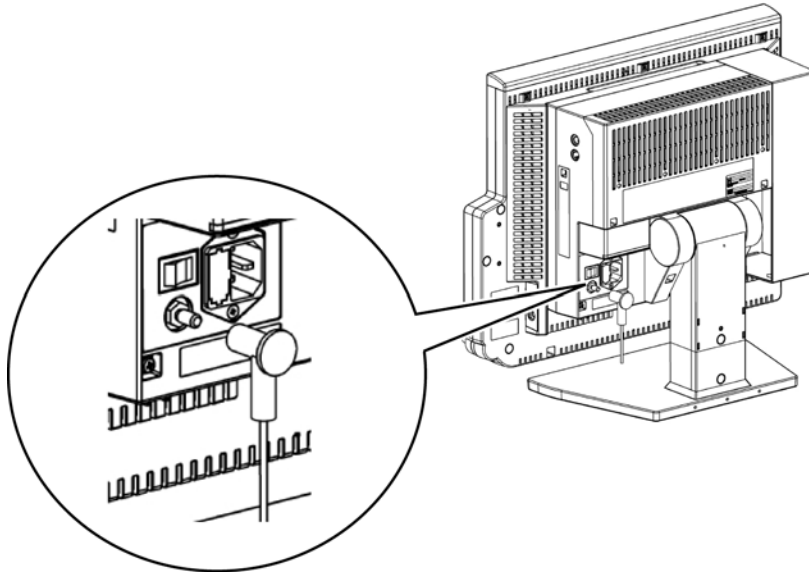
When the power supply switch on the main unit is turned ON, AC power will be supplied to the Input Box and LAN-ID setting indicator on the front side will light.



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-LAN Connection	2-1
DS-LAN Setup	2-2
Precautions about the DS-LAN	2-5
Wireless Network.....	2-6
Example of Wireless Network Construction	2-6
Module Attachment and Serial Communication Setup	2-7
Channel ID and Telemetry Wave Setup	2-8

Chapter 2 Network System Construction

CAUTION

- ◆ Configure the network as specified by Fukuda Denshi. If the equipment of different network type is connected, malfunction may occur to the whole network system.

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-LAN Connection

WARNING

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

CAUTION

- ◆ On a wired network, the alarm generated on the bedside monitor will be output to the network with a maximum delay of 1 second, and to the central monitor with a total delay of 2.5 seconds.
- ◆ When connecting to the DS-LAN network, perform "DS-LAN Setup" under [Initial Settings>System>DS-LAN] and restart the system before connecting the LAN cable.
- ◆ Use a repeater HUB for DS-LAN II network and a switching HUB for DS-LAN III network.
- ◆ The default setting of bed ID is "000". If connected to a wired network with the bed ID unchanged, monitoring on the central monitor will not be possible.
- ◆ When connecting to a wired network, make sure that there are no other bedside monitors with the same ID. If there is more than one bedside monitor with the same bed ID, the duplicated bedside monitors cannot be monitored on the central monitor.
- ◆ When connecting to the DS-LAN II network, set the ID in the range from 001 to 048. When connecting to the DS-LAN III network, set the ID in the range from 001 to 100.
- ◆ If the measurement unit of CO₂ concentration is mmHg and [99 mmHg] is selected for "Upper Limit of CO₂ (mmHg) Transmission" under [Initial Settings>System>DS-LAN], the CO₂ value of 100 mmHg or above will be transmitted as 99 mmHg.

NOTE

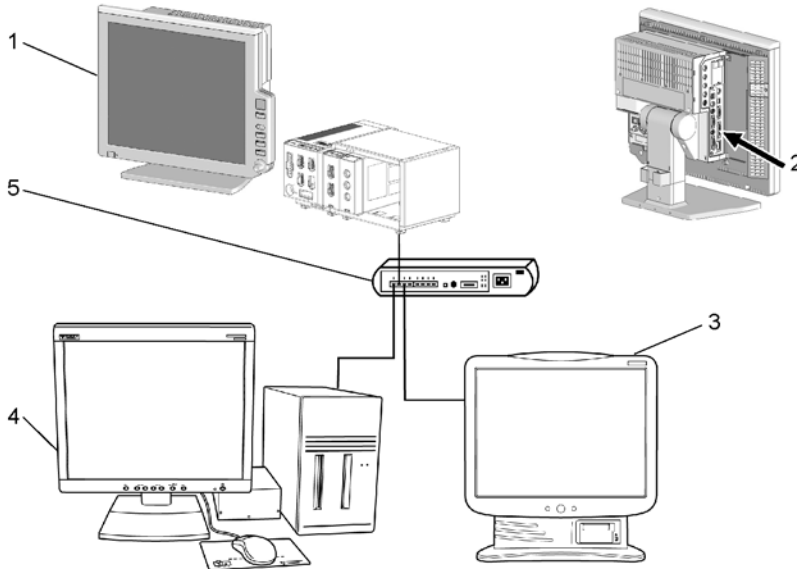
- ◆ When the HR/PR numeric data box is set, the alarm limit settings for the following parameters may not link between the bedside monitor and central monitor. In such case, perform the setting for each parameter. When changed on the bedside monitor, the alarm limit settings will link each other.

HR
PR_IBP

PR_SpO₂ (1ch)
PR_SpO₂ (2ch)

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.

Example of Wired Network Configuration



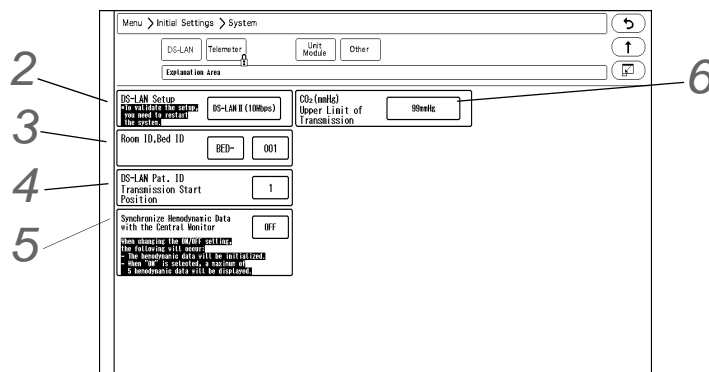
- 1 Bedside Monitor: DS-8500 System
- 2 Ethernet Branch Cable (CJ-522)
- 3 DS-7600 System Central Monitor
- 4 DS-5700 Central Monitor (For DS-LANII connection)
- 5 HUB

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

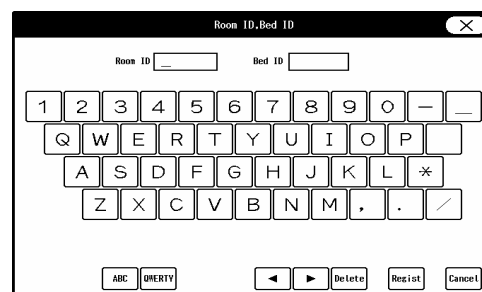
- ◆ The Bed ID is factory set to 000. If connected to the wired network with the ID unchanged, monitoring on the central monitor will not be possible.
- ◆ When connected to the wired network, make sure that there are no other bedside monitors with the same Bed ID. If the Bed ID is duplicated, monitoring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

CAUTION

- ◆ Precautions Common for the DS-LAN II/DS-LAN III Network
 - ◆ 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 Alarm/APNEA Source" setting is other than [CO₂] (Or, if [Auto] selects a setting other than [CO₂]), the CO₂ waveform will not be transmitted on a wired network.
 - ◆ For the numeric data displayed as "xxx", maximum or minimum value of measurable range will be transmitted.
 - ◆ The numeric data displayed as "--- " will be treated as not measured data.
 - ◆ If the measurement unit of CO₂ concentration is mmHg and [99 mmHg] is selected for "Upper Limit of CO₂ (mmHg) Transmission" under [Initial Settings>System>DS-LAN or Telemeter), the CO₂ value of 100 mmHg or above will be transmitted as 99 mmHg.
 - ◆ 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 a wired network, the time/date will synchronize with the central monitor. In this case, the time/date cannot be changed on this monitor.
 - ◆ 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 same parameter for the RR and apnea will be monitored on this monitor and the central monitor.
 - ◆ The alarms that can be notified to the central monitor depend on the model type and software version of the central monitor. For details, refer to the operation manual of the central monitor.

CAUTION

- ◆ Precautions about the DS-LAN II Network
 - ◆ The BP measurement unit should be set to "mmHg".
 - ◆ The data cannot be output to the AU-5500N.
 - ◆ When the BP measurement unit is "kPa", BP waveform, BP numeric data, NIBP numeric data, NIBP list will not be transmitted. It will be treated as not measured data, and will not be displayed on the central monitor. Also, the alarm limit setup from the central monitor cannot be performed.
 - ◆ The following arrhythmia alarms cannot be transmitted.
TACHY, BRADY, COUPLET, PAUSE, TRIGEMINY, TRIPLET, EXT TACHY, EXT BRADY, R on T, MULTIFORM, VENT RHYTHM, SVT, IRREGULAR RR, PROLONGED RR, S FREQUENT, S COUPLET, VPC, SVPC, PACER NOT CAPTURE, PACE NOT PACING
 - ◆ Arrhythmia alarm of "Slow_VT" will be transmitted as "VT" .
 - ◆ On a wired network, waveform, numeric data, and alarm of TEMP3 to 8 will not be transmitted. Also, the displayable waveform, numeric data, alarm differs depending on the connected central monitor. 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 DSC-8500, this alarm will not be generated on the central 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.

- 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.

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	301 bpm and above	300 bpm
Respiration Rate	151 Bpm and above	150 Bpm
Blood Pressure	-51 mmHg and below 301 mmHg and above	-50 mmHg 300 mmHg
Temperature	-0.1°C/31.8°F and below 45.1°C/113.2°F and above	0°C/32.0°F 45.0°C/113.0°F
Pulse Rate (Masimo Unit)	240 bpm and above 25 bpm and below	239 bpm 26bpm
Pulse Rate (Nellcor Unit)	251 bpm and above	300 bpm

Wireless Network

In this section, connection and setup procedure for wireless (telemetry) network is explained. By constructing a wireless network using the telemetry transmitter module (HLX-801 (FA), HLX-801 (G)), the data on this bedside monitor can be transmitted to the central monitor.

WARNING

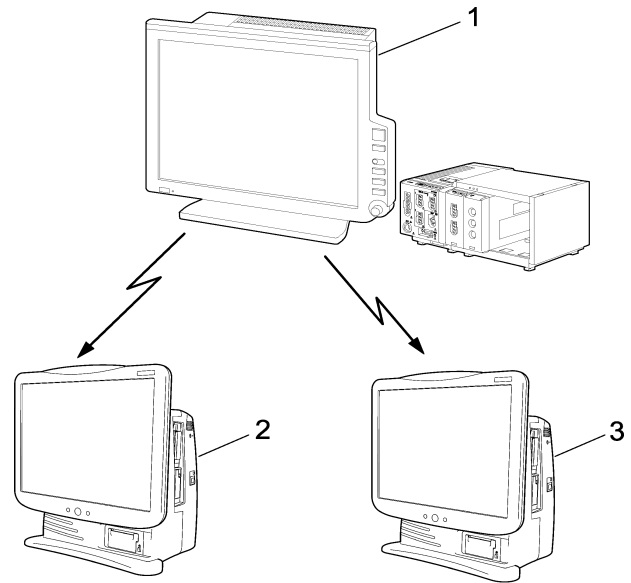
- Some wireless combinations of telemetry transmitters may generate interference with other devices.
- Before selecting the channel, verify it will not interfere with other channels.
- Make sure the telemetry manager of your system is aware of any changes to the telemetry channels.
- If transmitters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

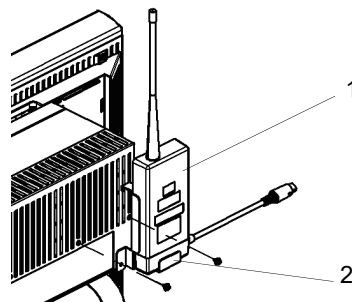
To attach the telemetry transmitter module to the DS-8500 System, a holder which is corresponded to each module is required.

Telemetry Transmitter Module	Attachment Holder
HLX-561	OAO-40A
HLX-801/HLX-801(G)	OAT-8185A (HLX-801 Mounting Bracket)

□ Attaching the Telemetry Transmitter Module

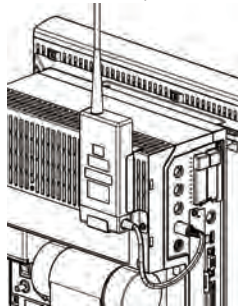
To attach the telemetry transmitter module to the main unit (DSC-8500 series), optional HLX Holder is required.

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



- 1 Telemetry Transmitter Module
- 2 HLX Holder

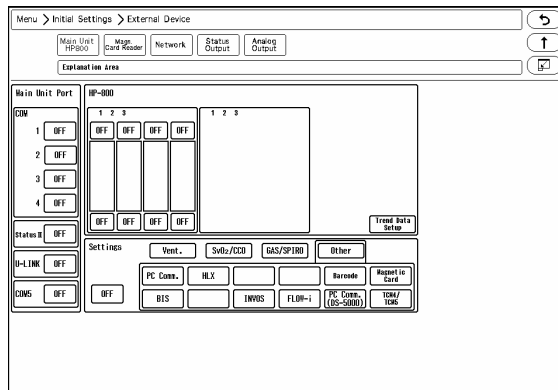
2 Connect the cable of the HLX to the serial connector (COM1 to COM4) on the main unit.



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.

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

WARNING

- A password can be set to access the channel ID setup menu to allow only the telemetry channel administrator to change the channel ID.
- Some combinations of channels may generate interference with other telemetry transmitters.
- Before selecting a channel, verify it will not interfere with other channels.
- Make sure the telemetry manager of your system is aware of any changes to the telemetry channels.
- If transmitters are used in a neighboring medical facility, your facility and the neighboring facility must make agreements on the setting of the telemetry channels to prevent telemetry

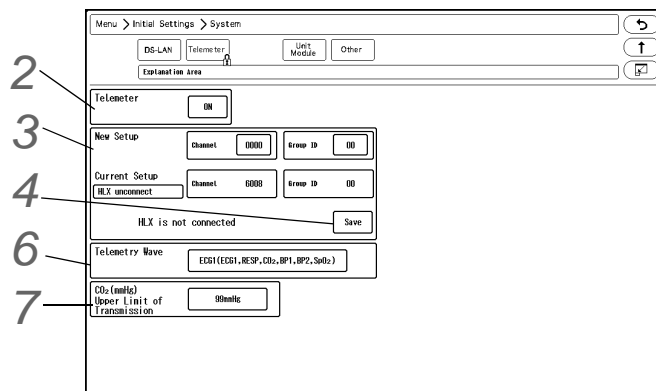
interference.

NOTE

- To change the setting, enter the password.
(☞ "Administrator Setup" P5-2)
- Before using the telemetry transmitter module, set the port to connect the HLX in advance.
(☞ "External Device Setup" P4-16)

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

▶ The Telemeter Setup window will be displayed.



2 Perform setup for the telemetry transmission.

1 Press the key for "Telemeter".

▶ The dropdown list will be displayed.

2 Select from [ON]/[OFF].

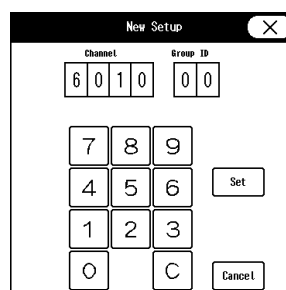
▶ [ON]: Telemetry transmission will be performed.

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

3 Set the channel ID and group ID.

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

▶ The "New Setup" window will be displayed.



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

3 Press the input area for the Group ID.

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

5 Press the [Set] key.

4 Save the channel ID and group ID.

1 Press the [Save] key.

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

REFERENCE

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

5 Check the stored channel ID and group ID.

Current Setup HLX-801	Channel 3400	Group ID 00
--------------------------	-----------------	----------------

NOTE

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

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

6 Select the 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 Nellcor™ unit, the PR value of 255bpm or above will be transmitted to the central monitor as 254bpm.

REFERENCE

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

Chapter 3 Using the CF card

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

Chapter 3 Using the CF card

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

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

Inserting the CF card

CAUTION

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

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

Data Backup/Copy Using the CF Card

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

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

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

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

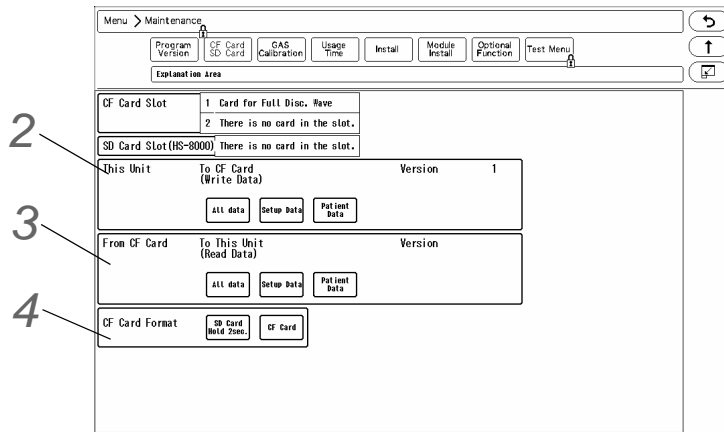
- Cancel the write-protect function before using the CF card.
- If the same card is repeatedly used without formatting, card capacity shortage may occur. Make sure to format the card before saving the data to the CF card.

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/Multiplier 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

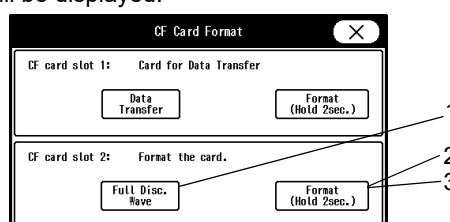
In this section, formatting of CF card to be used for storing the full disclosure waveform is explained. By inserting the formatted CF card to the CF Card Slot 2, storing of the full disclosure waveform data will automatically start, and the full disclosure waveform review function will become available.

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.

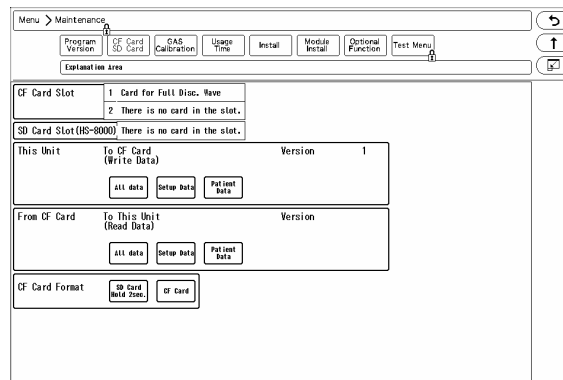
CAUTION

- ♦ 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

A ventilator can be connected to the DS-8500 system using the Status II port on the main unit 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/HP-800
Servo Ventilator 900C/900D/900E*	CJ-400RI-70SV9 (x1)
Servo Ventilator 300/300A	CJ-401RI-70SV3 (x1)
Servo Ventilator SERVO-i/SERVO-s/SERVO-U/SERVO-n/ SERVO-air	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 2 dura/Evita 4/Evita XL	CJ-402RI-70SVi (x1)
VELIA/ASTRAL	CJO-23DR2
VS ULTRA	CJO-24DR2

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

When connecting a ventilator, check the corresponding 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
Servo Ventilator SERVO-U/SERVO-n/SERVO-air	v1.0
PB740	M
PB760	H
PB840	K
Evita 2 dura	04.14
Evita 4	04.14
Evita XL	05.10
VELIA/ASTRAL	Not specified
VS ULTRA	Not specified


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 equipment, 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
 - ♦SERVO-U/n/air:
airway pressure upper limit alarm, expiratory minute volume upper/lower limit alarm, apnea alarm, gas supply alarm, air supply alarm, O₂ supply alarm, overrange alarm, respiratory rate alarm, PEEP low alarm, battery operation
 - ♦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 2 dura/Evita 4/Evita XL.
 - ♦ 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
 - ♦ When the Evita 2 dura/Evita 4/Evita XL is connected, 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 at the DS-8500 system.
 - ♦ When connecting the VELIA, ASTRAL, VS ULTRA, refer to the respective operation manual, and check which ventilator alarm will be output.
 - ♦ When the VELIA, ASTRAL, VS ULTRA ventilator is connected, and the ventilator power is turned OFF, alarm will not generate on the DS-8500. If the connection cable is disconnected from the ventilator, <Vent. Alarm> will generate, but <VENT_COMM> alarm will not generate on the DS-8500.
-

CAUTION

- ♦ The ventilator operation should be performed by well-trained and authorized personnel.
- ♦ When connecting the DS-8500 system and the 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" P3-24)
- ♦ When connecting the cable, make sure that the main power of this system and the ventilator is OFF.
- ♦ The external device parameters to be displayed on the graphic trend/tabular trend needs to be selected in advance. When the external device is connected, make sure to select the displaying parameters on the "Trend Data Setup" window ([Data Review>Graphic Trend or Tabular Trend] or [Initial Settings>External Device>Main Unit/HP-800]).

Ventilator Connection

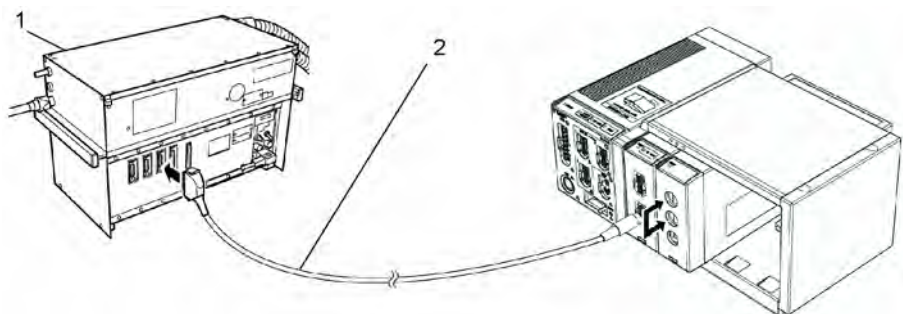
CAUTION

- ♦ Only one ventilator can be connected to each DS-8500 system. Do not connect more than one ventilators.
- ♦ The ventilator and anesthesia delivery system (FLOW-i) cannot be connected simultaneously.
- ♦ Ventilator and Multigas Unit (MGU-810 series) cannot be connected simultaneously.

☐ In Case of SV-900

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

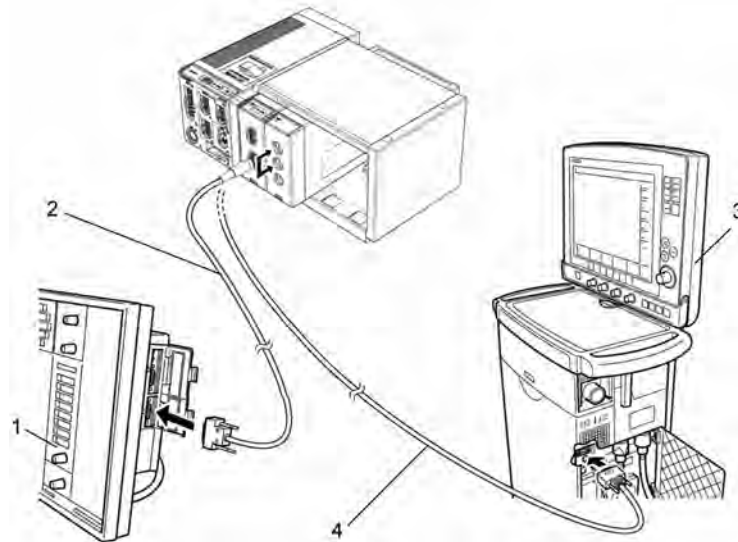
- 1 SV-900
- 2 CJ-400RI-70SV9



☐ In Case 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 the HP-800.)

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



In Case of SERVO-U/SERVO-n/SERVO-air

- 1 Connect the SERVO-U, SERVO-n, SERVO-air to the Status II connector on the DSC-8500, or one of Status II connector A or Status II connector B on the HP-800.

In Case of VELIA, ASTRAL, VS ULTRA

- 1 Connect the VELIA, ASTRAL, VS ULTRA to the Status II connector on the DSC-8500.

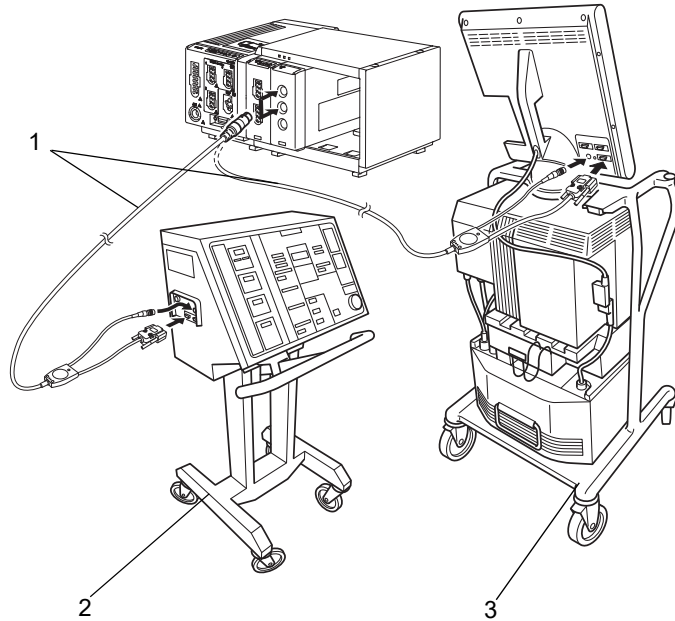
Connection of PB740/760/840

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



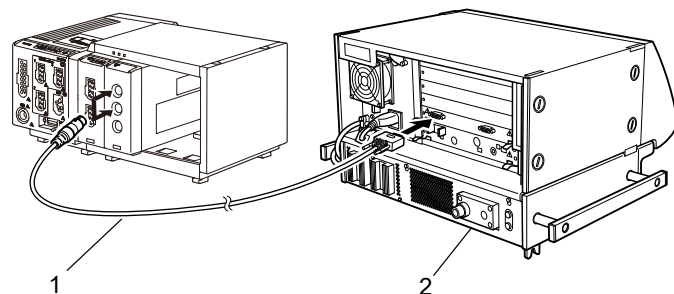
□ Connection of Evita

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: Modbus
 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.

REFERENCE

- Refer to the following procedure. (☞ "External Device Setup" P4-16)

SvO₂/CCO Monitor Connection

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

By connecting the SvO₂/CCO Monitor to one of the following ports, SvO₂/CCO Monitor data can be monitored on the DS-8500 System.

*COM1 to COM4 port on the main unit

*Status II port on the main unit

*Multiport Module HP-800

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)
VigilanceII	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)
PulsioFlex	-	CJ-725 (x1) ^{*1}

*1: To connect the PulsioFlex PC4000, USB to RS-232C connector cable (UC-232A, ATEN) specified by PULSION Medical Systems is required.

Make sure that the network for the Vigilance/Vigileo 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.

Make sure that the network for the PulsioFlex is set as follows.

For procedure to check the PulsioFlex network setting, refer to the operation manual for the PulsioFlex.

- RS-232C Protocol : PulsioFlex V1.0

CAUTION

- When connecting this system and the SvO₂/CCO monitor, use only the specified connection cable.

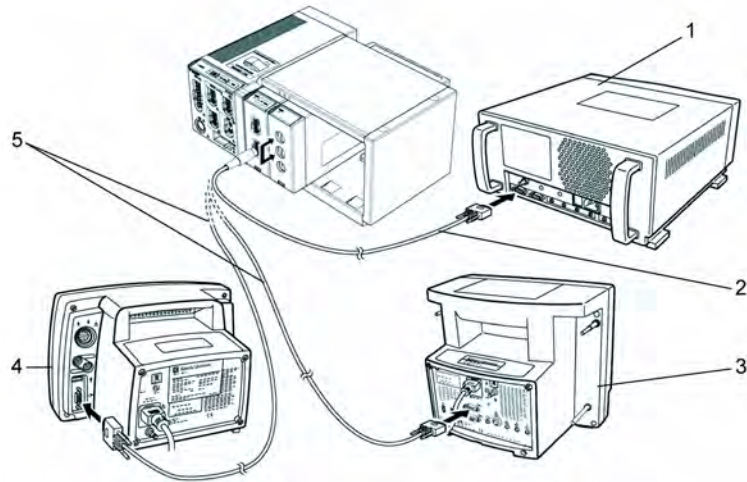
- ♦ Make sure that the SvO₂/CCO monitor is connected to the specified connector on this system. When connecting the cable, verify that the main power of this system and the SvO₂/CCO monitor is OFF.

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.)

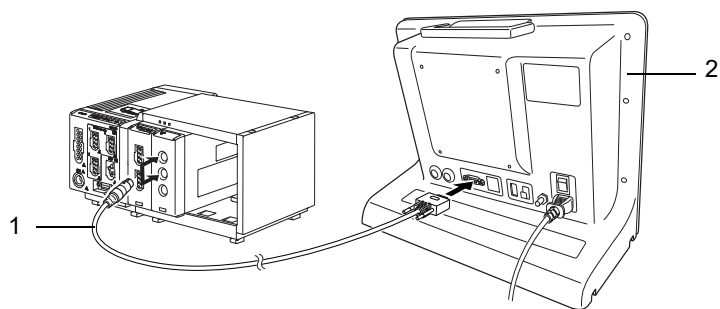
- 1 Vigilance
- 2 CJ-406RI-70Vigi
- 3 Vigilance II
- 4 Vigileo
- 5 CJ-402RI-70SVi



□ Connection of PiCCO

- 1 Connect the PiCCO to the DS-8500 system.
(The illustration is example of connection with HP-800.)

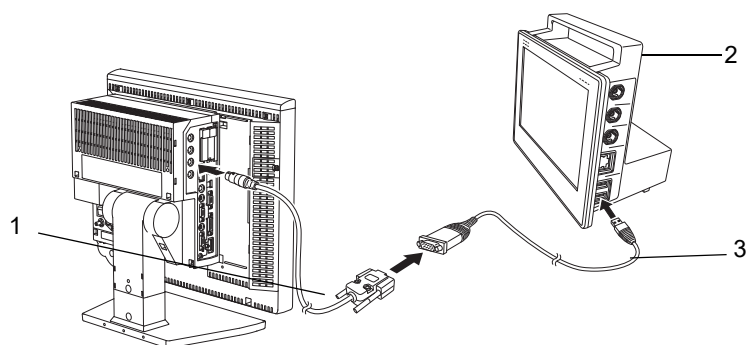
- 1 CJO-19RS5
- 2 PiCCO



□ Connection of PulsioFlex

1 Connect the PulsioFlex to the DS-8500 system.

- 1 CJ-725
- 2 PulsioFlex
- 3 USB-to-RS-232C Connector Cable (UC-232A, ATEN)



External Device Setup

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

REFERENCE

- ♦ Refer to the following procedure. (☞ "External Device Setup" P4-16)

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-800/810 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 MGU-810 series, spirometry measurement can be additionally monitored.

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

⚠ CAUTION

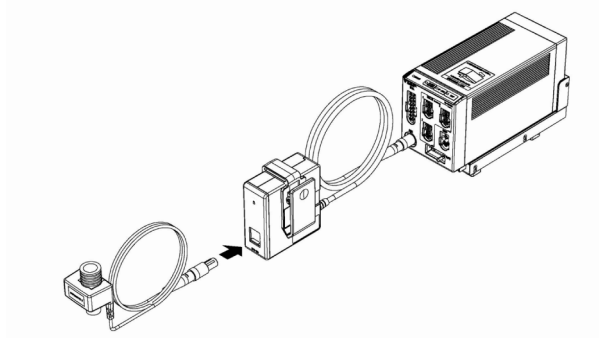
- ♦ Ventilator and Multigas Unit (MGU-810 series) cannot be connected simultaneously.
- ♦ The Anesthesia Delivery System (FLOW-i) and Multigas Unit (MGU-800/810 series) cannot be connected simultaneously.

Connecting the Capnostat 5

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

In Case of HPD-800/HCP-810

Connect to the AUX connector of the HS-8000.



*Mainstream Method
Capnostat 5 (Philips)*

Connecting the Sampling Line (Covidien)

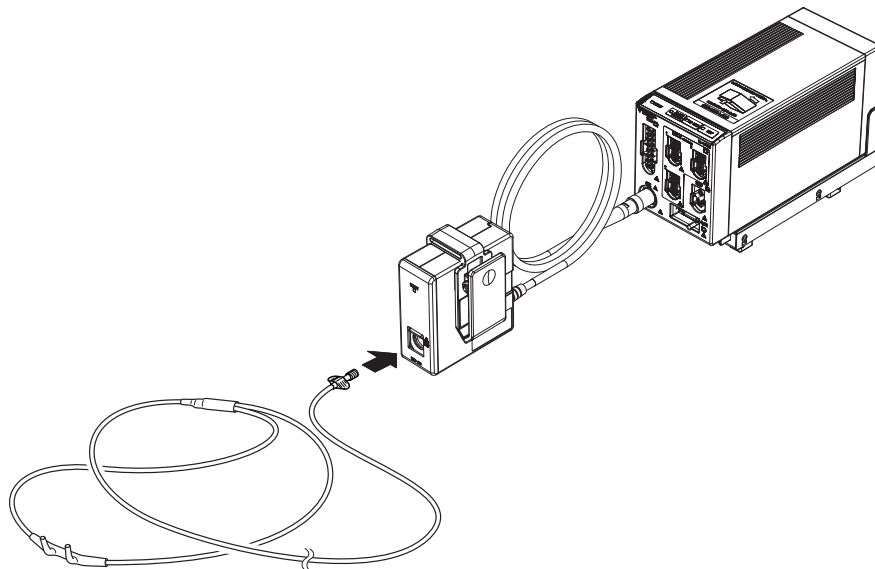
By connecting the FilterLine CO₂ sampling line series using the CO₂ Gas Unit (HCP-800/HCP-810), CO₂ concentration measured by intubation or non-intubation can be monitored.

In Case of HCP-800

Connect to the AUX connector of the HS-8000.

In Case of HCP-810

Connect to the AUX connector of the HS-8000.



*Sidestream Method
(Microstream technology developed by Covidien is used.)*

CO₂ Source Priority

When MGU-800 and HS-8000 or DS-8007 are connected simultaneously, the CO₂ source to prioritize the measurement can be set.

REFERENCE

- The setup can be performed on the "Gas" menu.
(☞ Operation Manual "Multigas Unit Data Setup (Multigas Concentration/Spirometry)" P7-86)

Multigas Unit/ Spiro Unit Selection

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

REFERENCE

- Refer to the following procedure. (☞ "External Device Setup" P4-16)

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		

By connecting the BISx (Covidien), the patient's recovery from anesthesia can be verified by BIS (Bispectral Index) value.

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.
- When using the BIS monitor and BISx at the same time, the data display of BISx will be prioritized.

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.
-

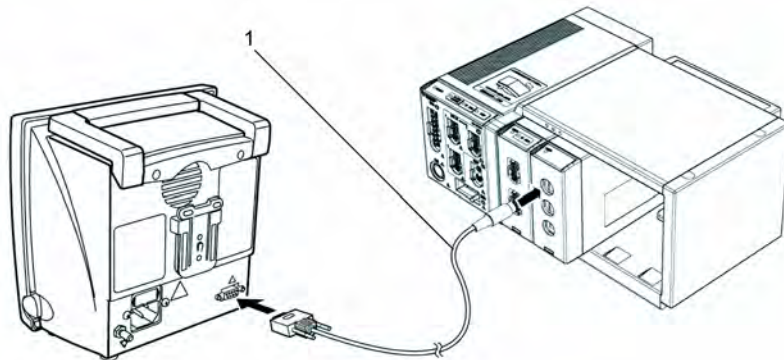
Connecting to the Main Unit:

- 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

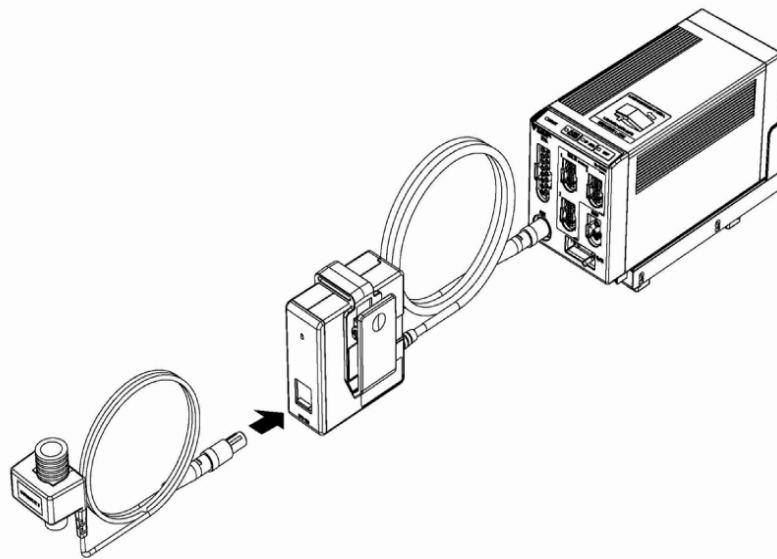
To display the BIS monitor data, external device setup is required.

REFERENCE

- ♦ Refer to the following procedure. (☞ "External Device Setup" P4-16)
-

Connecting the BISx (Covidien)

By connecting the BISx module (Covidien) using the HBX-800 BIS I/F Unit, BIS data can be monitored. The HBX-800 can be connected to the AUX connector of the HS-8000 or DS-8007.



HBX-800 and HS-8000

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 CJ-406RI-70Vigi

CAUTION

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

Connecting to the INVOS

- 1 Connect the INVOS 5100C to the serial connector or status 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.

REFERENCE

- ♦ Refer to the following procedure. (☞ "External Device Setup" P4-16)

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 Delivery 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 the 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 alarm will not be generated on the DS-8500 System.

CAUTION

- ♦ The operation of anesthesia delivery system should be performed by well-trained and authorized personnel.
- ♦ When connecting the DS-8500 System and the anesthesia delivery system, use only the specified connection cable.
- ♦ Make sure that the anesthesia delivery 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 delivery system is turned OFF.

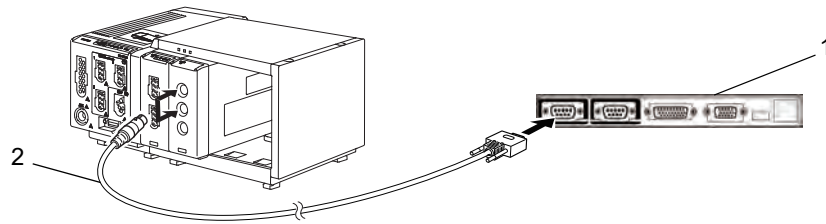
Connection with the FLOW-i

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 delivery system to be connected.

REFERENCE

- Refer to the following procedure. (☞ "External Device Setup" P4-16)

Transcutaneous Blood Gas Monitor Data Input

By connecting the transcutaneous blood gas monitor, TCM4 or TCM 5 FLEX (Radiometer Medical ApS) to the DS-8500 System, transcutaneous blood gas data can be monitored.

Transcutaneous Blood Gas Monitor	Connection Cable	
	For Status II Connector	For Serial Connector
TCM4	(Connection not possible)	CJ-726 (x1)
TCM5 FLEX	(Connection not possible)	CJ-725 (x1)

The software version of the transcutaneous blood gas monitor that can be connected to the DS-8500 System is as follows.

- TCM4: 3.04
- TCM5 FLEX: 1.18

CAUTION

- When connecting the DS-8500 System and the transcutaneous blood gas monitor, use only the specified connection cable.
- Make sure that the transcutaneous blood gas monitor 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 transcutaneous blood gas monitor is turned OFF.

Connecting the Transcutaneous Blood Gas Monitor

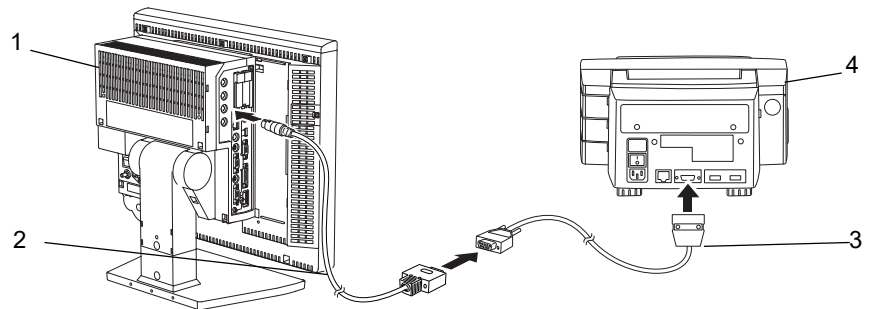
CAUTION

- Only one transcutaneous blood gas monitor can be connected to each DS-8500 System. Do not connect more than one transcutaneous blood gas monitors.

☐ In case of TCM4:

1 Use the CJ-726 connection cable and the cable specified by Radiometer Medical ApS to connect the TCM4 to the serial connector on the DSC-8500.

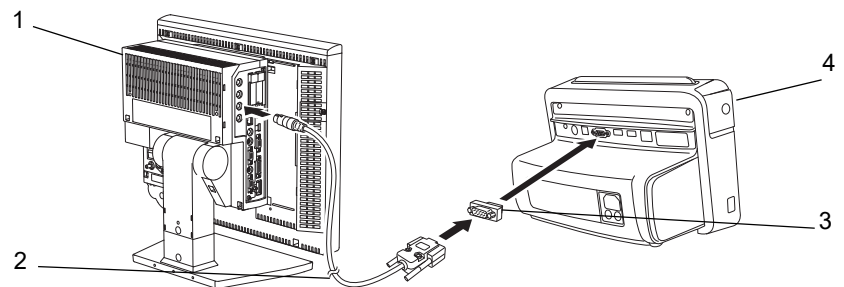
- 1 DSC-8500
- 2 CJ-726
- 3 Cable specified by Radiometer Medical ApS
- 4 TCM4



☐ In case of TCM5 FLEX:

1 Use the CJ-725 connection cable and the D-sub 9-pin male to male gender changer to connect the TCM5 FLEX to the serial connector on the DSC-8500.

- 1 DSC-8500
- 2 CJ-725
- 3 D-sub 9-pin male to male gender changer
- 4 TCM5 FLEX



External Device Setup

To monitor the transcutaneous blood gas monitor data, it is necessary to select the transcutaneous blood gas monitor to be connected.

REFERENCE

- ♦ Refer to the following procedure. (☞ "External Device Setup" P4-16)

Setup for the External Device Connection

This section explains about the external device connection setup.

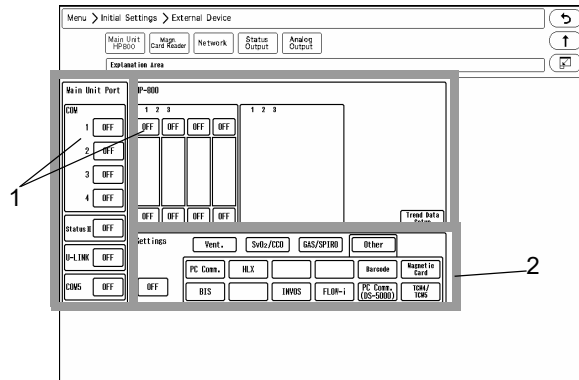
External Device Setup

- 1 Press the [Menu], [Initial Settings], [External Device] keys.
 - ▶ The "External Device" 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.

- [Vent.]: SV-900, SV-300, SERVO-i/s, SERVO-U/n/air, PB, Evita
- [SvO₂/CCO]: Vigilance, PiCCO, PulsioFlex
- [GAS/SPIRO]: MGU-800, MGU-810
- [Other]: PC Comm., HLX, Barcode, Magnetic Card, BIS, INVOS, FLOW-i, PC Comm. (DS-5000), TCM4/TCM5



Selectable External Device for Each Port

Port	Selectable External Device
COM1 to COM4	Vigilance, PiCCO, PC Comm., HLX, Barcode, Magnetic Card, BIS, INVOS, Flow-i, PC Comm. (DS-5000), PulsioFlex, TCM4/TCM5
Status II	SV-900, SV-300, SERVO-i/s, SERVO-U/n/air, Velia, Ultra, Astral, PB, Evita, Vigilance, PiCCO, BIS, INVOS, FLOW-i
U-LINK	MGU-800, MGU-810
HP-800	SV-900, SV-300, SERVO-i/s, SERVO-U/n/air, Velia, Ultra, Astral, PB, Evita, Vigilance, PiCCO, BIS, INVOS, FLOW-i

NOTE

- When connecting the cable, make sure that the power of this system and the external device is turned OFF.
- When the external device setup is changed, make sure that this system and the external device is properly communicating.
- If communication with the external device is already established through the corresponding port, it is necessary to disconnect the communication in order to change the selection on this menu.
- When connecting the VELIA, ASTRAL, VS ULTRA, select [SV-900] under [Ventilator].
- The external devices other than Vigilance, BIS, INVOS cannot be set to multiple ports. If the setting is duplicated, the other port will be automatically set to [OFF].
- If the same external device is set to multiple ports, it may take time to identify the device.
- Vigilance, PiCCO, and PulsioFlex cannot be used simultaneously.
- FLOW-i and MGU-800/MGU-810 cannot be used simultaneously.
- FLOW-i and ventilator cannot be used simultaneously.

- ♦ Ventilator and MGU-810 cannot be used simultaneously.
- ♦ 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 using the BISx, BIS Monitor data cannot be input.
- ♦ 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.
- ♦ For the HP-800 and the main unit port, the setting needs to be different.
- ♦ Make sure to power cycle the main unit when the HP-800 setting is changed.
- ♦ When [Magnetic Card] is selected, perform further settings on the "Magnetic Card Reader" setup menu.
- ♦ When [HLX] is selected, perform telemetry setup (channel ID, etc.) on the "Telemeter" setup menu.
- ♦ The external device parameters to be displayed on the graphic trend/tabular trend needs to be selected in advance on the "Trend Data Setup" window ([Data Review>Graphic Trend or Tabular Trend] or [Initial Settings>External Device>Main Unit/HP-800]).
- ♦ When [TCM4/TCM5] is selected, only TCM4, TCM5 FLEX can be connected. Other TCM series device cannot be connected.

Unit Module Setup

□ Multiparameter Connector Setup

On the "Multiplier" setup menu, the parameter to measure on each multiparameter connector can be set.

When the Input Box is not connected, the measuring parameters will be automatically set by connecting the relay cable to the multiparameter connector on the HS-8000 or DS-8007.

If the Input Box is connected with the HM-800 Multi Module, it is necessary to manually set the measuring parameter for each multiparameter connector.

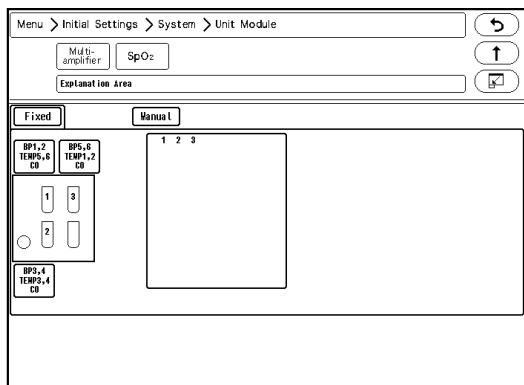
NOTE

- ♦ When the DS-8007 is used, the temperature measured on temperature jack is fixed as T1, T2.
-

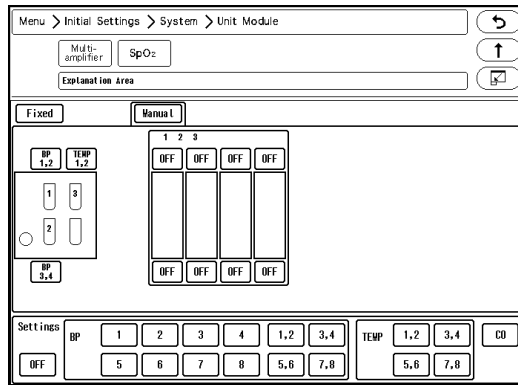
1 Press the [Menu], [Initial Settings], [System], [Unit Module] keys.

▶ The "Multiplier" setup menu will be displayed.

When the HS-8000 is used

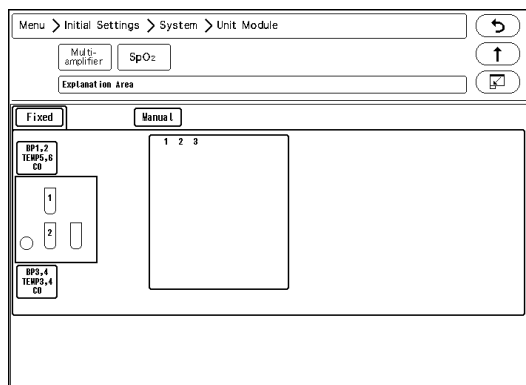


When [Fixed] is selected

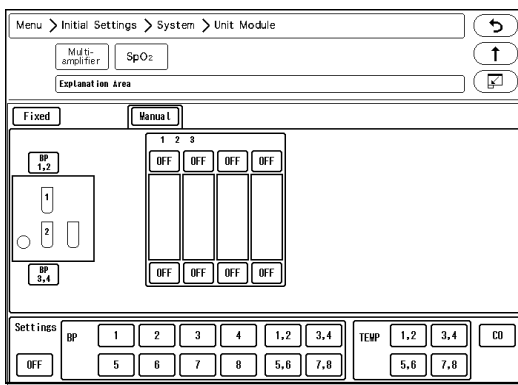


When [Manual] is selected

When the DS-8007 is used



When [Fixed] is selected



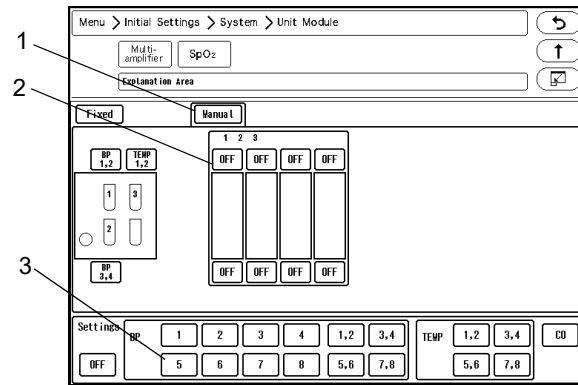
When [Manual] is selected

2 Select from [Fixed]/[Manual].

- ▶ [Fixed]: The parameter will be automatically fixed according to the actual cable connection. This selection is possible only when HS-8000 or DS-8007 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" P7-109)

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

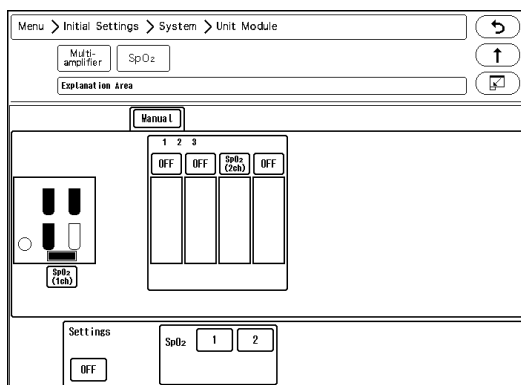
- ♦ The same parameter cannot be set to more than one connectors.
- ♦ By setting [OFF] for the unused connector, the parameter will become selectable on another connector.
- ♦ If the parameter assigned to the multiparameter connector and the connected relay cable does not match, the connector location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

SpO₂ Connector Setup

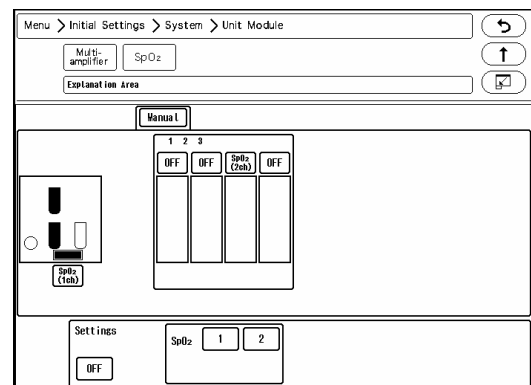
When using the SpO₂ Module (HG-810/HG-820), it is necessary to set the SpO₂ channel manually.

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

- ▶ The SpO₂ setup window will be displayed.



When the HS-8000 is used

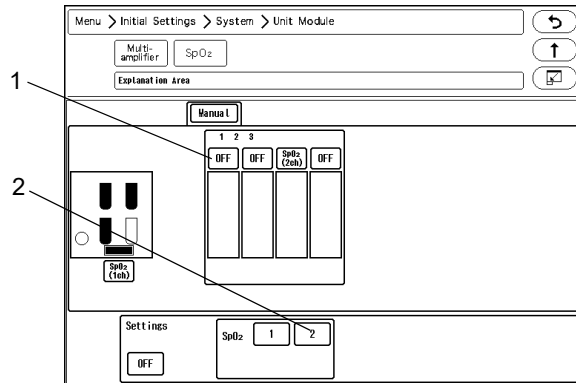


When the DS-8007 is used

2 SpO₂ channel can be assigned to any module.

Example:

To measure 1 channel of SpO₂ on the HS-8000, 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 only the second channel.
- If the channel setting is duplicated, one of the settings will be turned OFF.

Software Upgrade for Unit/Module

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

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

▶ The "Module Install" menu will be displayed.

NOTE

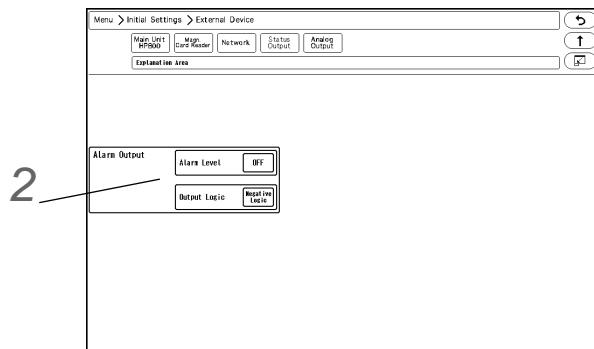
- Users should not perform the software update for the unit or module. To update the software, contact your nearest service representative.

Status 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 menu 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 440 ms cycle will be output.

NOTE

- ◆ Refer to "Status I/O Signal (Status II Connector)" P6-38 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 HS-8000, DS-8007 is capable to output the analog ECG and BP waveform.

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

On the "Analog Output" setup menu, initial settings for display/printing can be performed.

□ When the HS-8000 is used

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

▶ The "Analog Output" setup menu will be displayed.

2 Set the ECG waveform lead.

1 Select from [Disp. Lead]/[Selected Lead].

2 When [Selected Lead] is selected, press the key for "Output Lead Sel." to select the output lead.
Select from [I]/[II]/[III]/[aVR]/[aVL]/[aVF]/[V1]/[V2]/[V3]/[V4]/[V5]/[V6].

3 Select the IBP waveform to output from the HS-8000.

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

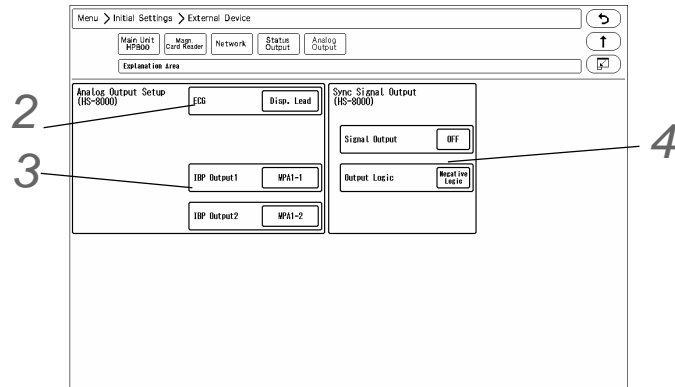
4 Set the synchronized signal output.

1 Press the key for "Signal Output", and select from [HR]/[RR].

- ▶ [HR]: Synchronized signal based on HR source (ECG, BP, SpO₂) will be output.
- ▶ [RR]: Synchronized signal based on RR source (impedance) will be output.

2 Set the "Output Logic".

- ▶ [Positive Logic]: Positive synchronized signal will be output.
- ▶ [Negative Logic]: Negative synchronized signal will be output.



REFERENCE

- ♦ Refer to the operation manual of the HS-8000 Super Unit for connector pin assignments of the output signal.

□ When the DS-8007 is used

The setting items are different for the DS-8007 and HS-8000.

1 When the DS-8007 is used, the screen shown on right will be displayed.

2 Set the "Analog Synchronized Signal Output".

- ▶ Select from [ON]/[OFF].

3 Set the "Analog Output 1", "Analog Output 2".

- ▶ Select from [Selected ECG Lead]/[Displayed ECG Lead]/[Multiparameter Connector 1-1]/[Multiparameter Connector 1-2]/[Multiparameter Connector 2-1]/[Multiparameter Connector 2-2].

- ▶ When [Selected ECG Lead] is selected, press the key for "Output Lead Sel.". Select from [I]/[II]/[III]/[aVR]/[aVL]/[aVF]/[V1] to [V6].

4 Set the "Analog Output 3".

- ▶ Select from [Selected ECG Lead]/[Displayed ECG Lead]/[Multiparameter Connector 1-1]/[Multiparameter Connector 1-2]/[Multiparameter Connector 2-1]/[Multiparameter Connector 2-2]/[Sync. Signal].

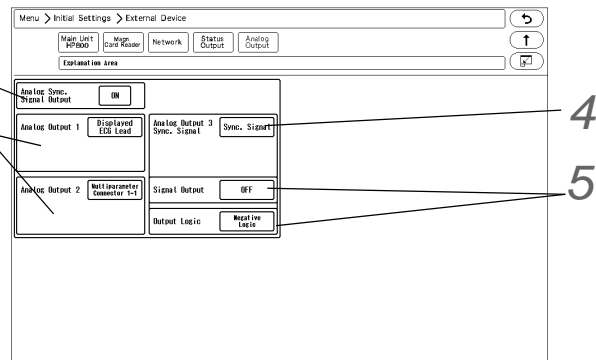
5 When [Sync. Signal] is selected, select also the output signal.

1 Press the key for "Signal Output", and select from [HR]/[RR].

- ▶ [HR]: Synchronized signal based on HR source (ECG) will be output.
- ▶ [RR]: Synchronized signal based on RR source (impedance) will be output.

2 Set the "Output Logic".

- ▶ [Positive Logic]: Positive synchronized signal will be output.
- ▶ [Negative Logic]: Negative synchronized signal will be output.



NOTE

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

Using the Magnetic Card Reader

This section explains the connection and setup procedure for the magnetic card reader.

By using the magnetic card reader, patient information can be automatically entered from the magnetic card at patient admittance.

(☞ Operation Manual "Entering Patient Information from the Magnetic Card" P5-5)

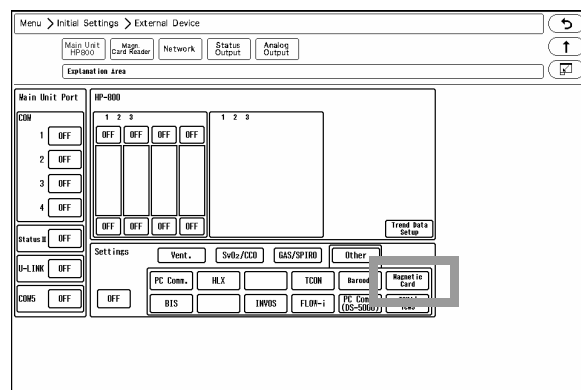
Connecting the Magnetic Card Reader

- 1 Connect the cable of the magnetic card reader to the conversion cable (CJ-756).
- 2 Connect the other end of the conversion cable to the serial connector (COM1 to 4) on the left side of the main unit.

Magnetic Card Reader Setup

The initial settings for the magnetic card reader can be performed.

- 1 Press the [Menu], [Initial Settings], [External Device] keys.
 - ▶ The "External Device" setup menu will be displayed.
- 2 Select the port (COM1 to 4) for the magnetic card reader.
- 3 Select [Magnetic Card Reader] in the [Other] category.

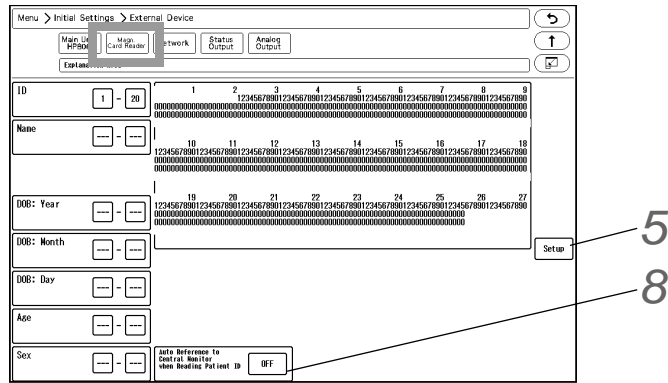


Since the data formats of magnetic card vary for each institution, it is necessary to set the digit location of each information.

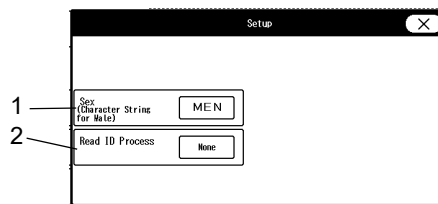
For the items that needs to be read, perform the setup following the procedure 4 to 7. This setup is not necessary for the items not required to be read.

- 4 Press the [Magnetic Card Reader] key.

- ▶ The "Magnetic Card Reader" setup menu will be displayed.



- 5 Press the [Setup] key to preconfigure the magnetic card reader. The character strings to indicate birth date, sex, etc., can be set.



- 1 Press the key for "Sex" to display "Character String for Male" window. Enter the character string for male (max. 3 characters) used on the magnetic card.
- 2 Set the "Read ID Process".
 - ▶ [None]: The whole patient ID will be read as the patient ID.
 - ▶ [Numeric]: Only the numerics will be read as the patient ID.
 - ▶ [Alphanumeric]: The numerics and alphabets will be read as the patient ID.

- 6 Analyze the starting and ending digit of the data read from a magnetic card.

NOTE

- ♦ The procedure to analyze the data read from the magnetic card is explained below.
- ♦ If not analyzing the data on the magnetic card, proceed to step 7.

REFERENCE

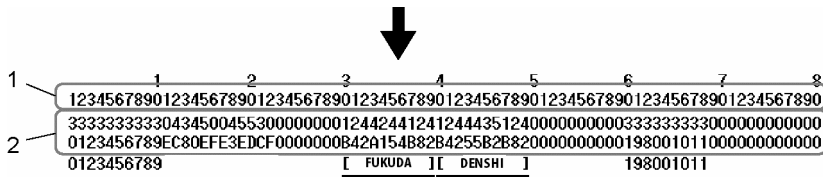
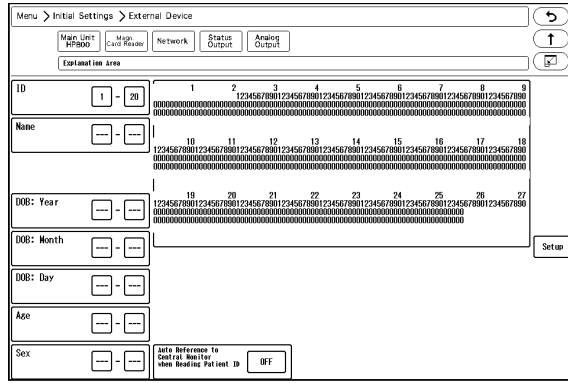
- ♦ On the "Magnetic Card Reader" setup menu, starting and ending digit of each data such as [ID], [DOB: Year] can be set.
- ♦ From: Starting digit number of the data to be read from the magnetic card
- ♦ To: Ending digit number of the data to be read from the magnetic card.

REFERENCE

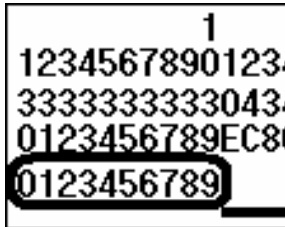
- ♦ The analyzing procedure is explained using the example of patient data below.
 Patient ID:0123456789
 Patient Name: FUKUDA DENSHI
 Date of Birth: Jan. 1, 1980
 Sex: Male

- 1 While the first page of the "Magnetic Card Reader" setup menu is displayed, scan the magnetic card.
 - ▶ At the first and second row, the data read from the card will be displayed in hexadecimal. At the third

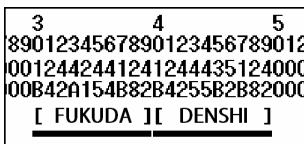
row, the characters converted from the data will be displayed.



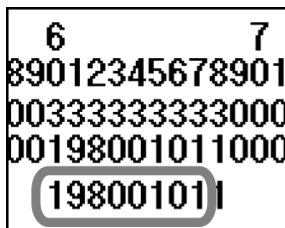
2 From the displayed result, specify the data position.



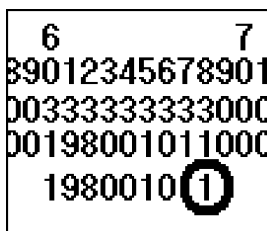
The patient ID, "0123456789" is displayed at 1st to 10th digit.



The patient name, "(Fukuda) (Denshi)" is displayed at 30th to 49th digit. Depending on the length of patient name, up to 59th digit may be used. "()" should be also included in the digit range.



The date of birth, "19800101" is displayed at 27th to 34th digit.



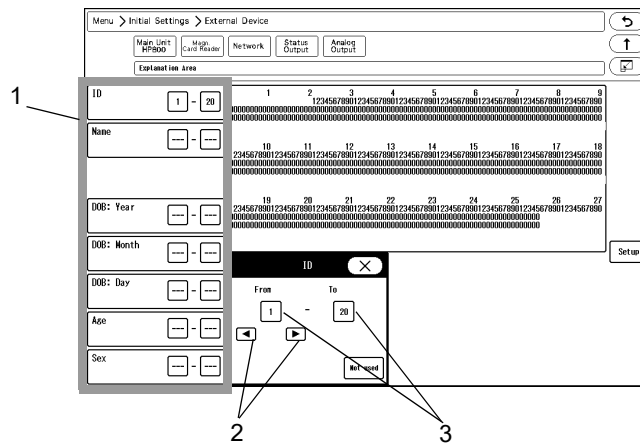
"1" which is displayed at the 68th digit can be estimated as the character string for male. It will be more definite if compared with the data of female.

3 The setup will be performed with the analyzed result.

NOTE

- After the setup, check if the data of other patient's card can be correctly read.

7 Enter the starting digit and ending digit for each data.



- Select the item to enter from the list displayed at left.
- Enter the starting digit or ending digit in the range of 1 to 255 using the left or right button.
- Press the [1] key for "From" or the [20] key for "To".

REFERENCE

- If the data is not present on the magnetic card, enter [Not Used] for both starting and ending digit.

- Repeat step 1 to 3.

8 Set the "Auto Reference to Central Monitor when Reading Patient ID".

- ▶ [ON]: Patient information can be automatically acquired from the central monitor using the magnetic card.
- ▶ [OFF]: Patient information cannot be received.

REFERENCE

- To use this function, select [Enable] for "Search ID" under [Initial Settings > System > Other].

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.

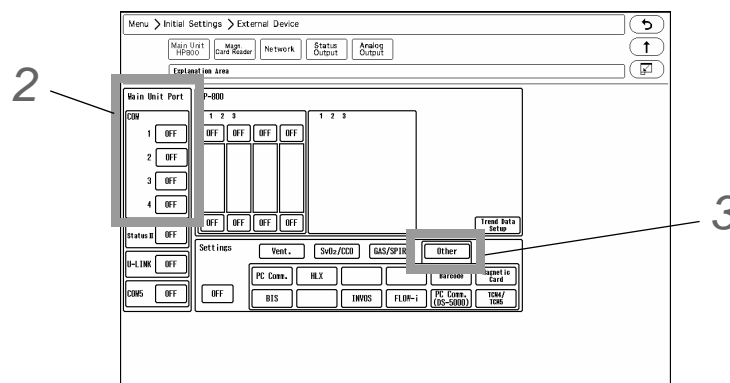
Connection with the System

- 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 the setup procedure for the laser printer.

There are two ways to print on the laser printer.

- ◆ Printing on the laser printer connected to the TCP/IP network
(Connects to the LAN (TCP/IP) Connector.)
- ◆ Printing on the laser printer connected to the central monitor
(Only when connected to DS-LAN III network)

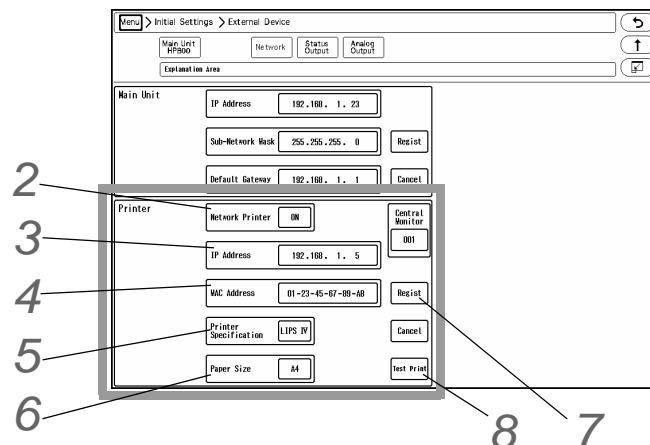
Laser Printer Setup

□ 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.

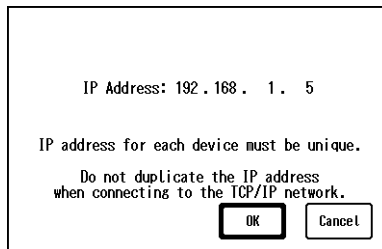
5 Select the printer specification.

- ▶ [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.

CAUTION

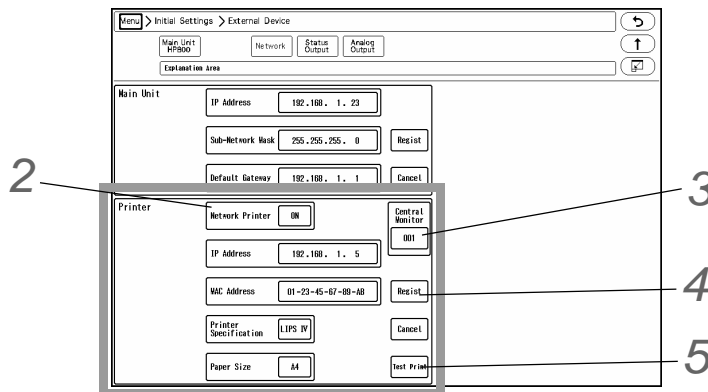
- ♦ If the output characters are garbled, printer specification may be incorrectly selected. Refer to the operation manual of the printer and check the printer specification.

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.

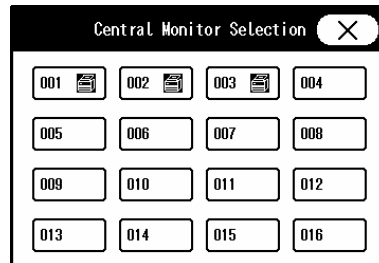


2 Select [DS-LAN] for "Network Printer".

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, central monitor printer output will be prioritized over the laser printer output. If the central monitor printer output is started during the laser printer output, the laser printer output will resume after the central monitor 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.
Measurement	User Label	User label settings for BP and TEMP
	Unit	Measurement unit settings for CO ₂ , BP, CVP, TEMP, ST, Height/Weight
	Other	Other settings such as arrhythmia analysis filter, etc.
User I/F	Display/Print	Display and print settings such as date format, BP alarm limit 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 Port/HP-800	Settings for external device connectors such as serial port, Status II connector, U-Link connector.
	Magnetic Card Reader	Settings for magnetic card reader
	Network	Network settings for laser printer.
	Status Output	Settings for alarm output.
	Analog Output	Settings for analog output, synchronized signal 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 multi-amplifier connector, SpO ₂ channel.
	Other	AC filter, Extended Display Unit, 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.
Administrator Setup	Key Lock	Settings of key lock level for display and setting
	Password Setup	Settings for password and administrator

Administrator Setup

This section explains about the "Administrator Setup" menu.
The "Administrator Setup" is composed of [Key Lock] and [Password Setup].

NOTE

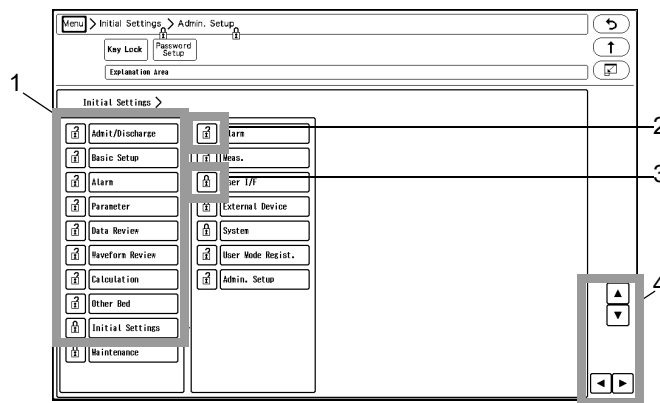
- To display the administrator setup menu, a password is required. There are 3 levels of password with different operation authorization. With higher level password, the lower level settings can be changed.
- For details of the password, contact Fukuda Denshi service representative.

Key Lock

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

2 Enter the password.

▶ The "Key Lock" menu will be displayed.



- 1 The lower level items will be displayed.
- 2 This indicates unlocked item. It is displayed in white.
- 3 This indicates locked item. To change the setting, an authorized password is required. There are 3 levels of password which are distinguished by the color of the icon. The level is in the order of red>yellow>green. For example, the following operation is possible. Red: Manager > Yellow: Administrator > Green: User
- 4 The page will switch.

REFERENCE

- Maximum of 3 types of password can be set for the administrator which can individually lock the setting with each password.
- The items that can be 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

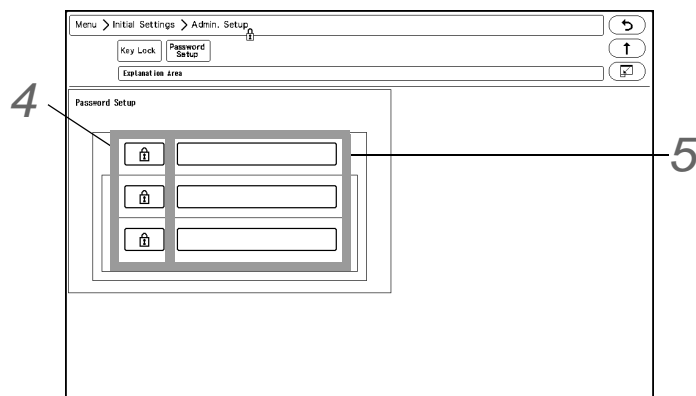
- ◆ The default passwords are set as follows.
Red Key: 11111111
Yellow Key: 22222222
Green Key: 33333333
- ◆ Before using the equipment, make sure to change the password.
- ◆ For details of the password, contact Fukuda Denshi Service Representative.

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.



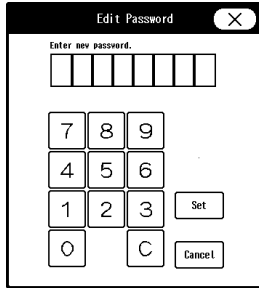
4 Enter the password.

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.

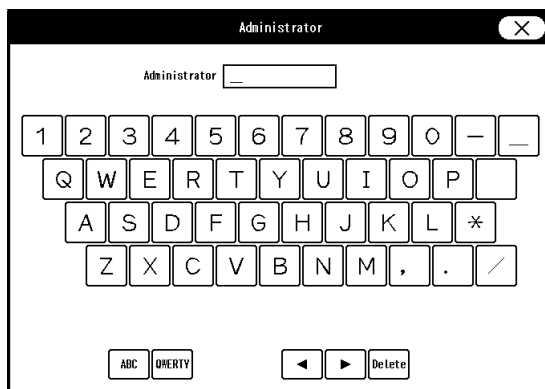
- 5 Set the administrator name.

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

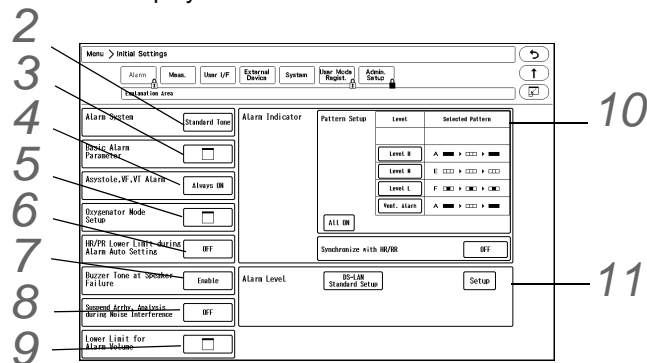
- ♦ Maximum of 8 characters can be set for the administrator name.

Alarm Related Setup

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

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

- ▶ The alarm setup menu 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".

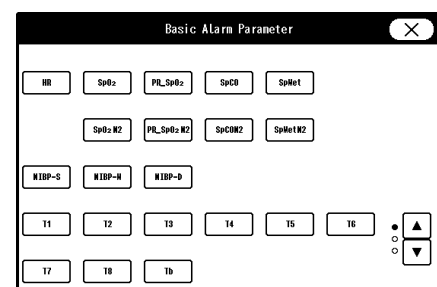
- ▶ The "Basic Alarm Parameter" window will be displayed.

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 **X**.

- ▶ 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 can be turned ON or OFF.
- ▶ [Check when OFF]: When turning OFF the arrhythmia alarms, a confirmation window will be displayed.

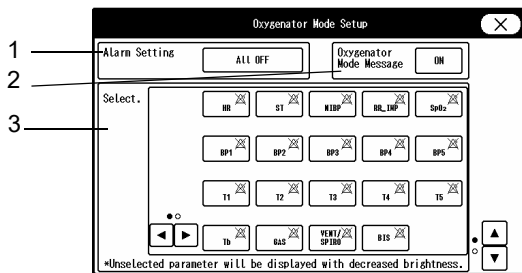
5 Set the "Oxygenator Mode Setup" .

WARNING

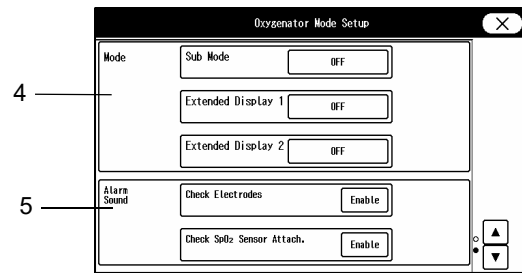
- ♦ The oxygenator mode is intended to prevent alarms during cardiopulmonary bypass surgery. Pay special attention when using this mode as the alarm generation will not be the same as to the standard monitoring mode.
- ♦ If the "Alarm Setting" under the Oxygenator Mode Setup is set to [All OFF], all 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.



Page 1



Page 2

1 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.

2 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.

- 3 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.
- 4 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.
- 5 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".

- ▶ None: No limit will be set.
- ▶ 30 bpm: When the auto alarm is set and the lower limit is below 30 bpm, the lower limit will be fixed to 30 bpm.
- ▶ 40 bpm: When the auto alarm is set and the lower limit is below 40 bpm, the lower limit will be fixed to 40 bpm.

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 is malfunctioning.
 - ◆ 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 (5 sec.) 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 menu.

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 menu 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.

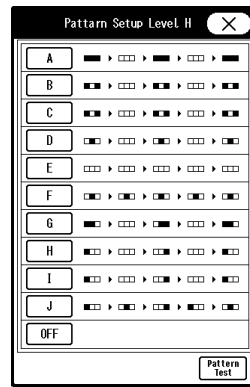
Alarm Indicator Flashing Pattern

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), (x, Blue, x), (x, Blue, x), (x, Blue, x), (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 alarm indicator will flash in green 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 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].

(👉 Operation Manual "Vital Alarm Message" P11-1)

(👉 Operation Manual "Vital Alarm Message (DS-LAN Standard Setup)" P11-4)

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

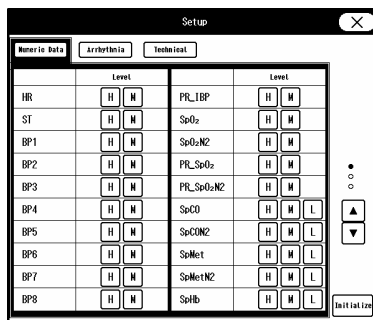
REFERENCE

- ◆ 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, OFF according to the priority. ("S" is the

highest priority alarm.)

1 Press the [Set] 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.

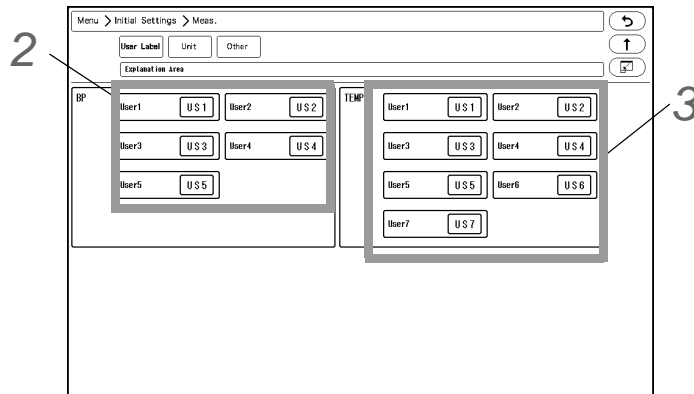
Measurement Related Setup

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.

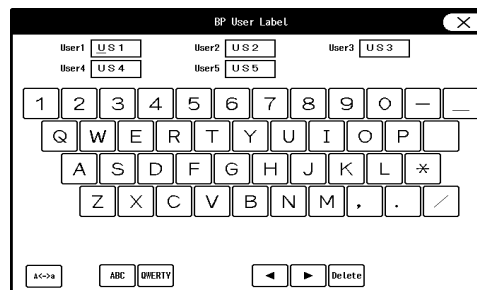
▶ The user label setup screen will be displayed.



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.

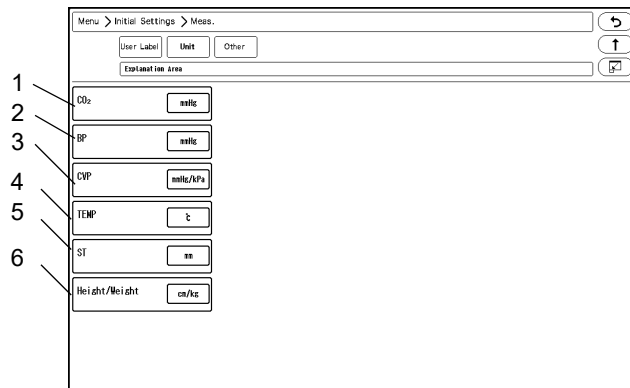
Measurement Unit

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

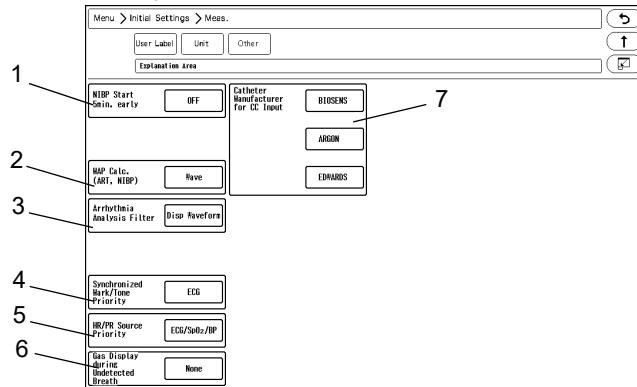
- ♦ When the BP, CVP unit is changed, the tabular/graphic trend data with the previous measurement unit will be deleted. Also, when the unit is changed, it is necessary to perform the alarm setup for the new measurement unit.
- ♦ The measurement unit of tcpO₂, tcpCO₂ can be set on the TCM4 or TCM5 FLEX. When the measurement unit is changed, the tabular trend data of tcpO₂ and tcpCO₂ on the bedside monitor will be deleted.

Other Setup

On the "Other" menu, other measurement related settings can be performed.

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

- ▶ The "Other" menu will be displayed.



- 1 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. This system outputs the data at completion of NIBP measurement, and 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.

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

NOTE

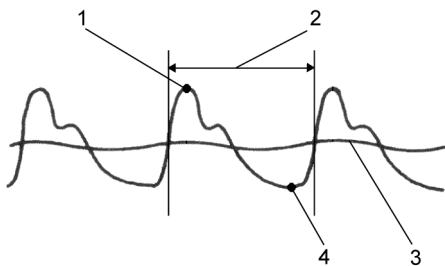
- This setting will be disabled when [Meas.] is set for "Periodic Measurement Starting Time" on the NIBP setup menu.

- 2 The mean blood pressure 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 = (Systolic BP + Diastolic BP x 2) / 3

[Wave]: In case of NIBP, maximum amplitude of oscillograph will be the mean value (MAP). In case of BP, the following measurement will be performed.

Example of BP Measurement



- 1: Systolic BP
- 2: HR interval
- 3: Mean BP (MEAN)
- 4: Diastolic BP

- 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 Hz to 40 Hz.

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 Hz to 40 Hz which is the same with [Fixed].

- 4 Set the "Synchronized Mark/Tone".

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

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

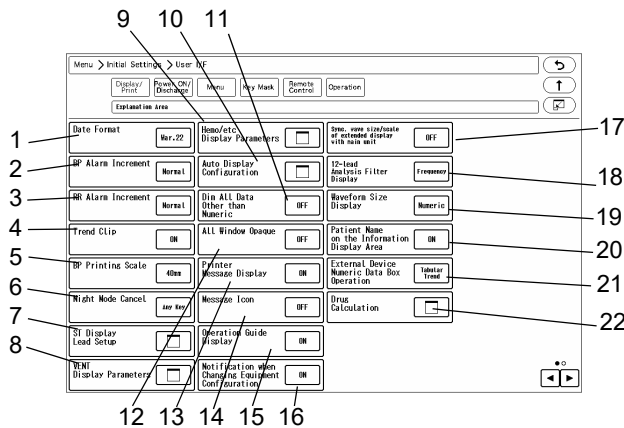
- 5 Set the display priority of the parameter to be displayed inside the HR/PR numeric data box.
 This priority setting will be applied when [Auto] is selected for "HR/PR", or when [HR/PR] user key is used to switch the HR/PR source.
 Select the priority order from the dropdown list.
 For example, if [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

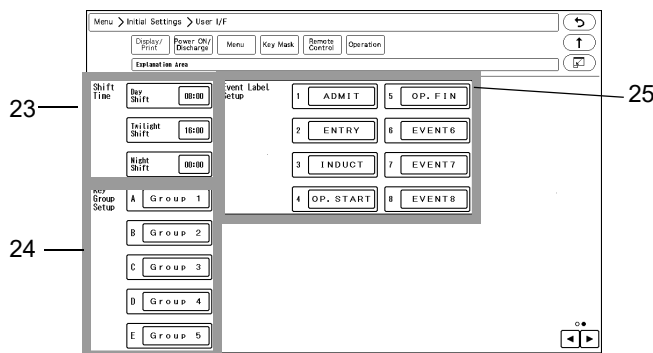
Display/Print Setup

On the "Display/Print" menu, initial settings for displaying/printing can be performed.

- 1 Press the [Menu], [Initial Settings], [User I/F] keys.
 - ▶ The "Display/Print" setup menu will be displayed.



Page 1



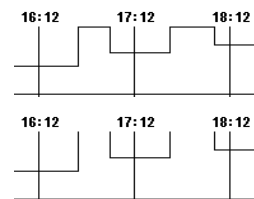
Page 2

- 1 The selected format will be applied to display and printing.
- 2 Select the BP alarm increment from [Normal] or [Small].

	[Normal]	[Small]
0 mmHg to 50 mmHg	2 mmHg increment	1 mmHg increment
55 mmHg to 300 mmHg	5 mmHg increment	
0 kPa to 7 kPa	0.2 kPa increment	0.1 kPa increment
7.5 kPa to 40.0 kPa	0.5 kPa increment	

- 3 Select the RR alarm increment from [Normal] or [Small].
 [Normal]: 5 Bpm (Adult), 2 Bpm (Child, Neonate)
 [Small]: 1 Bpm
- 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.

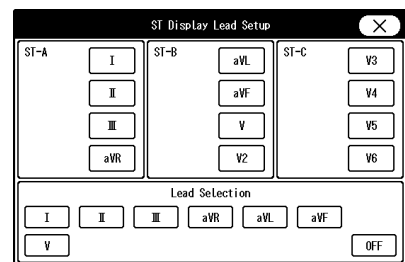
[ON]: The exceeded portion will be displayed in straight line at the upper or lower limit.



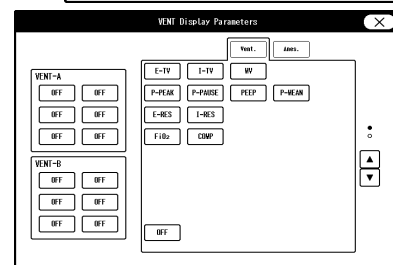
[OFF]: The exceeded portion of the vertical axis scale will not be displayed.

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

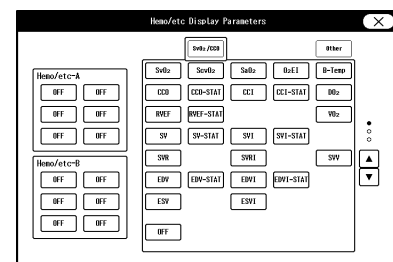
- 7 The ST lead to be displayed for ST-A to ST-C can be set.
 Set the lead to the key displayed in blue.



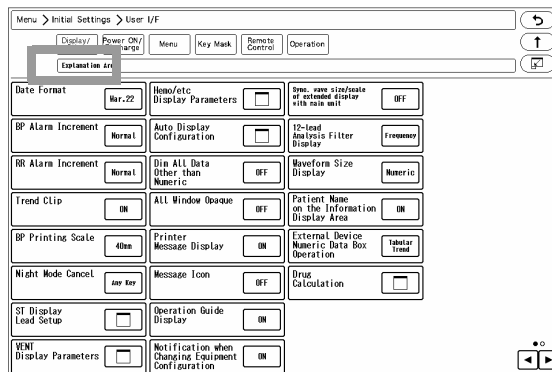
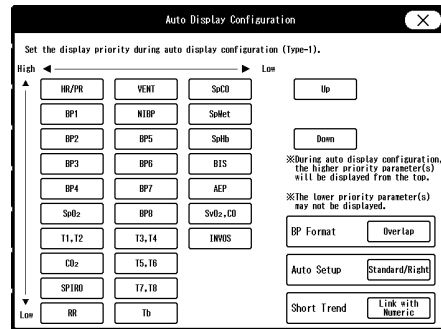
- 8 VENT Display Parameters
 The parameters to be displayed for VENT-A, VENT-B numeric data box can be set.



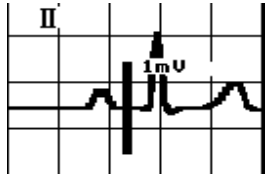
- 9 Hemo/etc Display Parameters
 The parameters to be displayed for Hemo/etc-A, Hemo/etc-B numeric data box can be set.



- 10 "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.
- 11 [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.
- 12 [OFF]: The window will become translucent allowing to view the waveform displayed behind the window. However, the key display will not become translucent.
[ON]: The window will not become translucent.
- 13 [ON]: The printer status will be displayed on the home display.
[OFF]: The printer status will not be displayed.
- 14 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.
(☞ Operation Manual "Numeric Data Box Display (for all parameters)" P3-12)
- 15 Operation Guide Display
[ON]: Operation guide message will be displayed in the window message area.
[OFF]: Operation guide message will not be displayed.



- 16 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.
- 17 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.
- 18 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.

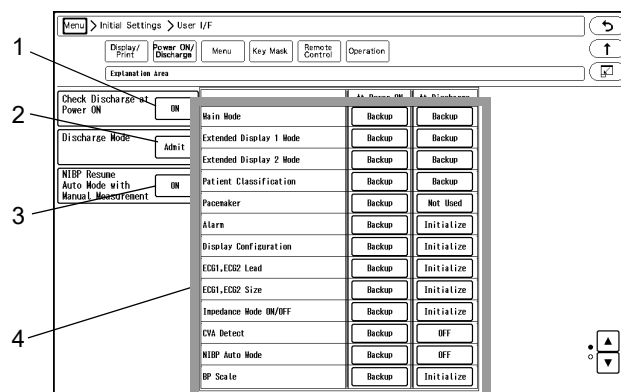
- 19 Select the display type of the waveform size.
 [Numeric]: The waveform size for the ECG, RESP, SpO₂ will be displayed in numerics.
 [Bar]: The waveform size will be indicated by a bar.
 [Bar (10mm)]: The waveform size will be indicated by a 10 mm bar. The amplitude voltage value of the corresponding waveform size will be displayed beside the bar. (shown on right)
- 
- 20 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.
- 21 External Device Numeric Data Box Operation
 [Tabular Trend]: The tabular trend will be displayed.
 [Parameters]: The parameter setup menu will be displayed.
- 22 Drug Calculation
 (☞ "Drug Calculation" P5-26)
- 23 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
- 24 Set the key group.
 8 user keys can be registered for each group. The label for the key group can be also set.
- 25 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.

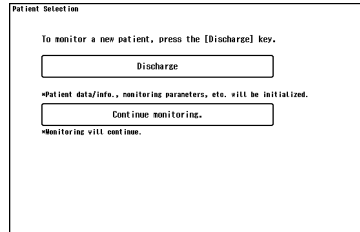
▶ The "Power ON/Discharge" setup menu will be displayed.



- 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. When the power has been turned OFF for 30 seconds or more, whether or not to display the discharge confirmation window can be selected.

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

[ON]: The discharge confirmation window will be displayed at power ON if the power has been turned OFF for 30 seconds or more.

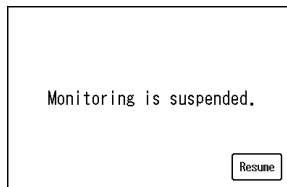


- Set the monitoring condition after the patient has been discharged.

[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

- [OFF]: At power ON and at discharge, NIBP auto mode will continue even after the patient is discharged regardless of whether the next patient is admitted or not.

[ON]: At power ON and at discharge, 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.

- 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]: Initializes the settings. 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 Settings	Initialize	The setting will be initialized with the currently selected mode.
Display Configuration	Initialize	The setting will be initialized with the currently selected mode.
ECG1, ECG2 Lead	Initialize	The setting will be initialized with the currently selected mode.

Selection other than Backup

Item	Setup	Power ON/Discharge
ECG1, ECG2 Size	Initialize	The setting will be initialized with the currently selected mode.
Impedance Mode ON/OFF	Initialize	The setting will be initialized with the currently selected mode.
CVA Detect	OFF	CVA detection will be set to OFF.
NIBP Auto Mode	OFF	NIBP auto mode will be turned OFF.
	OFF->2.5 min.	If NIBP Auto Mode is OFF, 2.5 min. interval will be set.
	OFF->5 min.	If NIBP Auto Mode is OFF, 5 min. interval will be set.
	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 process is performed, patient data such as recall and trend will be initialized. The parameter and alarm settings will be reset according to the settings made under [Menu>Initial Settings>User I/F>Power ON/Discharge).

NOTE

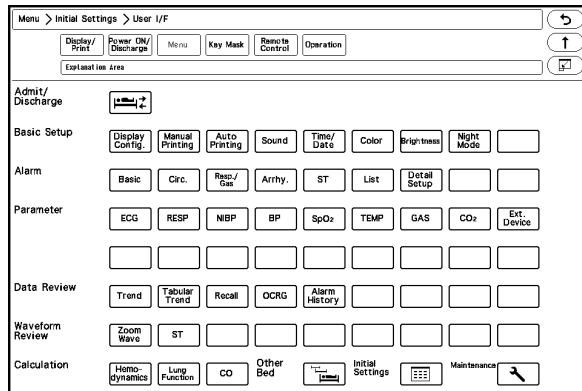
- The operation after the power is turned ON will be according to the setting made on [Initial Settings] > [User I/F] > [Power ON/Discharge]. However, if the power was turned OFF for less than 30 seconds, the setting before the power was turned OFF will remain.
- If the "Main Mode" setting is other than [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.

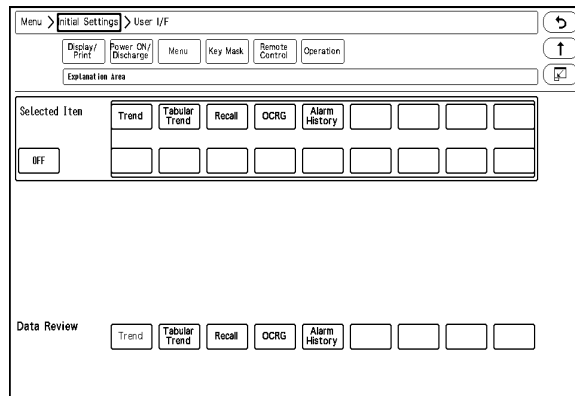
1 Press the [Menu], [Initial Settings], [User I/F], [Menu] keys.

▶ 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.

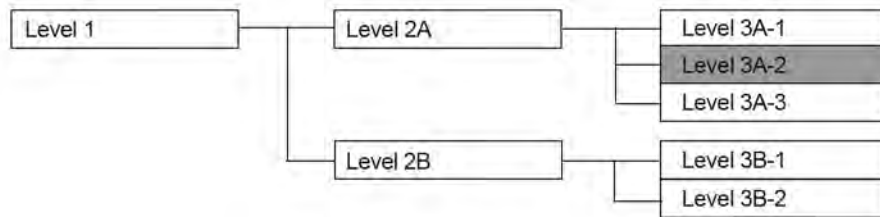
NOTE

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

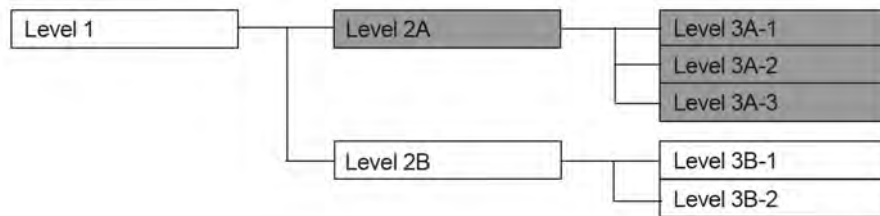
The setup items are in tree structure.

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

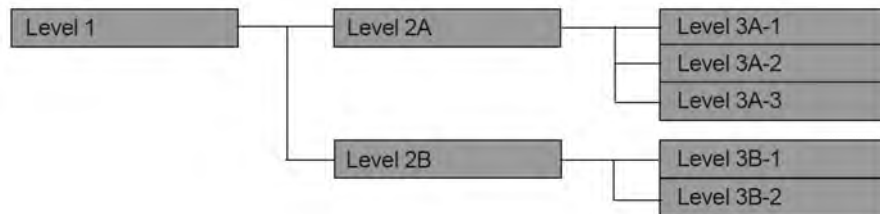
For the following tree structure, if "Level 3A-2" is masked, only this item will be masked.



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

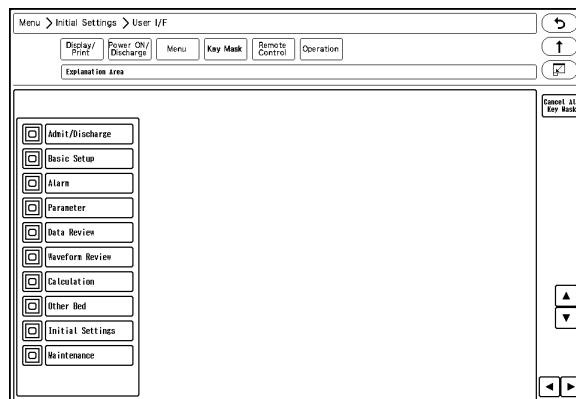


If "Level 1" is masked, the masked items will be as follows.



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

- ▶ The key mask setup screen will be displayed.

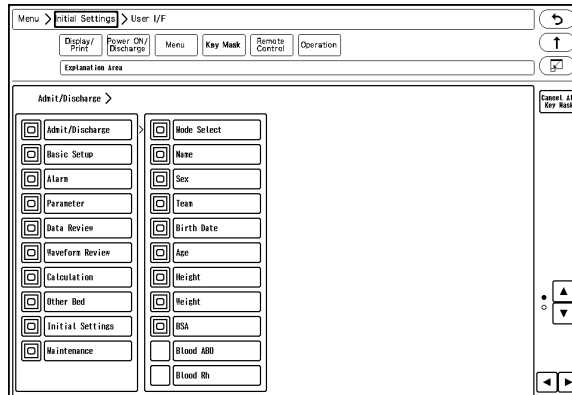


2 Select the item to perform the setting.

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.

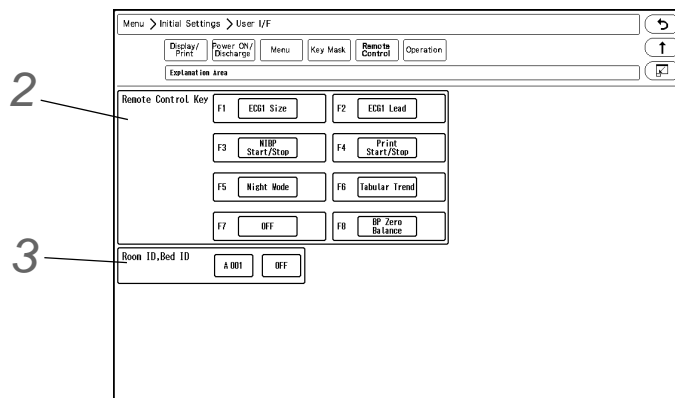
4 Press for the item to display.

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.

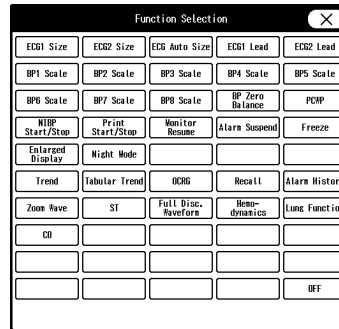
▶ The "Remote Control" menu will be displayed.



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 amplitude to 10 mm. The automatic adjustment is effective only when the key is pressed.
BP1 (to BP8) Scale	Switches the BP1 to BP8 scale each time the key is pressed. The switching scale will differ depending on the BP label. (☞ Operation Manual "BP Parameter Setup" P7-29)
BP Zero Balance	Starts zeroing for all BP. It will not function unless the transducers for all BP is opened to air.
PCWP	If the BP label is PAP, PCWP input screen will be displayed.
NIBP Start/Stop	Starts/stops the NIBP measurement. Pressing this key will display a message on the monitor to press the "Check" key. When the "Check" key is pressed, the measurement will start. Pressing this key during the measurement will stop the measurement.
Print Start/Stop	Starts/stops the manual printing. The printing duration set on the "Manual Printing" menu will be applied.
Monitor Resume	Resumes monitoring when the monitoring is suspended.
Alarm Suspend	Suspends the alarm. 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	The 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.

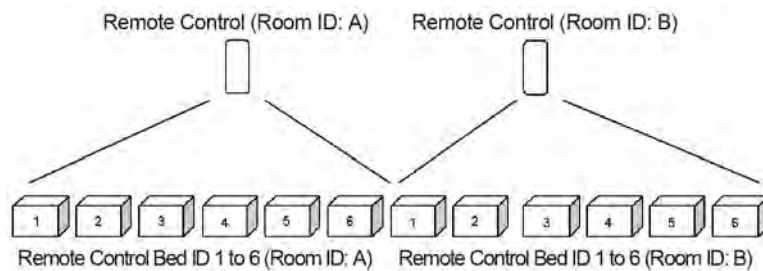
3 Set the Room ID/Bed ID.

CAUTION

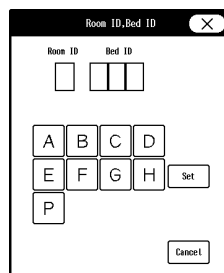
- Do not set the same remote control bed ID to multiple monitors on the same floor. Otherwise, it may cause to remote control multiple monitors at the same time.
- After the remote control setup, check that the remote control unit is properly operating.

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.

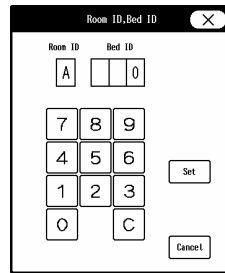


- Press the key for "Room ID, Bed ID".
 - The dropdown list will be displayed.
- Select from [ON] or [OFF].
 - [ON]: The Room ID/Bed ID setup will be enabled.
 - [OFF]: The Room ID/Bed ID setup will be disabled.
- Press the [A 000] key.
 - The "Room ID, Bed ID" window will be displayed.



- Select from [A] to [H] / [P].

- ▶ [A] to [H]: The keys to enter 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.

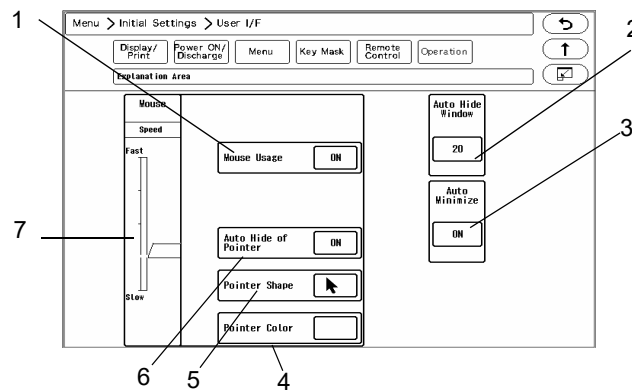
- ▶ [Set]: The entered Room ID/Bed ID will be set.
- ▶ [Cancel]: The entered Room ID/Bed ID will be canceled.

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.

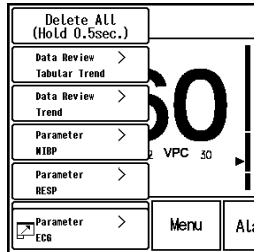


- 1 Mouse (optional) can be used for monitor operation.
[ON]: Mouse operation will be enabled when connected.
[OFF]: Mouse operation will be disabled even if connected.
- 2 Window display can be automatically closed after fixed duration.
[OFF]: Window display will not automatically close.
[5] to [60]: 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.

- 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.

- The color of the mouse pointer can be selected from black or white.
- The pointer shape can be selected from standard/large.
- 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.
- Select the moving speed of the pointer from 5 levels.

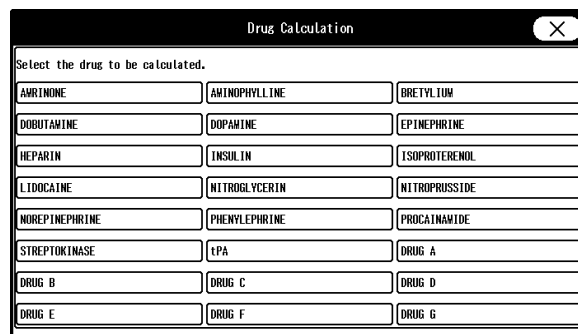
Drug Calculation

The following initial settings can be performed for the drug calculation.

- *Drug Name
- *Initial value to be entered when a drug is selected on the drug calculation menu (drug amount, drug amount unit, diluent amount, dosing rate, dosing rate unit)
- *Display ON/OFF for each drug

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

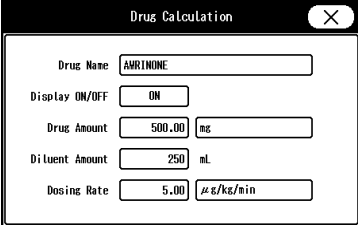
- ▶ Select the drug to change the initial settings.



2 Set the initial value for the drug.

- ▶ If [OFF] is selected for "Display ON/OFF", the corresponding drug will not be displayed on the drug selection list.
- ▶ When the unit for the dosing rate is set, the unit for the drug amount will be automatically set.

Dosing Rate Unit	Drug Amount Unit
units/h	units
IU/h	IU
Other than above	mg



System Setup

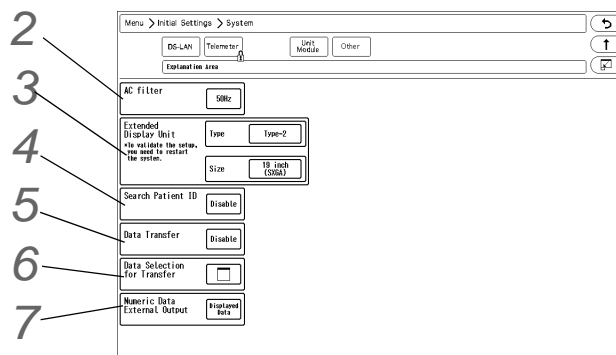
On the "System" menu, system related setup can be performed.

REFERENCE

- ♦ For the setup procedures of DS-LAN, telemeter, unit module setup, and data transfer among the DS-8007, DS-8500, refer to the corresponding chapters in this manual.
 - (☞ "Network System Construction" P2-1)
 - (☞ "Connection to the External Devices" P4-1)
 - (☞ Operation Manual "Data Transfer Function Using the Transport Monitor (DS-8007)" P4-5)

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 details of the extended display unit setup, contact your nearest service representative.

4 Set the "Search Patient ID".

- 1 Press the key for "Search Patient ID".
 - ▶ The dropdown list will be displayed.
- 2 Select from [Enable] or [Disable].
 - ▶ [Enable]: Patient data can be searched on the patient data server using the patient ID.
(☞ Operation Manual "Entering Patient Information from the Patient Data Server (When DS-LANIII is used)" P5-6)
 - ▶ [Disable]: Patient data will not be searched on the patient data server.

5 Set the "Data Transfer" function when the HS-8000 or DS-8007 is connected.

- 1 Press the key for "Data Transfer".
 - ▶ The dropdown list will be displayed.
- 2 Select from [HS-800]/[Disable]/[Transport].
 - ▶ [HS-8000]: The data transfer function with the HS-8000 will be enabled.
 - ▶ [Disable]: The data transfer function will be disabled.
 - ▶ [Transport]: The data transfer function with the DS-8007 will be enabled.

CAUTION

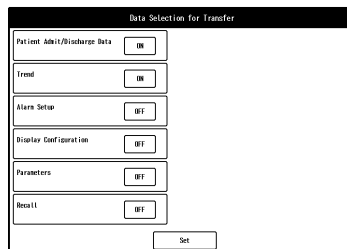
- ♦ If the data transfer function is enabled and alarm sound suspend function is ON, the alarm sound will be automatically suspended for 5 minutes when the Super Unit is connected.

6 Set the "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.

This setting is enabled only when [HS-8000] or [Transport] is selected for "Data Transfer".

- 1 Press the key for "Data for Transfer".
 - ▶ The "Data Selection for Transfer" menu 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)

- 7** Select the numeric data to be output 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.

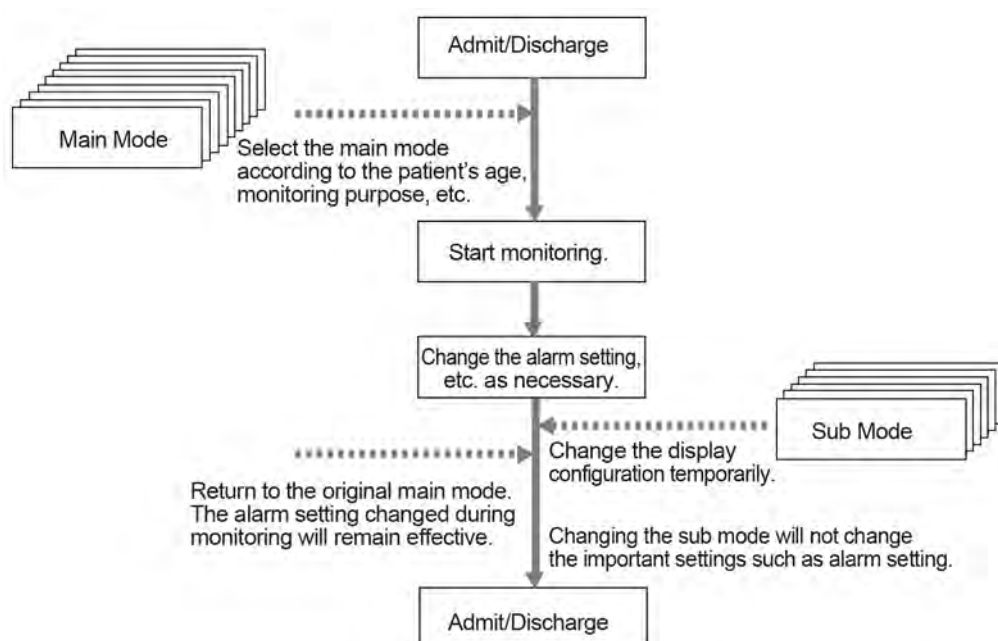
User Mode Registration

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.

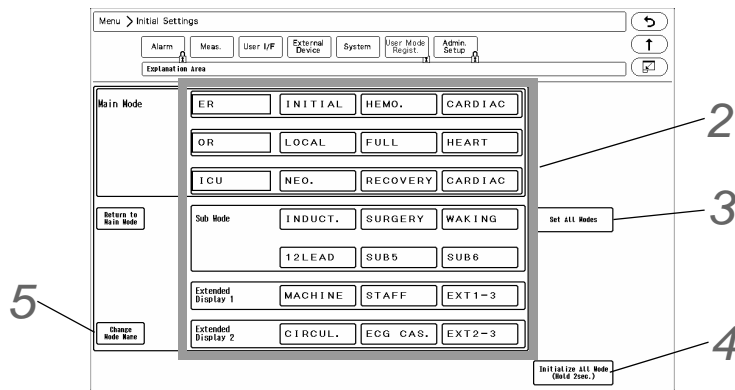
- ◆ Mode Name
- ◆ Display Configuration

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.

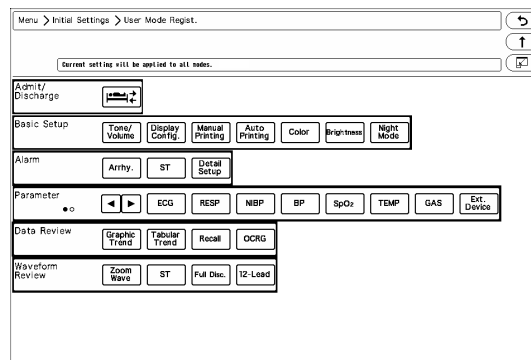
NOTE

- ♦ 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.

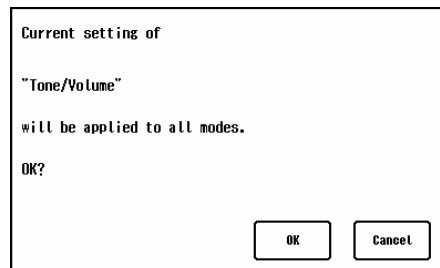
1 Press the [Set All Modes] key.

- ▶ 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) 6-37
 - RS-232C Connector Output Signal 6-37
 - Status I/O Signal (Status II Connector) 6-38

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		Description	Default	Backup
Alarm System		Fukuda Tone, Melodic Tone, Standard Tone	Standard Tone	○
Basic Alarm Parameter		Each Parameter (S, D, M can be specified for BP)	HR, SpO ₂ , NIBP-S, EtCO ₂	○
Asystole, VF, VT Alarm		Always ON, ON/OFF	Always ON	○
HR/PR Lower Limit during Alarm Auto Setting		OFF, 30 bpm, 40 bpm	OFF	○
Buzzer Tone at Speaker Failure		Enable, Disable	Enable	○
Suspend Arrhy. Analysis during Noise Interference		ON, OFF	OFF	○
Oxygenator Mode	Alarm	All OFF, Sel. Parameter, No Change	All OFF	○
	Oxygenator Mode Message	ON, OFF	ON	○
	Numeric Data		BP1 to BP8, T1 to T8, Tb	○
	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	
	Other Bed Alarm		1	
Alarm Indicator Setup	Level S ^{*1}	Pattern A to J, OFF	Pattern A	○
	Level H		Pattern A	○
	Level M		Pattern E	○
	Level L		Pattern F	○
	Ventilator Alarm		Pattern A	○
	Synchronize with HR/RR		Sync. to HR, Sync. to RR, OFF	OFF

Item		Description	Default	Backup
Alarm Level ^{*2}		DS-LAN Standard Setup, User Setup	DS-LAN Standard Setup	○
Numeric Data	HR	S, H, M	M	○
	ST	H, M	M	○
	BP1 to 8	H, M	M	○
	PR_IBP	H, M	M	○
	SpO ₂	H, M	M	○
	Ext SpO ₂	H,M	H	○
	PR_SpO ₂	H, M	M	○
	SpO ₂ -2	H,M	M	○
	Ext SpO ₂ -2	H,M	H	○
	PR-SpO ₂ -2	H,M	M	○
	NIBP	H, M	M	○
	TEMP1 to 8	H, M, L	L	○
	Tb	H, M, L	L	○
	RR	H, M, L	M	○
	Apnea	H, M, L	H	○
	CO ₂ In ^{*3}	H, M	M	○
	CO ₂ Et ^{*3}	H, M	M	○
	O ₂ In ^{*3}	H, M	M	○
	O ₂ -Exp ^{*3}	H, M	M	○
	N ₂ O In ^{*3}	H, M	M	○
	N ₂ O Exp ^{*3}	H, M	M	○
	Agent In ^{*3}	H, M	M	○
	Agent Exp ^{*3}	H, M	M	○
	MAC ^{*3}	H, M	M	○
	SpCO1, 2	H, M, L	L	○
	SpMet1, 2	H, M, L	L	○
	SpHb1, 2	H, M, L	L	○
	PEAK ^{*3}	H, M, L	L	○
	PEEP ^{*3}	H, M, L	L	○
	MV ^{*3}	H, M, L	M	○
BIS ^{*4}	H, M, L	M	○	
Arrhythmia	Asystole	S, H	H	○
	VF	S, H	H	○
	VT	S, H	H	○
	Ext Tachy	S, H	H	○
	Ext Brady	S, H	H	○
	Slow VT	H, M	H	○
	Tachy	S, H	H	○
	Brady	S, H	H	○
	Run	H, M	M	○
	Pause	H, M	M	○

Item	Description	Default	Backup	
	Triplet	H, M, L	L	○
	Couplet	H, M, L	L	○
	R on T	H, M, L	L	○
	Multiform	H, M, L	L	○
	Vent Rhythm	H, M, L	L	○
	Bigeminy	H, M, L	L	○
	Trigeminy	H, M, L	L	○
	Frequent	H, M, L	L	○
	SVT	H, M, L	L	○
	Irregular RR	H, M, L	L	○
	Prolonged RR	H, M, L	L	○
	S Frequent	H, M, L	L	○
	S Couplet	H, M, L	L	○
	VPC	L	L	○
	SVPC	L	L	○
	Pacer Not Capture	H, M, L	L	○
	Pacer Not Pacing	H, M, L	L	○
Technical	GAS Mixed Agents Detection	M, L, N	N	○
	SpO ₂ Low Perfusion	L, N	L	○
	Check NIBP cuff, hose	M, L, N	L	○
	NIBP meas. failed. (**-**)	M, L, N	M	○
	Check System Connection.	L, N	N	○
	Chk DS-LAN Comm	L, N	L	○
	Some parameters are not displayed due to the display layout setting.	L, N, OFF	N	○
	Check Electrodes	H, M, L	L	○
	Check SpO ₂ Sensor Attach.	H, M, L	L	○
	Super Unit Check Conn.	M, L	M	○
	IB-8000 Check Conn.	M, L	M	○
	BIS Sensor Expired	N, OFF	N	○
	BIS Sensor Usage>24 hrs.	L, N	L	○
	BIS SQI <15%	L, N	L	○
	BP Transducer OFF	M, L	L	○

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

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

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

*4: BIS alarm can be set only when the BISx is connected.

Initial Settings (Measurement)

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

 Initial Settings (User I/F)

Display/Print

Item	Description	Default	Backup
Date	07/19, Jul.19, 19 Jul	Jul. 19	○
BP Alarm Increment	Normal, Small	Normal	○
RR Alarm Increment	Normal, Small	Normal	○
Trend Clip	ON, OFF	ON	○
BP Printing Scale	20 mm, 40 mm	40mm	○
Night Mode Cancel	Any Key, Night Mode Key	Any Key	○

Display/Print

Item	Description	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	○
VENT Display Parameters	OFF [Ventilator] E-TV, I-TV, MV, P-PEAK, P-PAUSE, PEEP, P-MEAN, E-RES, I-RES, FiO ₂ , COMP [Anes.] Flowee, Ti, Ti/Ttot, Sup.Air, Sup.O ₂ , Sup.N ₂ O	VENT-A: All OFF VENT-B: All OFF	○
Hemo/etc Display Parameters Setup	OFF [SvO ₂ /CCO] SvO ₂ , ScvO ₂ , SaO ₂ , O ₂ El, B-Temp, CCO, CCO-STAT, CCI, CCI-STAT, DO ₂ , RVEF, RVEF-STAT, VO ₂ , SV, SV-STAT, SVI, SVI-STAT, SVR, SVRI, SVV, EDV, EDV-STAT, EDVI, EDVI-STAT, ESV, ESVI, dPmx [Other] tcpO ₂ , tcpCO ₂	Hemo/etc-A: All OFF Hemo/etc-B: All OFF	○
Auto Display Configuration	BP Format	Overlap, Separate	Overlap
	Automatic Setup	Standard/Right, Standard/Left	Standard/Right
	Short Trend	Link with Numeric, Link with Waveform	Link with Numeric
	Display Priority	HR/PR, VENT, SpCO, BP1, NIBP, SpMet, BP2, BP5, SpHb, BP3, BP6, BIS, BP4, BP7, SpO ₂ , BP8, SpO 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	○
All Window Opaque	ON, OFF	OFF	○
Printer Message	ON, OFF	ON	○
Message Icon	ON, OFF	OFF	○
Operation Guide Display	ON, OFF	ON	○
Notification when Changing Equipment Configuration	ON, OFF	ON	○
Sync wave size/scale of extended display with main unit	ON, OFF	OFF	○
12-Lead Analysis Filter Display	Frequency, Filter Type	Frequency	○
Waveform Size Display	Numeric, Bar, Bar (10 mm)	Numeric	○
Patient Name on the Information Display Area	ON, OFF	ON	○
External Device Numeric Data Box Operation	Tabular Trend, Parameter	Tabular Trend	○

Display/Print

Item	Description	Default	Backup	
Drug Calculation (Drug Amount)	AMRINONE	0.01 to 1500000.00	500mg	○
	AMINOPHYLLINE		500mg	
	BRETYLIUM		2000mg	
	DOBUTAMINE		250mg	
	DOPAMINE		800mg	
	EPINEPHRINE		4mg	
	HEPARIN		25000units	
	INSULIN		100units	
	ISOPROTERENOL		2mg	
	LIDOCAINE		2000mg	
	NITROGLYCERIN		50mg	
	NITROPRUSSIDE		50mg	
	NOREPINEPHRINE		4mg	
	PHENYLEPHRINE		300mg	
	PROCAINAMIDE		2000mg	
	STREPTOKINASE		750000IU	
	tPA		100mg	
DRUG-A to G	500mg			
Drug Calculation (Diluent Amount)	AMRINONE	1 to 1000	250mL	○
	AMINOPHYLLINE			
	BRETYLIUM			
	DOBUTAMINE			
	DOPAMINE			
	EPINEPHRINE			
	HEPARIN			
	INSULIN		100mL	
	ISOPROTERENOL		250mL	
	LIDOCAINE			
	NITROGLYCERIN			
	NITROPRUSSIDE			
	NOREPINEPHRINE			
	PHENYLEPHRINE			
	PROCAINAMIDE			
	STREPTOKINASE			
	tPA		200mL	
DRUG-A to G	250mL			

Display/Print

Item	Description	Default	Backup	
Drug Calculation (Dosing Rate)	AMRINONE	0.01 to 1500000.00	5.00µg/kg/min	○
	AMINOPHYLLINE		0.10mg/kg/h	
	BRETYLIUM		1.00mg/min	
	DOBUTAMINE		2.50µg/kg/min	
	DOPAMINE		2.00µg/kg/min	
	EPINEPHRINE		1.00µg/min	
	HEPARIN		1000.00units/h	
	INSULIN		1.00units/h	
	ISOPROTERENOL		1.00µg/kg/min	
	LIDOCAINE		2.00mg/min	
	NITROGLYCERIN		100.00µg/min	
	NITROPRUSSIDE		0.50µg/kg/min	
	NOREPINEPHRIN E		2.00µg/min	
	PHENYLEPHRINE		100.00µg/min	
	PROCAINAMIDE		2.00mg/min	
	STREPTOKINASE		30000.00IU/h	
tPA	20.00mg/h			
DRUG-A to G	1.00µg/kg/min			
Shift Time	Day Shift	Selectable Time	08:00	○
	Twilight Shift		16:00	
	Night Shift		00:00	
Key Group Setup	Label A to E	8 alphanumeric characters	Blank*	○
	A to E	Up to 8 user keys can be registered to each group (Home, Key Lock, Menu, Mode Select, Alarm Silence, Admit/Disch., Alarm Suspend, Rapid Discharge, NIBP Start/Stop, HR/PR Source, NIBP Cont., BP Zero, Print Start/Stop, Scale, Monitor Suspend, 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	○

Display/Print

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

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

Power ON/ Discharge

Item		Description	Default	Backup
Check Discharge at Power ON		ON, OFF	ON	○
Discharge Mode		Admit, Monitor Suspend, Standby	Admit	○
NIBP Resume Auto Mode with Manual Measurement		ON, OFF	ON	○
At Power ON Backup/Initialize	Main Mode	Backup, Current Mode, Mode 1 to 9	Backup	○
	Extended Display 1	Backup, Mode 1 to 3	Backup	
	Extended Display 2	Backup, Mode 1 to 3	Backup	
	Patient Classification	Backup, Adult, Child, Neonate	Backup	
	Pacemaker	Backup, Not Used	Backup	
	Alarm	Backup, Initialize	Backup	
	Display Configuration	Backup, Initialize	Backup	
	ECG1, ECG2 Lead	Backup, Initialize	Backup	
	ECG1, ECG2 Size	Backup, Initialize	Backup	
	Impedance Mode ON/OFF	Backup, Initialize	Backup	
	CVA Detect	Backup, OFF	Backup	
	NIBP Auto Mode	Backup, OFF OFF->2.5 min., OFF->5 min., 2.5 min., 5 min.	Backup	
	BP Scale	Backup, Initialize	Backup	
	SpO ₂ Averaging	Backup, Initialize	Backup	
	CO ₂ Scale	Backup, Initialize	Backup	
EtCO ₂ Peak Duration	Backup, 10 sec.	Backup		

Power ON/ Discharge

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

Menu

	Item	Description	Default	Backup
Menu Setup	Admit/Discharge	OFF, Admit/Discharge	Admit/Discharge	○
	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	○
	Alarm	OFF, Basic, Circ., Resp/Gas, Arrhy., ST, List, Detail Setup	Basic, Circ., Resp/Gas, Arrhy., ST, List, Detail Setup	○
	Parameter	OFF, ECG, RESP, NIBP, BP, SpO ₂ , TEMP, GAS, CO ₂ , BIS, Ext. Device	ECG, RESP, NIBP, BP, SpO ₂ , TEMP, GAS, CO ₂ , BIS, Ext. Device	○
	Data Review	OFF, Graphic Trend, Tabular Trend, Recall, OCRG, Alarm History	Graphic Trend, Tabular Trend, Recall, OCRG, Alarm History	○
	Waveform Review	OFF, Zoom, ST, 12-Lead, Full Disc.	Zoom, ST, 12-Lead, Full Disc.	○
	Calculation	OFF, Hemodynamics, Lung Function, CO, Drug Calc.	Hemodynamics, Lung Function, CO, Drug Calc.	○
	Initial Settings	Initial Settings	Initial Settings	○
	Maintenance	Maintenance	Maintenance	○

Key Mask



Item		Description	Default	Backup
Key Mask	Menu Items	ON/OFF	All ON	○
	Admit/Discharge Items	ON/OFF	All ON	○
	Alarm>Circulatory Items	ON/OFF	All ON	○
	Alarm>Respiratory/Gas Items	ON/OFF	All ON	○
	Alarm>Arrhythmia Items	ON/OFF	All ON	○

Remote Control

Item		Description	Default	Backup
Remote Control	Remote Control Key	ECG1/ECG2 Size ECG1 Lead, ECG2 Lead ECG Auto Size BP1 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: Graphic Trend F8: BP Zero Balance	○
	Room ID/Bed ID*	Room ID: A,B,C,D,E,F,G,H,P Bed ID: 1 to 32	A001 OFF	○

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

Operation (Touch Panel, etc.)

Item		Description	Default	Backup
Mouse Setup	Mouse Usage	ON, OFF	ON	○
	Auto Hide of Pointer	ON, OFF	ON	○
	Pointer Shape			○
	Pointer Color	White, Black	White	○
	Moving Speed	5 levels	Bottom Level	○
Window	Auto Hide Window	OFF, 5, 10, 20, 30, 60 sec.	60 sec.	○
	Auto Minimize	ON, OFF	ON	○

 Initial Settings (External Device)

Item		Description	Default	Backup	
Main Unit Port, HP-800	COM1	OFF, SV-900, SV-300, SERVO-i/s, SERVO-U/h/air, PB, Evita, Vigilance, PiCCO, MGU-800, MGU-810, PC Comm., HLX, Barcode, Magnetic Card, BIS, PulsioFlex, TCM4/TCM5, INVOS, FLOW-i, PC Comm. (DS-5000)* ¹	OFF * ²	○	
	COM2		OFF * ²	○	
	COM3		OFF * ²	○	
	COM4		OFF * ²	○	
	Status II		OFF * ²	○	
	U-LINK		OFF * ²	○	
Network	Main Unit	IP Address	Numeric (0 to 9)	0.0.0.0	○
		Sub-Network Mask		0.0.0.0	○
		Default Gateway		0.0.0.0	○

Item		Description	Default	Backup		
	Printer	Network Printer	ON, OFF, DS-LAN	OFF	○	
		IP Address	Numeric (0 to 9)	0.0.0.0	○	
		MAC Address	Alphanumeric (0 to 9, A to F)	00.00.00.00.00.00	○	
		Printer Spec.	LIPS IV, ESC/page, PCL 5	LIPS IV	○	
		Paper Size	A4, Letter	Letter	○	
		Central Monitor	001 to 016	001	○	
Status Output Setup Alarm Output		Alarm Level	OFF, APNEA, Level H, Level H,M, Level H,M,L	OFF ^{*2}	○	
		Output Logic	Positive Logic, Negative Logic, Pulse	Negative Logic ^{*2}	○	
Analog Output Setup (HS-8000)		ECG	Disp. Lead, Selected Lead	Disp. Lead	○	
		IBP Output 1	MPA1-1, MPA1-2, MPA2-1, MPA2-2, MPA3-1, MPA3-2	MPA1-1	○	
		IBP Output 2		MPA1-2	○	
		Signal Output	HR, RR	OFF	○	
		Output Logic	Positive Logic, Negative Logic	Negative Logic	○	
Analog Output Setup (DS-8007)	Analog Synchronized Signal Output		ON, OFF	ON	○	
	Analog Output 1		Selected ECG Lead, Displayed ECG Lead, Multiparameter Connector 1-1, Multiparameter Connector 1-2, Multiparameter Connector 2-1, Multiparameter Connector 2-2	Displayed ECG Lead	○	
	Analog Output 2			Multiparameter Connector 1-1	○	
	Analog Output 3		Selected ECG Lead, Displayed ECG Lead, Multiparameter Connector 1-1, Multiparameter Connector 1-2, Multiparameter Connector 2-1, Multiparameter Connector 2-2, Sync. Signal	Sync. Signal	○	
	Signal Output			HR, RR	OFF	○
	Output Logic			Positive Logic, Negative Logic	Negative Logic	○
Magnetic Card Reader Setup	Starting Digit / Ending Digit	Patient ID	Entering using numeric keys	1-20	○	
		Patient Name		OFF-OFF	○	
		Birth Year		OFF-OFF	○	
		Birth Month		OFF-OFF	○	
		Birth Day		OFF-OFF	○	
		Age		OFF-OFF	○	
		Sex		OFF-OFF	○	
	Auto Reference to Central Monitor when Reading Patient ID		ON, OFF	OFF	○	

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

NOTE

- ◆ For the item with *2 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		Description	Default	Backup	
DS-LAN	DS-LAN Setup	DS-LANII (10Mbps), DS-LANIII (100Mbps)	DS-LANII (10Mbps)	○	
	Room ID	4 alphanumeric characters	BED-	○	
	Bed ID	3 numerics	0	○	
	DS-LAN Pat. ID Transmission Start Position	1st to 20th character	1st character	○	
	Synchronize Hemodynamic Data with the Central Monitor	ON, OFF	OFF	○	
	CO ₂ (mmHg) Upper Limit of Transmission	No limit, 99mmHg	99mmHg	○	
Telemeter	ON	ON, OFF	ON		
	Channel	HLX-801 (FA) 0801 to 0879, 0900 to 0979 1000 to 1079, 1100 to 1179 1200 to 1279, 1300 to 1379 HLX-801 (G) 9501 to 9539, 9600 to 9639 9700 to 9739, 9800 to 9839 9900 to 9938, 2701 to 2739 2800 to 2839, 2900 to 2918 2921 to 2939, 3000 to 3039 3100 to 3118	Telemetry Transmission Depends on the telemetry transmitter module	○	
	Group ID	00 to 63	00 *	○	
	Transmitting Waveform	ECG1(ECG1, RESP, CO ₂ , BP1, BP2, SpO ₂), ECG2 (ECG1, ECG2, RESP/ CO ₂ , BP1, SpO ₂)	ECG1(ECG1, RESP, CO ₂ , BP1, BP2, SpO ₂)		
CO ₂ (mmHg) Upper Limit of Transmission		No limit, 99mmHg	99mmHg	○	
Unit Module	Multiamplifier	Fixed, Manual	Fixed 1: BP1,2,TEMP5,6 , CO 2: BP5,6, TEMP1,2 , CO 3: BP3,4, TEMP3,4 , CO	○	
	SpO ₂	Settings for 1ch, 2ch	1ch: HS, 2ch: OFF	○	
Other	AC Frequency	50Hz, 60Hz	60Hz	○	
	Search Patient ID	Enable, Disable	Disable	○	
	Extended Display Unit	Type	Type1, Type2	Type1	○
		Size	19 inch (SXGA), 15 inch (XGA) (LC-8015: 15 inch) (19 inch only for Type 1)	19 inch (SXGA)	
	Data Transfer Function	HS-8000, Disable, Transport	Disable	○	
Data Selection for Transfer	ON, OFF	Patient Admit/Discharge Data: ON Trend: ON Alarm Setup: OFF Display Configuration: OFF Parameters: OFF Recall: OFF	○		

Item		Description	Default	Backup
	Numeric Data External Output	Displayed Data, All Data	Displayed Data	○

NOTE

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

□ Initial Settings (User Mode Registration)

Item		Description	Default	Backup
Main Mode**1	Site Name	8 characters	ER	○
			OR	
			ICU	
	Mode Name	8 characters	Initial	○
			Hemodynamics	
			Cardiac	
			Local	
			Full	
			Heart	
			Neo.	
Recovery				
Cardiac				
Sub Mode ²	Mode Name	8 characters	Induct.	○
			Surgery	
			Waking	
			12-lead	
			Sub Mode 5	
			Sub Mode 6	
Extended Display 1	Mode Name	8 characters	Machine	○
			Staff	
			Extended 1 Mode 3	
Extended Display 2	Mode Name	8 characters	Circ.	○
			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
- ♦ Clock Setting
- ♦ Brightness
- ♦ Tone/Volume
- ♦ Color Setup

- ◆ Night Mode Setup
- ◆ Alarm Settings
- ◆ Settings for Each Parameter
- ◆ Settings for Review Data (Graphic 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		○
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	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, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Graphic 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	Graphic Trend		
	Display Parameter	OFF		
	Reference Line Function	OFF		
	Cursor	OFF		
	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		

Main Mode (Mode 1)

Item		Default (19 inch)	Default (15 inch)	Backup
Detail Setup (Waveform)	Grid	OFF		○
	Thickness	Regular		
	Clip	OFF		
	Fill CO ₂ Waveform	OFF		
	Fill O ₂ Waveform	OFF		
	Fill Agent Waveform	OFF		
	12-Lead ST Wave	Ref.		
	12-Lead 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		
	Graphic/Tabular Trend	OFF		
	Graphic/Tabular Trend Size	Small		

Main Mode (Mode 2)

Item		Default (19 inch)	Default (15 inch)	Backup
Item		Hemodynamics		○
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	Numeric Data Area	Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont. Next to RR_IMP: NIBP List	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), Graphic Trend, Tabular Trend, Recall, Print Start/ Stop, User Key Up/Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, Graphic Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/ Stop, User Key Up/Down, Home	
	User Key Down 2/2	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	
Short Trend		(Same as Main Mode 1)		○

Main Mode (Mode 2)

Item		Default (19 inch)	Default (15 inch)	Backup
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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		
	Graphic/Tabular Trend	OFF		
Graphic/Tabular Trend Size	Small			

Main Mode (Mode 3)

Item		Default (19 inch)	Default (15 inch)	Backup
Item		Cardiac		○
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, Print Cancel, 12L Analysis Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont.	Below HR: 12-Lead Print, Print Cancel, 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), Graphic Trend, Tabular Trend, Recall, NIBP List, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, Graphic Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/ Stop, User Key Up/Down, Home	
	User Key Down 2/2	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	

Main Mode (Mode 3)

Item		Default (19 inch)	Default (15 inch)	Backup
Short Trend		(Same as Main 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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		
	Graphic/Tabular Trend	OFF		
Graphic/Tabular Trend Size	Small			

Main Mode (Mode 4)

Item		Default (19 inch)	Default (15 inch)	Backup
Item		Local		○
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, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Graphic Trend, Tabular Trend, Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	
Short Trend		(Same as Main Mode 1)		○

Main Mode (Mode 4)

	Item	Default (19 inch)	Default (15 inch)	Backup
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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		
	Graphic/Tabular Trend	OFF		
Graphic/Tabular Trend Size	Small			

Main Mode (Mode 5)

	Item	Default (19 inch)	Default (15 inch)	Backup
	Item	Full		○
	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	○

Main Mode (Mode 5)

Item		Default (19 inch)	Default (15 inch)	Backup
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.	○
	User Key Down 1/2	Menu, Alarm Silence, Admit/Disch., BP Zero, Scale, Alarm Setup (All), Graphic Trend, Tabular Trend, Recall, Print Start/ Stop, User Key Up/Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, Graphic Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home	
	User Key Down 2/2	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	
Short Trend		(Same as Main 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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		○
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	○

Main Mode (Mode 6)

Item		Default (19 inch)	Default (15 inch)	Backup
Waveform		ECG1, SpO ₂ , BP1, BP Overlap 1, BP5, BP6, CO ₂ , Agent	ECG1, SpO ₂ , BP1, BP2, CO ₂	○
User Key	Numeric Data Area	Next to NIBP Data: NIBP Auto Mode	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 Start/Stop, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, Graphic Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home	
	User Key Down 2/2	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	
Short Trend		(Same as Main 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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		
	Graphic/Tabular Trend	OFF		
Graphic/Tabular Trend Size	Small			

Main Mode (Mode 7)

Item		Default (19 inch)	Default (15 inch)	Backup
Item		Neo.		○
Layout		Standard/Right	Standard/Right & Bottom	○

Main Mode (Mode 7)

Item		Default (19 inch)	Default (15 inch)	Backup
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), Graphic Trend, Tabular Trend, Recall, Print Start/ Stop, User Key Up/Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, Graphic Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/ Stop, User Key Up/Down, Home	
	User Key Down 2/2	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	
Short Trend		(Same as Main 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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		
Graphic/Tabular Trend	OFF			
Graphic/Tabular Trend Size	Small			

Main Mode (Mode 8)

Item		Default (19 inch)	Default (15 inch)	Backup
Item		Recovery		○
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	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), Graphic Trend, Tabular Trend, Recall, Print Start/ Stop, User Key Up/Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, Graphic Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home	
	User Key Down 2/2	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	
Short Trend		(Same as Main 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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		
Graphic/Tabular Trend	OFF			
Graphic/Tabular Trend Size	Small			

Main Mode (Mode 9)

Item		Default (19 inch)	Default (15 inch)	Backup
Item		Cardiac		○
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, Print Cancel, 12L Analysis Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont.	Below HR: 12-Lead Print, Print Cancel, 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), Graphic Trend, Tabular Trend, Recall, NIBP List, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, Graphic Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/ Stop, User Key Up/Down, Home	
	User Key Down 2/2	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	
Short Trend		(Same as Main 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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		
Graphic/Tabular Trend	OFF			
Graphic/Tabular Trend Size	Small			

Sub Mode (Mode 1)

Item		Default (19 inch)	Default (15 inch)	Backup
Item		Induct.		○
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	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, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home	Menu, Alarm Silence, Graphic 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	Graphic Trend		
	Display Parameter	OFF		
	Reference Line Function	OFF		
	Cursor	OFF		
	Cursor Linkage	Tabular Trend		
	Short Trend Overlap	All OFF		
Data Resolution	5 sec.			
Detail Setup (Numeric Data)	Alarm Limit Display	Graph		○
	At Alarm Occurrence	3D		

Sub Mode (Mode 1)

Item		Default (19 inch)	Default (15 inch)	Backup
Detail Setup (Waveform)	Grid	OFF		○
	Thickness	Regular		
	Clip	OFF		
	Fill CO ₂ Waveform	OFF		
	Fill O ₂ Waveform	OFF		
	Fill Agent Waveform	OFF		
	12-Lead ST Wave	Ref.		
	12-Lead 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		
	Graphic/Tabular Trend	OFF		
Graphic/Tabular Trend Size	Small			

Sub Mode (Mode 2)

Item		Default (19 inch)	Default (15 inch)	Backup
Item		Surgery		○
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	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), Graphic Trend, Tabular Trend, Recall, Print Start/ Stop, User Key Up/Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, Graphic Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home	
	User Key Down 2/2	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home	
Short Trend		(Same as Sub Mode 1)		○

Sub Mode (Mode 2)

	Item	Default (19 inch)	Default (15 inch)	Backup
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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		
	Graphic/Tabular Trend	OFF		
	Graphic/Tabular Trend Size	Small		

Sub Mode (Mode 3)

Item		Default (19 inch)	Default (15 inch)	Backup
Item		Waking		○
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	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	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		○
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	○

Sub Mode (Mode 4)

Item		Default (19 inch)	Default (15 inch)	Backup
Waveform		ECG12 Lead, BP1, SpO ₂ , CO ₂ , RESP	ECG12 Lead	○
User Key	Numeric Data Area	Below HR: 12-Lead Print, Print Cancel, 12L Analysis Below NIBP Data: NIBP Start/Stop, NIBP Auto Mode, NIBP Cont.	Below HR: 12-Lead Print, Print Cancel, 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), Graphic Trend, Tabular Trend, Recall, NIBP List, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Admit/Disch., BP Zero, Graphic Trend, Tabular Trend, Recall, Alarm Setup (All), Print Start/Stop, User Key Up/Down, Home	
	User Key Down 2/2	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home	Menu, Alarm Silence, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home	
Short Trend		(Same as Sub 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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		
Graphic/Tabular Trend	OFF			
Graphic/Tabular Trend Size	Small			

Sub Mode (Mode 5)

Item		Default (19 inch)	Default (15 inch)	Backup
Item		Sub Mode 5		○
Layout		Numeric Data/Bottom 2 rows		○

Sub Mode (Mode 5)

Item		Default (19 inch)	Default (15 inch)	Backup
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	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, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/ Down, Home	Menu, Alarm Silence, Graphic Trend, Tabular Trend, Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	
Short Trend		(Same as Sub 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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		
Graphic/Tabular Trend	OFF			
Graphic/Tabular Trend Size	Small			

Sub Mode (Mode 6)

Item		Default (19 inch)	Default (15 inch)	Backup
Item		Sub Mode 6		○
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	○

Sub Mode (Mode 6)

Item		Default (19 inch)	Default (15 inch)	Backup
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, Graphic Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	Menu, Alarm Silence, Graphic Trend, Tabular Trend, Night Mode, Key Lock, Print Start/Stop, User Key Up/Down, Home	
Short Trend		(Same as Sub 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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		
Graphic/Tabular Trend	OFF			
Graphic/Tabular Trend Size	Small			

Extended Display 1 Mode 1

Item	Default (19 inch)	Default (15 inch)	Backup
Item	Machine		○
Layout	Large/Right	Standard/Right	○
Numeric Data	Right: HR, SpO ₂ , BP1, BP2, BP3, BP4, GAS	Right: HR, SpO ₂ , BP1, BP2, BP3, BP4, GAS	○
Waveform	ECG1, SpO ₂ , BP1, BP2, BP3, BP4	ECG1, SpO ₂ , BP1, BP2, BP3, BP4	○

Extended Display 1 Mode 1

Item		Default (19 inch)	Default (15 inch)	Backup
User Key	Numeric Data Area	-	-	○
	User Key Down 1/2	Extended 1 Mode 1, Extended 1 Mode 2, Extended 1 Mode 3, Graphic Trend, Tabular Trend, Display Config. (Extended 1), Display Config. (Extended 2), Home	Extended 1 Mode 1, Extended 1 Mode 2, Extended 1 Mode 3, Graphic 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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		○
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	○

Extended Display 1 Mode 2

Item		Default (19 inch)	Default (15 inch)	Backup
User Key	Numeric Data Area	-	-	○
	User Key Down 1/2	Extended 1 Mode 1, Extended 1 Mode 2, Extended 1 Mode 3, Graphic Trend, Tabular Trend, Display Config. (Extended 1), Display Config. (Extended 2), Home	Extended 1 Mode 1, Extended 1 Mode 2, Extended 1 Mode 3, Graphic Trend, Tabular Trend, Display Config. (Extended 1), Display Config. (Extended 2), Home	
	User Key Down 2/2	-	-	
Short Trend		(Same as Extended Display 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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		○
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	○

Extended Display 1 Mode 3

Item		Default (19 inch)	Default (15 inch)	Backup
User Key	Numeric Data Area	-	-	○
	User Key Down 1/2	Extended 1 Mode 1, Extended 1 Mode 2, Extended 1 Mode 3, Graphic Trend, Tabular Trend, Display Config. (Extended 1), Display Config. (Extended 2), Home	Extended 1 Mode 1, Extended 1 Mode 2, Extended 1 Mode 3, Graphic 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		
	12-Lead ST Wave	Ref.		
	12-Lead 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.		○
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	Extended 2 Mode 1, Extended 2 Mode 2, Extended 2 Mode 3	
	User Key Down 2/2	-	-	

Extended Display 2 Mode 1

Item		Default (19 inch)	Default (15 inch)	Backup
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		
	12-Lead ST Wave	Ref.		
	12-Lead 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.		○
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	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)		○

Extended Display 2 Mode 2

Item		Default (19 inch)	Default (15 inch)	Backup
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		
	12-Lead ST Wave	Ref.		
	12-Lead 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		○
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		

Extended Display 2 Mode 3

Item		Default (19 inch)	Default (15 inch)	Backup
Detail Setup (Waveform)	Grid	ON		○
	Thickness	Regular		
	Clip	OFF		
	Fill CO ₂ Waveform	OFF		
	Fill O ₂ Waveform	OFF		
	Fill Agent Waveform	OFF		
	12-Lead ST Wave	Ref.		
	12-Lead 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	Description	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	○
Password Setup	Administrator name: 8 characters each	Blank	○
	Password: 8 characters each	Red Key: 11111111 Yellow Key: 22222222 Green Key: 33333333	

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

Periodic Replacement 7-1
 To Check the Periodic Replacement Period..... 7-1
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 your nearest 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.

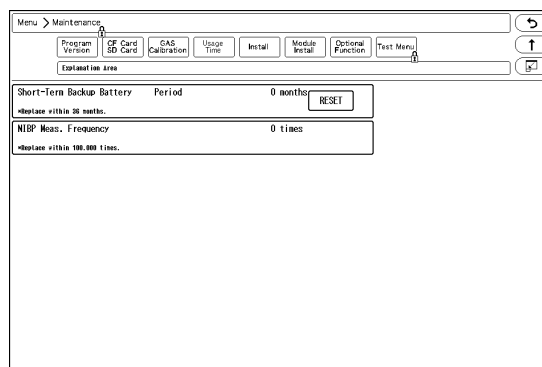
Periodic Replacement Parts	Periodic Replacement Period
DSC-8500 Series (Main Unit)	
Short-Term Backup Battery	3 years The usable life of the short-term backup battery will shorten if the power of the equipment is frequently turned ON and OFF. When the <DSC-8500 Check Short-Term Battery> message is displayed, make sure to replace the short-term backup battery.
HS-8000 series (Super Unit)	
NIBP Unit	100,000 times of measurement or 6 years, whichever earlier
HCP-800/HCP-810	
CO ₂ Unit	30,000 hours
MGU-800/MGU-810 Series	
Water Trap	1 month
DRYLINE Receptacle	1 years

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 the equipment, accessories, follow the regulations of local authority or each institution. Do not dispose of as ordinary waste.
- When disposing of the battery, separate it from other wastes and contact your nearest service representative.
- If there is risk of infection, dispose of as infectious waste according to the regulations of local authority or each institution.

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 equipment, accessories, and cables, and keep them together in one place for next use.
- ♦ Always check for adequate supply of ECG electrodes, and other disposable accessories. If any shortage is found, contact your nearest service representative.

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 an area where the environmental conditions, such as atmospheric pressure, temperature, sunlight, dust, sodium, sulfur, will not adversely affect the system.
- ♦ Store in a level area where the equipment is not exposed to vibration and shock (including during transportation).
- ♦ Store in an area which meets the following environmental conditions.
 - ♦ Storage Temperature: -10°C to 60°C/14°F to 140°F
 - ♦ Storage Humidity: 10% to 95% (at 40°C/104°F, non-condensing)
 - ♦ Atmospheric Pressure: 70 kPa to 106 kPa

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/disinfect the equipment and sensors.

CAUTION

- ◆ Do not sterilize the equipment.
- ◆ Do not disinfect the equipment while monitoring patient.

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. For disinfecting procedure, refer to the next section, "Housing"..

CAUTION

- ◆ Never use strong-acidic cleaning solution.
- ◆ To clean the touch panel, use an optional cleaning cloth, eyeglass cleaning cloth, soft cotton cloth, or non-woven cloth (pulp, rayon, polyethylene, etc.).

- 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 is not touched for 30 seconds, the key lock condition will be automatically canceled. When the key lock condition is canceled, press the [Key Lock] key again.
- ▶ <Key Locked> will be 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 canceled.

Housing

□ Cleaning

Wipe using a tightly squeezed cloth saturated with diluted neutral detergent. Then wipe with a dry cloth.

Usable Cloth:

- *Soft cloth (cotton)
- *Soft non-woven cloth (pulp, rayon, polyethylene, etc.)

□ Disinfection

Wipe with a cloth dampened with one of the following chemicals. Then, wipe off with dry cloth.

Chemicals:

- *Glutaral 2%
- *Alcohol (ethanol, isopropyl alcohol for disinfection)
- *Benzalkonium Chloride 0.2%
- *Benzethonium Chloride 0.2%
- *Alkyldiaminoethylglycine Hydrochloride 0.5%

Usable Cloth:

- *Soft cloth (cotton)
- *Soft non-woven cloth (pulp, rayon, polyethylene, etc.)

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 equipment 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.
 - ♦ For the precautions for storing and handling the chemicals, refer to the instruction manual for the respective chemical.
-

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

To clean the cuff shell, remove the bladder and wash it using neutral detergent. Make sure that the cuff is dry before placing back the bladder inside.

For procedure to clean/disinfect the reusable cuff, refer to the instruction manual for the respective cuff.

Do not reuse/resterilize the disposable cuff.

 **CAUTION**

- ♦ After washing, ensure the size indication on the bladder and cuff shell match. Make sure that the cuff hose is threaded through one of the hose openings in the cuff.
-

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/resterilize 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 sterilize by irradiation, steam, or ethylene oxide.
- ♦ OxiMax is a single-patient use type sensor. Do not reuse or resterilize.

Masimo Sensor

- ♦ Do not soak the sensor or patient cable in water or antiseptic solution. (Sensors and connectors are not water-proof.)
- ♦ Do not sterilize 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.
For most of the sensors, the adhesiveness will return by cleaning the sensor with alcohol and completely drying

it before applying it to the patient. For details of the cleaning procedure, refer to the instruction manual of the sensor.

- ♦ Disinfect the Masimo reusable sensor and patient cable according to the manufacturer's guidelines.
- ♦ When cleaning the Masimo reusable sensor 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 / re-sterilize 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

- ♦ Sterilize the airway adapter according to the manufacturer's guidelines.
- ♦ Do not reuse / re-sterilize the disposable airway adapter.

Water Trap (Multigas Unit)

- ♦ The water trap on the MGU-800/810 series receives fluids from the sampling line connected to the patient.
- ♦ When the sampling line or water trap gets completely occluded with water, <GAS Check Sample Line> will be displayed.
- ♦ No parts of the water trap are intended to be cleaned.
- ♦ Under environment of 37 °C temperature and 100% humidity, the emptying interval of water trap is as follows.
 - ♦ For Adult/Child
 - 17 hours (@200 mL/min.)
 - 26 hours (@120 mL/min.)
 - ♦ For Neonate

26 hours (@120 mL/min.)

45 hours (@70 mL/min.)

- 1 Remove the water trap by pressing and holding the release button on the holder part.



- 2 Unscrew the reservoir from the filter to separate them

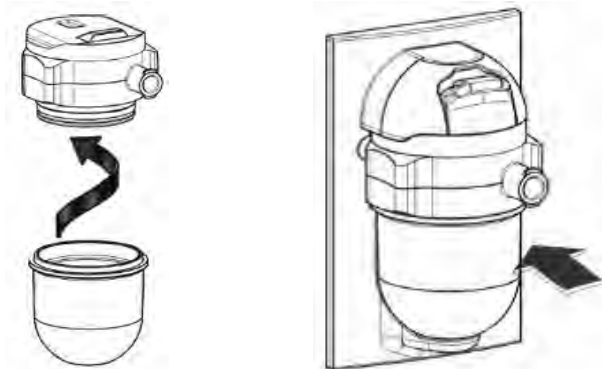


- 3 Empty the reservoir.

⚠ WARNING

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

- 4 Screw back the reservoir and reattach the water trap



BISx

- ♦ Clean any spillage of blood or solutions on BISx as soon as possible.
- ♦ Use lint-free absorbent towels for spill cleanups.
- ♦ Dampen the towel with detergent and lukewarm water to aid in cleaning.
- ♦ After cleaning, wipe the PIC connector ends with alcohol and allow to dry completely.
- ♦ Residual moisture inside the connector may affect BISx performance.
- ♦ Use lint-free absorbent towels dampened with a 10% bleach solution, or a commercial disinfectant.

 CAUTION

- ♦ BIS sensor is disposable. Do not reuse it.
 - ♦ Do not reuse the BIS sensor to other patients. It may cause cross-infection.
 - ♦ The duration for one usage should be within 24 hours.
-

Chapter 9 Maintenance Check

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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. Make sure to perform "Daily Check" and "Periodic Check" described in this section to maintain functionality, performance and reliability. Fukuda Denshi is not liable for any accidents arising from lack of maintenance.

Contact your nearest service representative for information on basic performance.

For additional information required by the service and technical engineers to service the equipment, refer to your nearest service representative.

 **CAUTION**

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

Daily Check

Perform the daily check according to the procedure described in this section.

Periodic Check

Periodic check of medical electronic equipment is mandatory to prevent failures and accidents and to ensure safety and reliability.

Periodic check may be performed by the medical institution or by a third party by concluding a "Maintenance Contract".

For more details, contact your nearest service representative.

Daily Check Items and Procedures

Perform the daily check.

- ◆ If the equipment fails any check item on the daily check list, the general judgment will be "Fail". Repair the equipment so that it passes all the check items.
- ◆ Use the equipment only if the judgments for all the items are "OK".

No.	Check Items	Check Procedure	Criteria
1. External Appearance			
01	External Appearance	Visually check the exterior for scratches, cracks, and rust.	No abnormality should be found.

No.	Check Items	Check Procedure	Criteria
2. Installation			
01	Installation	Check whether the equipment is installed on a level surface.	The installation area must be level and free from vibration and shock.
02	Installation	Check whether the equipment is installed in a place susceptible to adverse environment.	The temperature and humidity of the installation area must be as specified. The equipment should not be subjected to splashing water or chemicals.

No.	Check Items	Check Procedure	Criteria
3. Operation			
01	Function	Turn ON the power of the main unit, and check whether it operates normally.	The home display should appear, and the power LED located at the lower left of the display unit should light.
			The date and time should be correct.
02	Function	Turn ON the power of the main unit, and check whether it operates normally.	The power supply LED of the main unit should light.
03	Function	(When IB-8004 is used)	The set LAN ID indicator should light.
04	Function	(When HS-8000/HSA-80 is used)	The home display should appear, and the power LED of the HS-8000 should light.
05	Function	(When HS-8000 is used)	With the BP relay cable and BP transducer connected, pressing the BP zero balance switch should start the zero balance.
			Pressing the NIBP Start/Stop key should inflate the NIBP cuff.
			Connecting the SpO ₂ sensor should light the sensor LED.
06	Function	(When HR-800 is used)	The [READY] indicator on the HR-800 should light in green.
			Pressing the [RECORD] key on the HR-800 should start the waveform printing. When pressed again, the printing should stop.
			Pressing the [FEED] key on the HR-800 while not printing should feed the paper.
07	Function	(When HPD-800/HPD-810/HCP-800/HCP-810/HBX-800 is used)	The home display should appear, and power supply LED should light in green.
08	Function	(When HCP-800/HCP-810 is used)	When the sampling tube is connected, "0" should be displayed in the numeric data box.
09	Function	(When MGU-800 is used)	The home display should appear, and the power LED located at the upper left of the MGU-800 should light.

No.	Check Items	Check Procedure	Criteria
10	Function	(When MGU-810 is used)	The home display should appear, and the power LED located at the lower right of the MGU-810 should light.
11	Function	(When HP-800/HM-800/HG-800 are used)	<Check Connection> message for the module should not be displayed.
			Any error message for the expansion module should not be displayed on the home display.
12	Function (When DSA-82 is used)	Turn ON the power of the host monitor, and check whether the power supply LED lights.	The power supply LED on the front side of the adapter should light.
13	Cables	Visually check all cables for any damage.	No damage should be found.
14	CO ₂ Calibration (When HCP-800/ 810/820 is used)	Check the date of the previous calibration. (Refer to the following caution.)	Should be within one year.
		Check the remaining time until the next calibration. [Menu]> [CO ₂]> [CO ₂ Cal.]	Should not be 0 hrs.
15	Sampling Tube (When MGU-800/ MGU-810 is used)	Check that it is not reused.	Extra supplies should be kept.
16	Airway Adapter (When MGU-800/ MGU-810 is used)	Check that it is not reused.	Extra supplies should be kept.
17	Flow Sensor (When MGU-810 is used)	Check that it is not reused.	Extra supplies should be kept.
18	Gas Measurement Accuracy Check (When MGU-800/ MGU-810 is used)	Check the date of the previous gas measurement accuracy check.	Should be within one year.

No.	Check Items	Check Procedure	Criteria
4. Periodic Replacement Parts, Periodic Check			
01	Water Trap (When MGU-800/MGU- 810 is used)	Check the last replaced date of reservoir.	Should be within 1 month.
02	Nafion Tube DRYLINE Receptacle (When MGU-800/MGU- 810 is used)	Check the last replaced date of Nafion Tube, O ₂ filter, dust filter.	Should be within 1 years.
03	Periodic Inspection	Check the date of the previous periodic inspection.	Should be within one year.

 **CAUTION**

- ♦ 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.

Periodic Check Items and Procedures

Perform the periodic check according to the following list.

- ♦ The periodic check should be performed once a year.
- ♦ The "Periodic Check List" is on the last page of this manual.
- ♦ If the equipment fails any check item on the periodic check list, the general judgment will be "Fail". Repair the equipment so that it passes all the check items.
- ♦ Use the equipment only if the judgments for all the items are "OK".
- ♦ Check all cables, equipments, accessories, earth impedance, leakage current, and accuracy.

CAUTION

- ♦ Before the check procedure, back up the setup data and patient data on a CF card.
- ♦ Some models of commercially available bench top functional testers and patient simulators can be used to verify the proper functionality of SpO₂ monitoring system, sensors, cables, but they are incapable of properly evaluating the SpO₂ measurement accuracy. SpO₂ measurement accuracy can only be evaluated by comparing measurement data with SaO₂ measurements obtained from simultaneously sampled arterial blood using a laboratory Co-oximeter.

No.	Check Items	Check Procedure	Criteria
1. External Appearance/Accessories			
01	External Appearance	Visually check the exterior for scratch, crack, deformation, and rust.	No scratches, cracks, deformation, and rust should be found on the exterior.
02	Cables	Check that neither damage nor broken wire is found in all cables.	Neither damaged nor broken wire should be found.
03	Printing Paper	Visually check the installed condition.	The paper should be correctly installed.
04	Operation Manual	Check that accompanying documents (operational manual, etc.) are stored in specified location.	Should be stored in specified location.

No	Check Items	Check Procedure	Criteria
2. Power Supply			
01	Main Power Supply Switch	Check by connecting the power cable to AC and turning the power supply switch ON/OFF.	Check that the power supply LED lights.
02	Fuse	Remove the fuse from the fuse holder, and visually check the model type and current capacity.	The specified fuse indicated on the equipment should be used.

No	Check Items	Check Procedure	Criteria
3. Display/Operation/Print			
01	Check Labels	Visually check the rating label and caution label of the equipment.	Should be neither peeled nor stained nor unclear.
02	Operation, Switch	Check by operating the switches and touch keys.	Should operate correctly.
03	LCD Unit	Check that the home display is displayed on the LCD.	Characters and waveform should be clear. The display should be clearly displayed with sufficient brightness.
04	Alarm Indicator	Check if the alarm indicator lights when the power is turned ON.	The 3 segments should light in red, white, and red when the power is turned ON.
05	Alarm Sound/ Operating Sound	On the "Tone/Volume" menu, check the alarm sound.	Alarm sound should generate with proper volume. There should be no beat noise.

No	Check Items	Check Procedure	Criteria
06	Date/Time	Check the year, month, day, and time on the display.	The year, month, day, and time should be correctly displayed.
07	Printing Status	Perform test printing on the maintenance menu. Visually check the printing condition and also if there are thin or missing points.	The printed characters should be clear and legible.
08	Paper Speed	Perform test printing on the maintenance menu. Check by measuring the length of printed grid.	Error should be within $\pm 5\%$ for 25 mm/sec and 50 mm/sec waveform traces.
09	Remote Control	Check that the screen switches with the remote control operation.	The screen should switch.
10	Telemetry Transmitter	Check the receiving condition of waveforms from the telemetry transmitter.	Correct waveforms and numeric data should be displayed and receiving condition should be stable.

No	Check Items	Check Procedure	Criteria
4. ECG			
01	ECG Display Size	Input square wave of 1 mV amplitude from the simulator, and check the displayed waveform on the monitor with a waveform size of x1.	The amplitude of the displayed waveform should be within 10 mm \pm 1 mm.
02	Heart Rate Display Accuracy	Set the heart rate to 60 bpm on the simulator, and check the displayed heart rate on the monitor.	The displayed heart rate should be within 60 bpm \pm 3 bpm.
03	Lead OFF	Remove each electrode from the simulator and check that "Lead OFF" message is displayed.	The "Lead OFF" message for the removed electrode should be displayed.

No	Check Items	Check Procedure	Criteria
5. Respiration (Impedance Measurement)			
01	Respiration Rate display accuracy	Input the respiration signal of 20 Bpm with the following setting from the simulator, and check the displayed RR value on the monitor. Baseline Impedance : 1500 Ω , Detection Lead: II (LL), Respiration Waveform: Normal, Amplitude: 1 Ω	The displayed RR should be within 20 Bpm \pm 3 Bpm.

No	Check Items	Check Procedure	Criteria
6. Invasive Blood Pressure			
01	BP Zero	Input the blood pressure of 0 mmHg from the simulator, perform zero balance, and check the BP value on the monitor.	Zero balance should be properly performed, and the displayed BP value should be within 0 mmHg \pm 1 mmHg.
02	BP value display accuracy	Set the BP value to 250 mmHg on the simulator, and check the displayed BP value on the monitor.	The displayed BP value should be within 250 mmHg \pm 5 mmHg.

No	Check Items	Check Procedure	Criteria
7. SpO ₂			
01	Oxygen Saturation Display Accuracy	Input the oxygen saturation signal of 90%SpO ₂ from the simulator, and check the displayed oxygen saturation value on the monitor.	The displayed oxygen saturation value should be within 90%SpO ₂ \pm 2%.
02	Pulse Rate Display Accuracy	Input the pulse rate signal of 60 bpm from the simulator, and check the displayed HR value on the monitor.	The displayed heart rate should be within 60 bpm \pm 3 bpm.

No	Check Items	Check Procedure	Criteria
8. NIBP			
01	NIBP Test	Connect the 500 ml tank, and perform the NIBP test under the test menu.	All the test results should be "OK".

02	BP Measurement Error	Set the simulator to 120 mmHg for SYS, 80 mmHg for DIA, 90 mmHg for MAP, and perform the NIBP measurement.	The displayed BP value should be within 120 mmHg \pm 10 mmHg for SYS, 80 mmHg \pm 10 mmHg for DIA, 90 mmHg \pm 10 mmHg for MAP.
03	Pulse Rate Measurement Error	Set the pulse rate to 60 bpm on the simulator, and perform the NIBP measurement.	The displayed pulse rate should be within 60 bpm \pm 3 bpm.

No	Check Items	Check Procedure	Criteria
9. Temperature			
01	Temperature display error	Input the temperature signal of 37°C from the simulator, and check the displayed temperature value on the monitor.	The displayed temperature value should be within 37°C \pm 0.2°C.

No	Check Items	Check Procedure	Criteria
10. Cardiac Output (Blood Temperature, Injectate Temperature)			
01	Blood Temperature Measurement	Input the blood temperature signal of 37°C from the simulator, and check the displayed blood temperature value on the monitor.	The displayed blood temperature value should be within 37°C \pm 0.3°C.
02	Injectate Temperature Measurement	Input the injectate temperature signal of 15°C from the simulator, and check the displayed injectate temperature value on the monitor.	The displayed injectate temperature value should be within 15°C \pm 0.5°C.

No	Check Items	Check Procedure	Criteria
11. CO ₂ Concentration (Optional)			
01	CO ₂ Concentration Calibration (HCP-800/HCP-810)	Perform calibration according to the procedure explained in "Chapter 9 Maintenance Check" (Maintenance Manual).	The calibration should complete without error.
02	CO ₂ Concentration Measurement	Perform measurement with 5% calibration gas, and check the displayed CO ₂ concentration value on the monitor.	The displayed CO ₂ concentration value should be within 38 mmHg \pm 2 mmHg.

No	Check Items	Check Procedure	Criteria
12. BIS (Optional)			
01	Sensor Detection	Connect the signal generator and BIS sensor simulator, and check that the brain wave is displayed.	Brain wave should be displayed on the monitor.

No	Check Items	Check Procedure	Criteria
13. Analog Output			
01	ECG Output Accuracy	Input 10 Hz sine-wave signal of 1mV (2mVp-p) amplitude from the simulator, connect the oscilloscope to the output, and check the displayed waveform.	The displayed waveform amplitude should be within 1 V \pm 0.1 V (2 Vp-p \pm 0.2 Vp-p).
02	BP output accuracy	Input BP signal of 0 mmHg, 100 mmHg, 250 mmHg from the simulator, connect the oscilloscope to the output, and check the displayed waveform.	The displayed output voltage should be within 0 V \pm 0.1 V at 0 mmHg, The displayed output voltage should be within 1 V \pm 0.1 V at 100 mmHg,

No	Check Items	Check Procedure	Criteria
14. Electrical Safety			
01	Earth Leakage Current (NC)	Measure the earth leakage current under normal condition using a leak measurement safety tester. Test according to the test method of IEC 60601-1.	It should be 5 mA or less.

02	Earth Leakage Current (SFC)	Measure the earth leakage current under single failure condition using a leak measurement safety tester. Test according to the test method of IEC 60601-1.	It should be 10 mA or less.
03	Patient Leakage Current I (NC)	Measure the patient leakage current under normal condition using a leak measurement safety tester. Test according to the test method of IEC 60601-1.	AC/DC It should be 0.01 mA or less.
04	Patient Leakage Current I (SFC)	Measure the patient leakage current under single failure condition using a leak measurement safety tester. Test according to the test method of IEC 60601-1.	AC/DC It should be 0.05 mA or less.
05	Patient Leakage Current III (SFC)	Measure the patient leakage current under single failure condition using a leak measurement safety tester. Test according to the test method of IEC 60601-1.	It should be 0.05 mA or less.
06	Patient Auxiliary Current (NC)	Measure the patient auxiliary current (NC) under normal condition using a leak measurement safety tester. Test according to the test method of IEC 60601-1.	It should be 0.01 mA or less.
07	Patient Auxiliary Current (SFC)	Measure the patient auxiliary current (SFC) under single failure condition using a leak measurement safety tester. Test according to the test method of IEC 60601-1.	It should be 0.05 mA or less.

No	Check Items	Check Procedure	Criteria
14. Electrical Safety (※)			
Perform the following check item as appropriate. Check these items when you have disassembled the equipment to check or replace the boards or unit.			
08	Protective ground resistance	Measure protective ground continuity resistance. Test according to the test method of IEC 60601-1.	It should be 0.1Ω or less between the protective earth terminal and accessible conductive part. The protective earth conductor resistance in the power cable should be 0.1Ω or less.
09	Withstand Voltage Test (A-a1)	Apply 1500V for 1 minute between mains part and accessible metal part which is protectively earthed. Test according to the test method of IEC 60601-1	It should resist the applied voltage.
10	Withstand Voltage Test (A-a2)	Apply 4000V for 1 minute between mains part and exterior without protective earth. Test according to the test method of IEC 60601-1.	It should resist the applied voltage.
11	Withstand Voltage Test (B-a)	Apply 4000V for 1 minute between mains part and applied part. [Caution] The test voltage may differ as the internal protective circuit configuration differs depending on the device. Test according to the test method of IEC 60601-1.	It should resist the applied voltage.

12	Withstand Voltage Test (B-d)	Apply 1500V for 1 minute between exterior and applied part. [Caution] The test voltage may differ as the internal protective circuit configuration differs depending on the device. Test according to the test method of IEC 60601-1.	It should resist the applied voltage.
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Gas Measurement Accuracy Check Procedure (MGU-800/MGU-810)

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

CAUTION

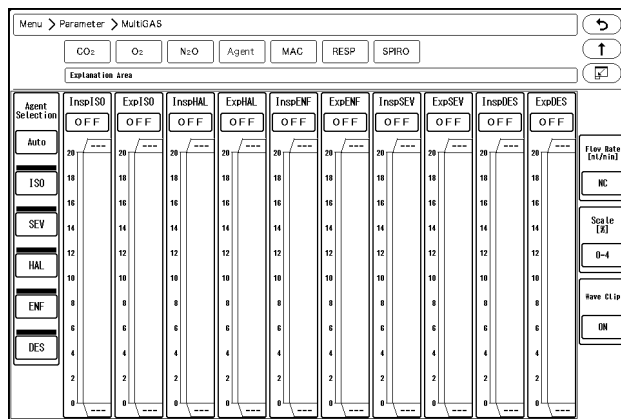
- Perform the gas measurement accuracy check when the multigas unit is connected.
- Warm up the multigas unit sufficiently before updating the checked date of gas measurement accuracy. To acquire maximum measurement accuracy, 10 minutes of warm up is required after the power is turned ON.
- If the accuracy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

NOTE

- The gas measurement accuracy of the multigas unit should be checked every year. The date of the last measurement check will be displayed on the "Gas Accuracy Check" screen. During the accuracy check, 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 perform it manually as necessary.
- Zeroing should be performed with the transducers opened to air.
- During accuracy check, the pressure display on the calibration gas regulator should be in the range displayed in green.

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

- ▶ Press the [Menu], [Gas] ("Parameter"), [Agent] keys to display the "Agent" setup screen, and select [200 mL/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 Accuracy Check] keys.

- ▶ The "Gas Accuracy Check" screen will be displayed.

GAS	Target Value(%)	Measurement (%)	Status
CO ₂	5.0	0.1	
O ₂	40.0	21.0	
N ₂ O	40.0	30.0	
HAL	5.0	3.5	

- ▶ 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 the gas measurement accuracy check 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.

CO ₂ :	5.0±1.1%
O ₂ :	45.0±5.7%
N ₂ O:	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" was updated.

GAS	Target Value(%)	Measurement (%)	Status
CO ₂	5.0	4.8	
O ₂	40.0	40.3	
N ₂ O	40.0	39.8	
HAL	5.0	5.0	

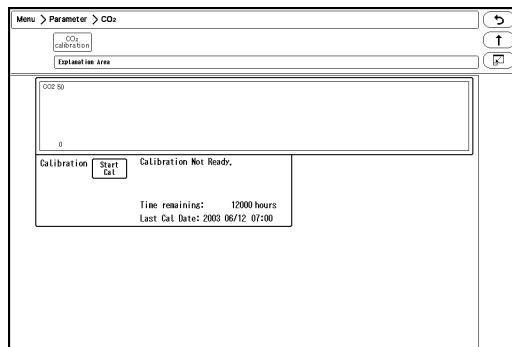
7 Set the "Flow Rate" to initial value.

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.

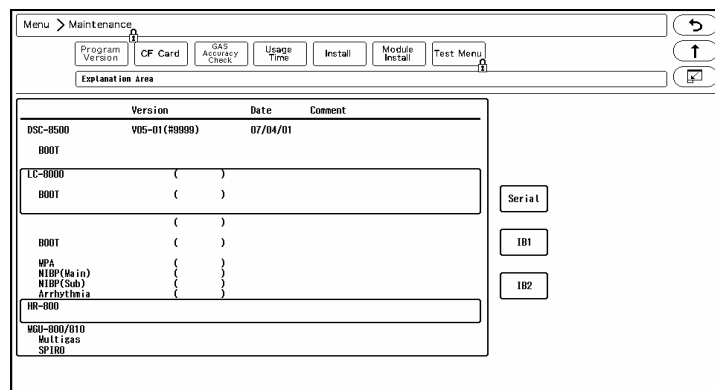
- ♦ When EtCO₂ measurement is not stable or accuracy is degraded compared with other measuring device.
- ♦ When the patient monitor was not used for a while, or when EtCO₂ was not measured for a while.
- ♦ When "HCP-800 Calibration" is displayed on the "Periodic Replacement Parts" screen at power ON.
- ♦ 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.



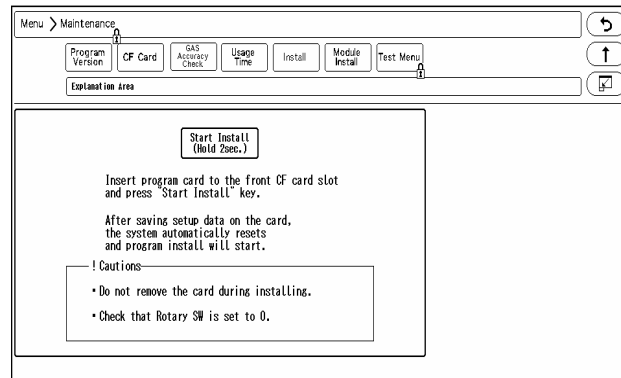
- ▶ The software version, boot version, date, comment required for the DS-8500 system will be displayed.
 - ♦ DSC-8500 Main Unit Software
 - ♦ Display Unit (LC-8019T/LC-8019TC, LC-8015T/LC-8015TC)
 - ♦ HS-8000/DS-8007 Software
 - ♦ HR-800 Recorder Unit Software
 - ♦ MGU-800/810 Multigas Unit Module, 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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