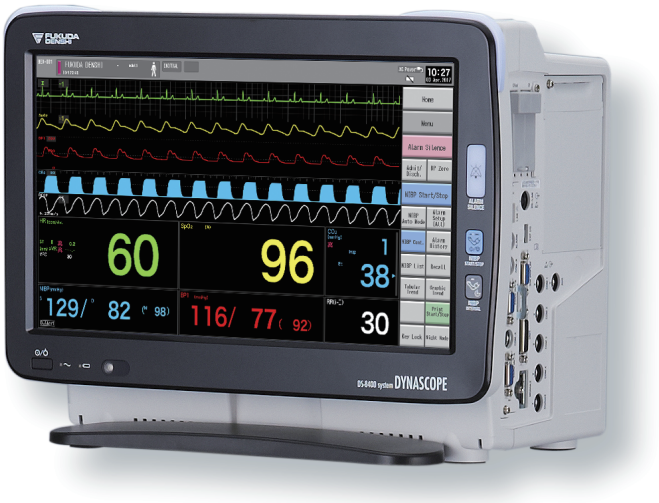
DYNASCOPE 8000 Series
Patient Monitor

DS-8400 system

Ver. 05

Maintenance Manual



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

FUKUDA

This manual is for the DS-8400 System Version 05.

AS TO ELECTRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY
ANSI/AAMI ES 60601-1 (2005)+AMD1 (2012),
IEC 60601-2-25 (2011), IEC 60601-2-27 (2011),
IEC 80601-2-30 (2009)+AMD1 (2013), IEC 60601-2-34 (2011),
IEC 60601-2-49 (2011), ISO 80601-2-55 (2011),
ISO 80601-2-56 (2009) AND ISO 80601-2-61 (2011).

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

CAUTION

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

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

Contents

Preface

Safety

Chapter 1 Installation of the Unit

Chapter 2 Network System Construction

Chapter 3 Using the External Media

Chapter 4 Connection to the External Devices

Chapter 5 Initial Settings

Chapter 6 Setup Item/Default Value

Chapter 7 Replacement Parts

Chapter 8 Cleaning/Disinfecting/Storing

Chapter 9 Maintenance Check

Preface

Preface

Introduction

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

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

Important Notice

For Safe Operation of the Equipment

(1) Before using this equipment, read this operation manual.

(2) Fukuda Denshi cannot predict all the dangers which may be caused by misusage of this product or environmental condition.

(3) For using this equipment, there are many items that "should be performed", "should not be performed", and "cannot be performed". It is not possible to cover all these items in this manual or warning labels. Therefore, it is necessary to also follow the general safety precaution other than the items described in this manual.

(4) To prevent accidents, usage other than intended, or usage, cleaning, and maintenance not described in this manual should not be performed.

(5) When using this equipment, follow the respective regulation to minimize the probability of accidents.

Intended Use of this Equipment

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

<Intended Use>

This equipment is intended for measuring parameters such as ECG, respiration, NIBP, pulse rate, SpO_2, SpCO, SpMet, pulse wave, temperature, BP, CO, respiration gas (concentration of CO_2, N_2O, volatile anesthetic agent, O_2), 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-8400 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 External Media	Procedure to use the external media
4.Connection to the External Devices	External equipment connection/setup, magnetic card reader usage
5.Initial Settings	Initial setup, administrator setup, alarm/measurement setup, user I/F, user mode registration
6.Setup Item/Default Value	Default and backup of setup items
7.Replacement Parts	Precautions about the periodic replacement parts, consumable parts
8.Cleaning/Disinfecting/Storing	Procedure to handle, clean, store this equipment
9. Maintenance Check	Daily and periodic checks, self-diagnosis function, software version software install

Safety

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.

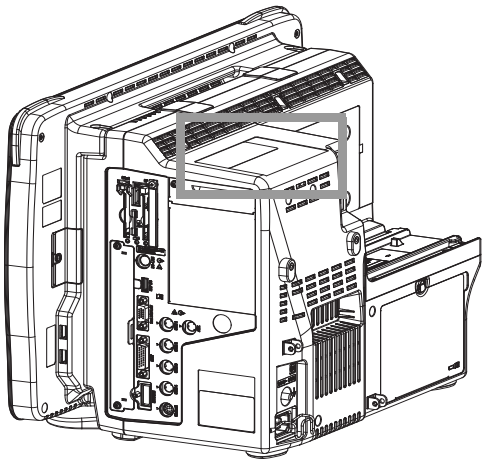
Warning Labels Attached to the Unit

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

⚠ CAUTION

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

❑DS-8400 System Main Unit

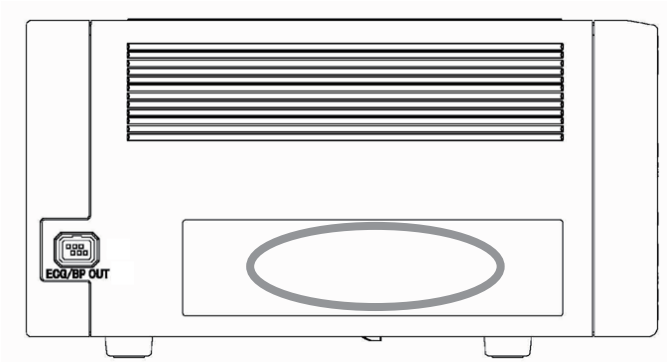


Warning Label Attached to the Equipment

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

Contents of the Label

❑Super Unit: HS-8000 Series



Warning Label Attached to the Equipment (HS-8312)

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

Contents of the Label

Graphic Symbols

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

Symbol	Description
	Follow operating instructions (Warning); indicated in blue. Failure to follow operating instructions could place the patient or operator at risk.
	Follow operating instructions (Information); Indicates the need to refer to the related accompanying documents before operation.
	General precaution
	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)
	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 Part
	GAS Output Part
	Signal Input Part
	TCP/IP Network Connector Connects to TCP/IP network.
	RS-232C Connector Connects the related device.
	Eject Indicates the switch to pull out the paper tray.
	Indicates prohibited actions. Refer to the instruction.
	Indicates mandatory or instructed actions. Refer to the instruction.
	Battery
	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.

Symbol	Description
IP32	Dustproof (IP3X): Protection against tips of tools. Waterproof (IPX2): Protection against water drops falling vertically over 15 degrees range.
IPX1	Waterproof (IPX1): Protection against water drops.
	Alarm Silence
	NIBP Start/Stop
	NIBP Periodic Measurement
	Lock
	Unlock

Precautions for Safe Operation of Medical Electrical Equipment

⚠ CAUTION

- Users should have a thorough knowledge of the operation before using this equipment.
- Do not use the equipment in an environment where protective earth and wiring is questionable.

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

- Set the monitor to the user's intended position where the user can easily recognize the visual and audible monitoring conditions. Normally it is recommended to set at a distance of one (1) m from the user.
- Install or store in a place where the equipment will not be exposed to splashing water.
- Install or store in an area where environmental conditions such as atmospheric pressure, temperature, humidity, ventilation, sunlight, dust, sodium, and sulfur will not adversely affect the system.
- 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.
- Make sure to secure the equipment during usage.
- Do not place the equipment or accessories in any position that might cause it to fall on the patient.

❑Precautions Before Using the Equipment

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

❑Precautions During Using the Equipment

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

❑Precautions After Using the Equipment

- Unplug all the cables from the patient before turning off the power.
- When unplugging the cables, do not apply excessive force by pulling on the cord. Pull by 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 your nearest service representative.

❑Precaution about Disassembling/Remodeling the Equipment

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

❑Precautions about Maintenance Check

- Make sure to periodically check the equipment, accessories, and cables.
- Before reusing the equipment that has been left unused for a while, make sure that the equipment operates 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 each equipment is properly grounded.

Precautions about the Maintenance

⚠ WARNING

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

⚠ CAUTION Precautions about Safety Check

- For safe operation of the equipment, regular inspection and maintenance are required. Once a year, check all cables, devices, and accessories for damage, earth impedance, earth and leakage currents, and all alarm functions. Also, ensure that all safety labels are legible. Maintain a record of these safety inspections.
- Immediate maintenance has to be carried out for the following case.
  - When the equipment was subjected to extreme mechanical stress, e.g. after a heavy fall.
  - When the equipment was subjected to liquid spill.

- When the monitoring function is interrupted or disturbed.
- When parts of the equipment enclosure are cracked, removed, or lost.
- When any connector or cable shows signs of deterioration.

Precautions about the Network System

Medical Telemetry

⚠ CAUTION Precautions about the Installation

- The medical institution (hereinafter referred as "Institution") must decide the telemetry installation plan for the medical institution in order to prevent interference between transmitters (telemetry based on destination country's radio law). When telemetry has already been installed and been used, radio format, frequency, and antenna power are required to be examined to prevent interference.
- When using telemetry which requires zone location, the institution is to set up the zones as an operation unit for each transmitter to prevent electronic interference between telemetry throughout the Institution.
- When using telemetry which requires zone location, display and identify each prepared zone in the equipment.
- When laying receiver antenna for each transmitter, the Institution has to examine the installation so that electronic interference does not occur.
- Based on the above examination result, the Institution should place each receiver antenna as required.

⚠ CAUTION Precautions about the Management

- The institution appoints a person to manage the wireless channels for the whole medical institution. And when using telemetry which requires zone location, the Institution should nominate a person to manage the wireless channels in each zone (a "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.
- When using the electrosurgery-proof type ECG relay cable, the impedance respiration cannot be measured, and its numeric data and waveform will not be displayed. When measuring in an environment where electrosurgery is not performed, make sure to use the standard ECG relay cable.
- As this equipment utilizes capacitive touch panel, the energy from the electrosurgical knife may pass through the cable to the touch panel causing unintentional touch panel control. Locate the cables as far away as possible from the touch panel.

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-8400 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 any equipment or cable not authorized by Fukuda Denshi to any I/O connector. Also, do not connect any damaged equipment or cable. If done so by mistake, not only that the equipment cannot deliver its maximum performance, the equipment may be damaged and safety cannot be ensured.
- 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 the equipment under condition other than specified, contact your nearest representative.
- Use only the supplied 3-way AC power cable. Use of other cables may result in electric shock to the patient and the operator.
- The power cable must be connected to a hospital grade outlet.
- When using multiple ME equipment simultaneously, perform equipotential grounding to prevent potential difference between the equipments. Even a small potential difference may result in electric shock to the patient and the operator.

- Carefully route the cables to avoid patient entanglement and strangulation.
- When lifting this equipment, hold the bottom part of the main unit and not the display unit.
- Damage to the LCD may cause leakage of liquid crystal. In such case, do not touch the leaked liquid crystal with bare hands, or put it into your mouth as it may cause intoxication. If the liquid crystal accidentally enters the eyes or mouth, wash off immediately with water and consult a physician.
- When attaching the display unit to the main unit, slowly insert the rail on the rear side of the display unit to the guides on both sides of the main 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 SpO_2 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 SpO_2 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 SpO_2 on a same site for a long duration may cause blisters from the irradiation light of the SpO_2 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 SpO_2 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 CO_2 Monitoring (HCP-800/HCP-810/HCP-820, HPD-800/HPD-810/HPD-820)

- Only one of either HCP-800/HCP-810/HCP-820/HPD-800/HPD-810/HPD-820 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/HCP-820, 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/HCP-820, <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/HCP-820 by the sampling line, as the sampling line could disconnect from the equipment, causing the equipment to fall on the patient.
- CO_2 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" P7-85)
- 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

- Do not assess the patient's condition only with the information from this equipment. A clinical judgment based on the information from the equipment should be made by a doctor who fully understands functions of the equipment, in a comprehensive manner combined with clinical findings and other test results.
- Do not assess the patient's condition only with the alarm from this equipment. When the alarm is set to OFF or if the alarm priority is low, a sudden change of the patient may not be noticed.
- If an alarm generates, check the patient's condition first and ensure the safety. Depending on the alarm, take appropriate measures to remove the problem. If the problem lies with the alarm setting, set the alarm properly.
- When measuring for a long period of time, make sure not to compress the patient with the lead cables and the electrodes. Compressing the same site for a long duration may inhibit the blood flow and generate compression necrosis and burn injury.
- Use only the spare parts specified for this equipment. Otherwise, proper function cannot be executed.
- Do not use the touch panel with the film attached. It may cause malfunction or damage the touch panel.
- For quality improvement, specifications are subject to change without prior notice.

- This equipment utilizes LED for the backlight. Since this LED deteriorates by the life cycle, the display may become dark, scintillate, or may not light by the long term use. In such case, contact your nearest service representative.
- 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 the equipment for a long period, disconnect the power cable and lithium-ion battery.
- Although the LCD utilizes highly accurate picture elements, occasionally, there may be a few pixels which do not light or constantly light. Please note that this is not an equipment failure, and will not affect monitoring operation.
- Exposing LCD panel to intense light may deteriorate display property. Do not expose the panel to direct sunlight or strong ultra violet (UV) light.
- The lithium-ion battery can only be charged in the specified operational temperatures of the equipment. Refer to the operation manual of the lithium-ion battery (BTO-005) for details.

⚠ CAUTION Precautions about the ECG Monitoring

- If any electrodes get detached from the patient after being connected to the lead cable and patient monitor, pay attention that the metal part of the electrode does not get in touch with any metal parts of the bed or any conductive parts. Also, the operator should not touch any conductive parts with bare hands. Otherwise, it may 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 μV.
  - When the ECG waveform size is x2 or x4, the arrhythmia detection level is 150 μV.
- 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 SpO_2 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 SpO_2 connector. Otherwise, the outside light may affect to falsely display measurements.
- The pulse wave is normalized for SpO_2 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 SpO_2 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 SpO_2 sensor instruction manual.
- If "---" is displayed for the SpO_2 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 NIBP Monitoring

- Do not apply the NIBP cuff to site of injury. An injury may be worsened by the measurement.
- Do not apply the NIBP cuff to the arm on side treated axillary lymph nodes dissection. It may lead to lymphatic edema by the cuff pressure.
- Measuring on a limb with SpO_2 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 CO_2 Monitoring (HCP-800/HCP-810/HCP-820)

- Conduct CO_2 calibration for the following case.
  If the CO_2 gas calibration is not performed at a specified interval, CO_2 measurement accuracy may be affected and also subsequent gas calibration may not be possible.
  - When the accumulated measurement time exceeds 1,200 hours from the first use.
    However, if the first calibration was performed before the accumulated measurement time reaches 720 hours, another calibration is required when the accumulated measurement time exceeds 1,200 hours from the first calibration.
  - When 12 months has elapsed or the accumulated measurement time has exceeded 4,000 hours from the previous calibration.
  - When $EtCO_2$ measurement is not stable or accuracy is degraded compared with other measuring device.
  - When the patient monitor was not used for a while, or when $EtCO_2$ was not measured for a while.

- Perform the calibration 5 minutes after turning ON the power on the HCP-800/HCP-810/HCP-820.
- Do not disconnect the sampling tube during calibration. If disconnected, calibration will cease.
- Dispose of calibration gas according to the regulation of each medical institution.
- Microstream® $EtCO_2$ 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® $EtCO_2$ sampling tube.
- Only use Microstream® $EtCO_2$ sampling lines to ensure the monitor functions properly.

⚠ CAUTION Precautions about the CO_2Monitoring (HPD-800/HPD-810/HPD-820 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 CO_2 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/HPD-820 Gas Unit I/F and HCP-800/HCP-810/HCP-820 CO_2 Gas Unit, the upper $EtCO_2$ 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 SpO_2 second alarm function and its threshold selection should be based on the patient's clinical indication/portent and medical evaluation.
- If the SpO_2 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 [SpO_2], and if SpO_2 waveform/numeric data is set to [Disp. OFF], the PR value will not be displayed.
- If the RR source is set to [CO_2/GAS], and if CO_2 waveform/numeric data is set to [Disp. OFF], the RR value will not be displayed.
- If the RR source is set to [CO_2/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/HPD-820, HCP-800/HCP-810/HCP-820 are simultaneously used, the CO_2 concentration measurement will be performed by the equipment selected for the "CO_2 Source Priority" under ([Menu] > "Parameter" [CO_2]) .
- 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.
- CO_2, N_2O 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 cmH_2O at 60 L/min.
    The pediatric flow sensor dead space is 0.75 mL and the flow resistance is 0.9 cmH_2O 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 External Media

- Use only the specified external media.
- Use only the external media formatted on this equipment.
- 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.

⚠ 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, benzine, 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-8400 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 [CO_2/GAS] (Or, if [Auto] selects a setting other than [CO_2/GAS]), the CO_2 waveform will not be transmitted on a wired network.
  - For the numeric data displayed as "xxx", maximum or minimum value of measurable range will be transmitted.
  - The numeric data displayed as "--- " will be treated as not measured data.
  - If the measurement unit of CO_2 concentration is mmHg and [99mmHg] is selected for "Upper Limit of CO_2 (mmHg) Transmission" ([Initial Settings]>[System]>[DS-LAN]), the CO_2 value of 100 mmHg or above will be transmitted as 99 mmHg.
- As the DS-8400 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-8400 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-8400 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-8400 System will be displayed. The monitored RR and APNEA will be the same for the central monitor and the DS-8400 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 CO_2 concentration is mmHg and [99mmHg] is selected for "CO_2 (mmHg) Upper Limit of Transmission" ([Initial Settings]>[System]>[Telemeter]), the CO_2 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 (factory default).
  The alarm sound can be turned ON on the Tone/Volume setup screen.
- If the DS-8400 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. If the malfunction persists, stop using the equipment.
- The alarm generation on the DS-8400 System is not guaranteed if the alarm other than the specified one 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 a 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 are OFF.

Precautions about the SpO_2 Sensor

⚠ DANGER Danger of Burn Injury Caused by the SpO_2 Sensor

- When monitoring SpO_2, make sure to use only the specified sensor/relay cable. If any other sensor/relay cable is used, a high temperature rise of the sensor may place the patient in danger of burns.
  If there are any questions regarding the sensor/relay cable use for SpO_2 measurements of this equipment, please contact Fukuda Denshi service representative.

Precautions about the Masimo Model

⚠ CAUTION

- Possession or purchase of this device does not convey any express or implied license to use the device with unauthorized sensors or cables which would, alone or in combination with this device, fall within the scope of one or more of the patents relating to this device.

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 less than 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 set by the user, or the display mode which was last set.
However, this is only if the equipment was operated for 30 minutes or more before the power failure.

MGU-800/810, HCP-800/810/820, HPD-800/810/820 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.
- Verify that there is no wire break on the patient cable once a week.

Battery Pack

- Even if the battery pack is not in use, the remaining capacity decreases due to self-discharge.Make sure to verify once a week that the battery pack is fully charged.
- To fully charge the empty battery pack, it takes 5.0 hours during operation, and 2.5 hours when the power is OFF and AC cable is connected.
- The performance of the battery deteriorates with repeated use. To ensure performance of the battery, it is recommended to replace it once a year.

Electromagnetic Compatibility

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.

⚠ DANGER Static Electricity

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

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

⚠ WARNING Cellular Phone

- The radio wave may cause malfunction to the device.
  Cellular phones and radio sets should be turned off in the room (building) where medical device is located.

⚠ CAUTION Lightning

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

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

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

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

EMC Guidance

This 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.)

This equipment complies with IEC 60601-1-2: 2007 for the following system configuration.

- Main Unit: DSC-8410
- Display Unit: LC-8018TC
- Patient Monitor: DS-8007
- Multi Module: HM-801
- Multi Module: HM-800 x 2
- Recorder Unit: HR-800
- Telemetry Transmitter Module: HLX-801
- Gas Unit I/F: HPD-820
- Input Box: IB-8004
- Multiport Module HP-800
- Multigas Unit: MGU-810
- BISx I/F Unit: HBX-800
- BISx Module: BISx
- Lithium-Ion Battery: BTO-005

❑Compliance to the Electromagnetic Emissions

The DS-8400 System is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-8400 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-8400 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-8400 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-8400 System is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-8400 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-8400 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-8400 System is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-8400 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
			Portable and mobile RF communications equipment should be used no closer to any part of the DS-8400 System, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended Separation Distance
Conducted RF IEC 61000-4-6	3Vrms 150kHz to 80MHz	3Vrms	$d = 1.2\sqrt{P}$
Radiated RF IEC 61000-4-3	3V/m 80MHz to 2.5GHz	3V/m	$d = 1.2\sqrt{P}$ 80MHz to 800MHz $d = 2.3\sqrt{P}$ 800MHz to 2.5GHz 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: 

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.

*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-8400 System is used exceeds the applicable RF compliance level above, the DS-8400 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-8400 System.

*2: Over the frequency range 150kHz to 80MHz, field strength should be less than 3V/m.

❑Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the DS-8400 System

The customer or the user of the DS-8400 System can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the DS-8400 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-8400 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

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. The following units can be connected.

- Main Unit
- Display Unit (LC-8018TC/LC-8016TC)
- Super Unit (HS-8000/DS-8007 Series)
- Input Box

Connection with the Display Unit

⚠ WARNING

- 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, make sure to secure them with screws.
- Before starting up the equipment, make sure that the screws are securely tightened.

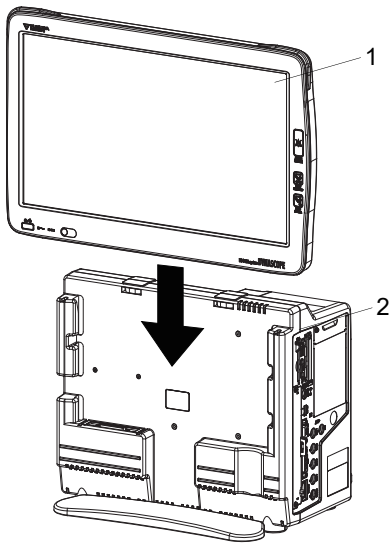
NOTE

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

1 Attach the display unit to the main unit from above using the guide on the rear side of the display unit and connection guide on the main unit.

1 Display Unit

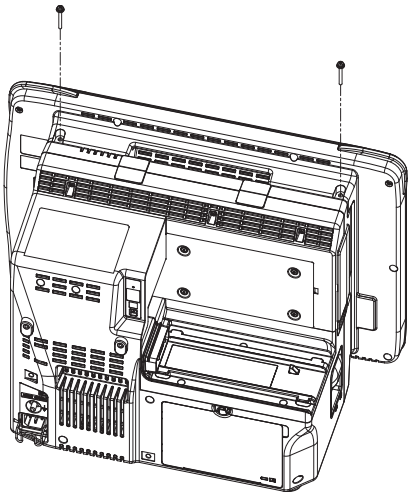
2 Main Unit



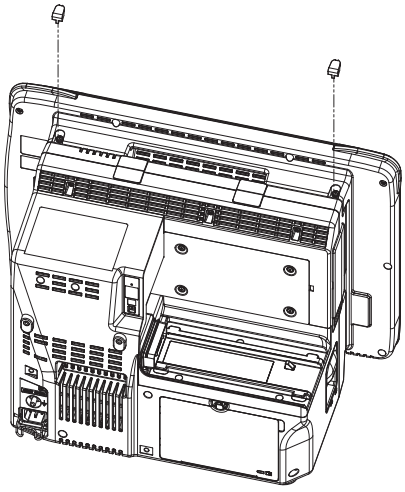
NOTE

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

2 Fix 2 parts on the top side with accessory screws (double washer sems screw: M4x30).



3 Attach the screw cover over the fixed screw.



Connecting the Super Unit, Input Box, DS-8007

Connect the main unit and the HS Adapter (HSA-80) 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 (HSA-80) or DS-8007 Adapter (DSA-82) to the main unit via Input Box.

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

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

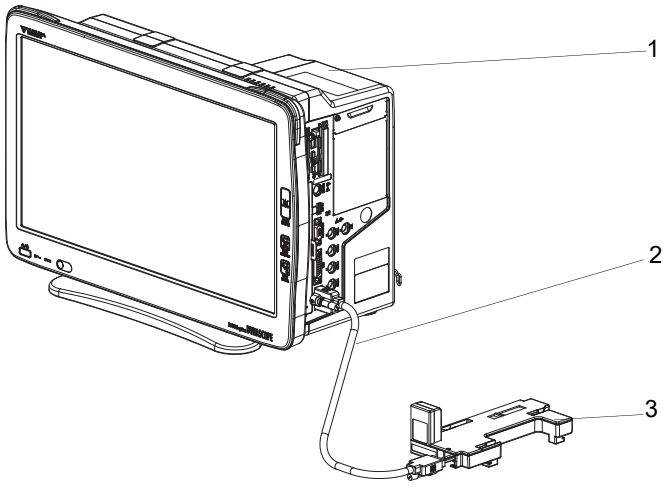
Model	Length
CJO-08SS0.3	0.3m
CJO-08SS1.5	1.5m
CJO-08SS3.5	3.5m
CJO-08SS5	5 m
CJO-08SS10	10 m

⚠ 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-8400 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.

❑Connecting the Main Unit and HS-8000 (with the HSA-80)

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



1 Main Unit

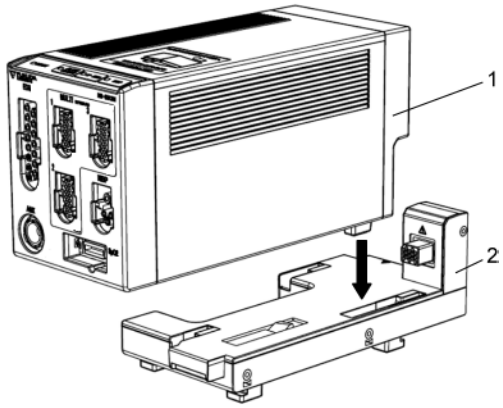
2 Module Connection Cable (CJO-08SSxx)

3 HS Adapter (HSA-80)

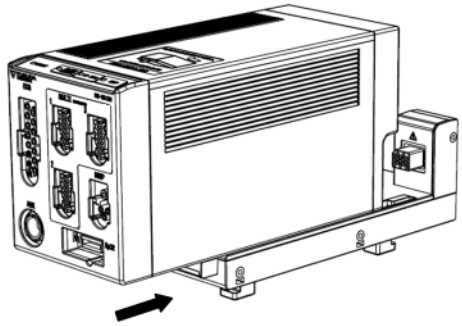
2 Align the HS-8000 leg position with the guide on the HSA-80.

1 HS-8000

2 HSA-80



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



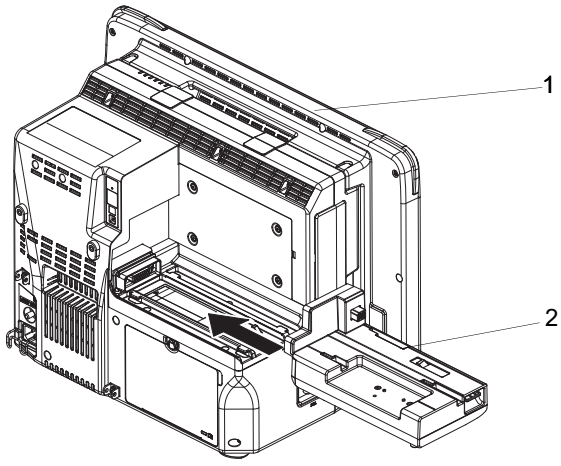
The HS-8000 can be connected/disconnected from the HSA-80 with the main unit power turned ON.

⚠ CAUTION

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

❑Connecting the Main Unit and HS-8000 (with the HSA-81)

1 Align the HS Adapter for DS-8400 (HSA-81) along the rail on the rear side of the main unit and slide it in the arrow direction until it is securely connected.



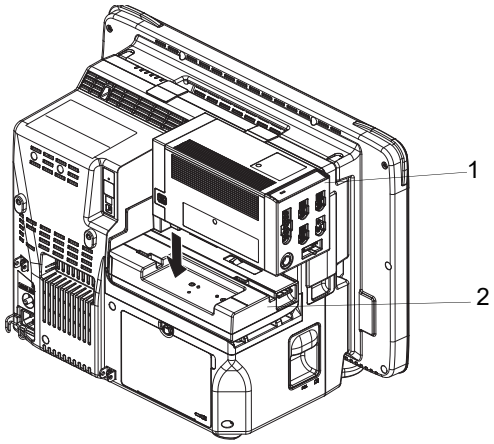
1 Main Unit

2 HS Adapter for DS-8400 (HSA-81)

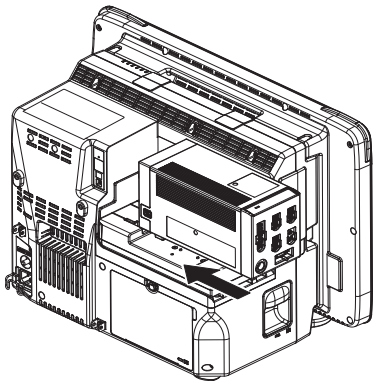
2 Align the HS-8000 leg position with the guide on the HSA-81.

1 HS-8000

2 HSA-80



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



❑Connecting the Main Unit, HS-8000, and Input Box

1 Connect the cables to the left and middle connectors on the Input Box to connect the main unit and the HS Adapter respectively.

NOTE

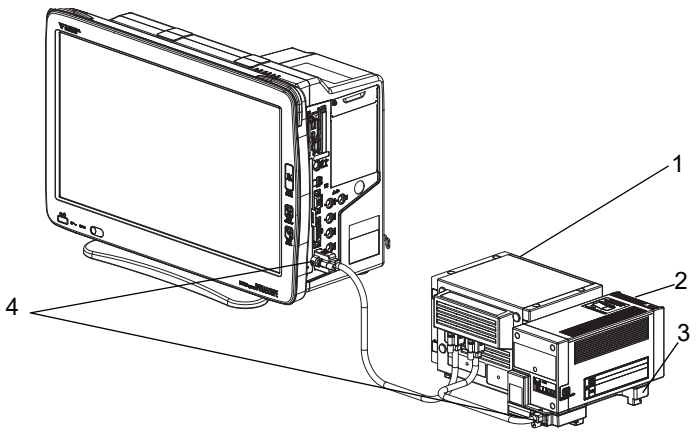
- There are 3 module-LAN connectors on the rear side of the Input Box. Connect the module connection cable to the specified connector according to the printing on the rear side.

1 Input Box: IB-8004

2 Super Unit: HS-8000 series

3 HS Adapter: HSA-80

4 module-LAN Connector



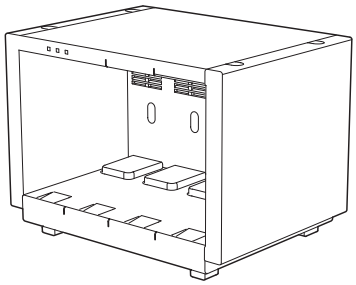
⚠ CAUTION

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

connection cable.

❑Setup for the Input Box (IB-8004)

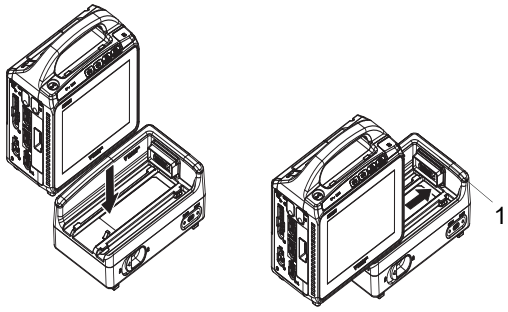
One Input Box can be connected to the DS-8400 system.



The Input Box ID corresponds to the following displayed messages.
IB1 : "IB-8000-1" or "IB1"

❑Connecting the Main Unit and DS-8007 (with the DSA-82)

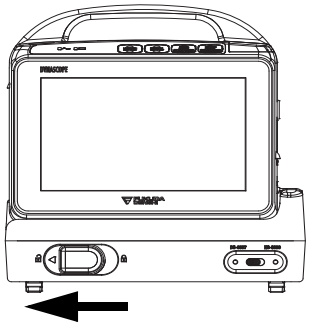
1 Place the DSA-82, and align the DS-8007 along the rail and slide it in the arrow direction until it is securely connected.

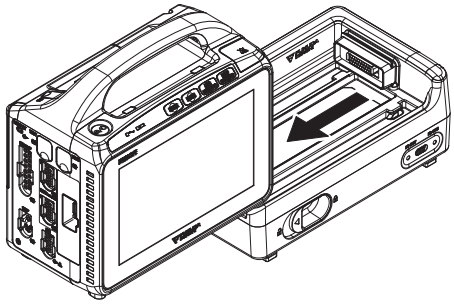


- Set the switch to the left side (DS-8007 side). The LED for the selected unit will light in green.

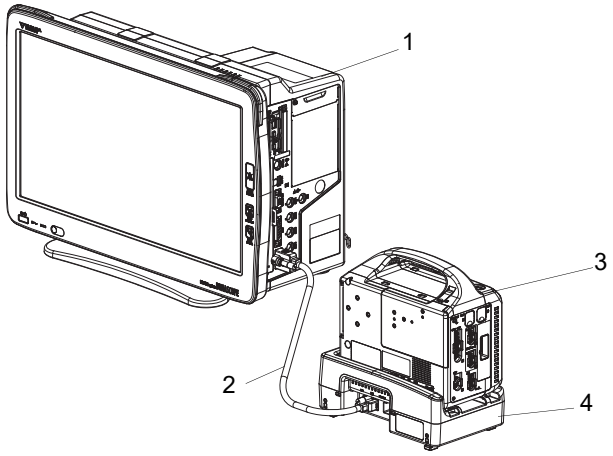
1 DS-8007/HS-8000 Switch

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





2 Connect the main unit (DSC-8410) and DS-8007 Adapter (DSA-82) using the module connection cable (CJO-08SSxx).



1 Main Unit (DSC-8410)

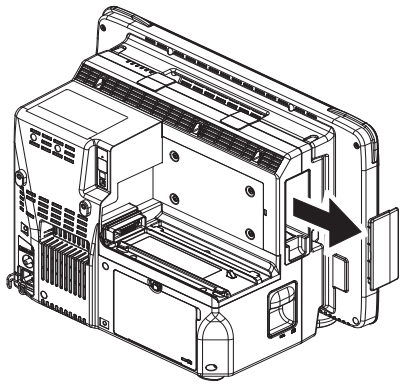
2 Module Connection Cable (CJO-08SSxx)

3 DS-8007

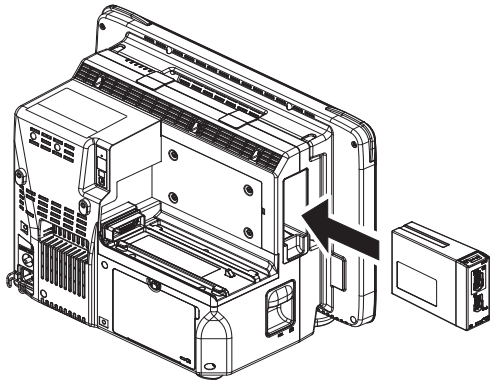
4 DS-8007 Adapter (DSA-82)

❑Connection of Expansion Module

1 Remove the module case cover on the left side of the main unit.



2 Insert the expansion module.



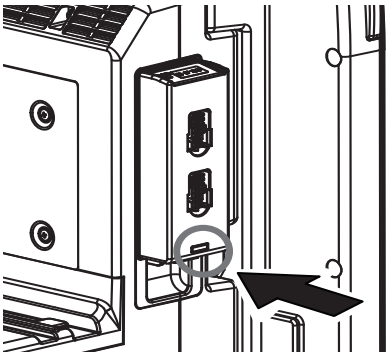
NOTE

- Insert the expansion module so that the "Δ" 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 this setup, the expansion module can be used regardless of the inserted slot position of the Input Box.

3 Press the release button until it becomes flat.

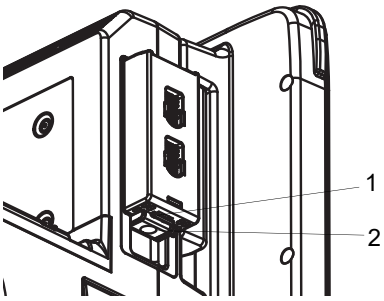


❑Removing the Expansion Module

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

1 Protruded Part on the Bottom

2 Lever

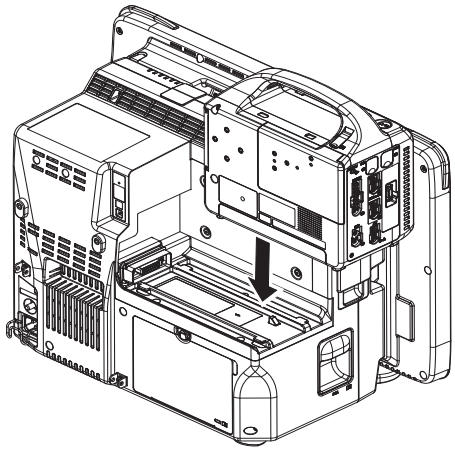


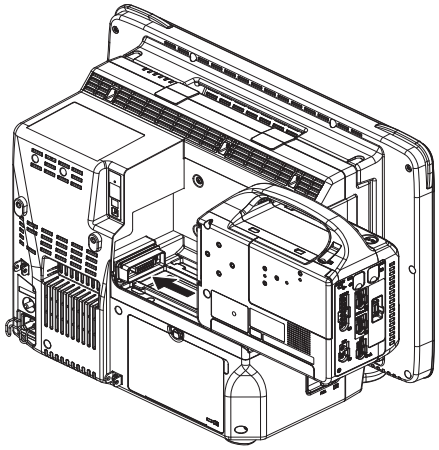
2 Pull out the expansion module by pushing up the lever while the "Δ" on the release button can be seen.

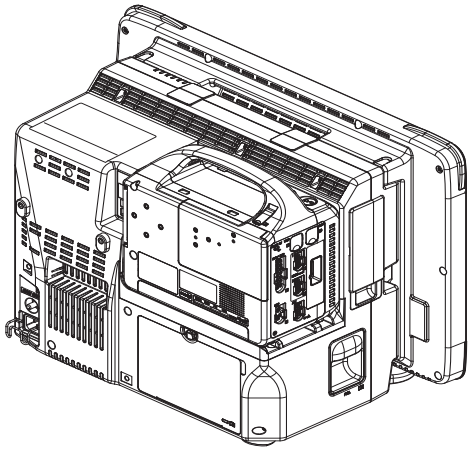
The expansion module can be connected/removed with the DS-8400 power turned ON.

Connecting the DS-8400 and DS-8007

1 Place the DS-8007 on the center of the rail on the rear side of the DS-8400, and slide it in the arrow direction until it is securely connected.







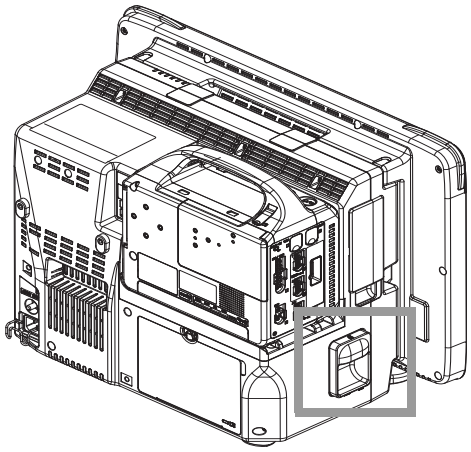
⚠ WARNING

- When connecting the equipment, make sure that it is securely installed.
- After connecting the equipment, make sure that it is locked.
- Do not use the equipment unlocked.

⚠ CAUTION

- Pay attention not to pinch your hands or any cables when attaching the equipment.

2 To remove the DS-8007, slide the Super Unit release lever.



Connection of Multigas Unit

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

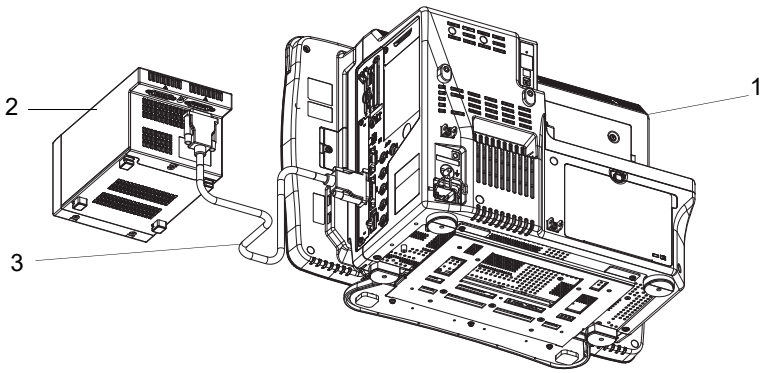
Model	Length
CJO-09SS0.3	0.3 m
CJO-09SS1.5	1.5 m
CJO-09SS5	5 m

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

1 Main Unit

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/MGU-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 Recorder Unit cannot be performed.
- Make sure that the power of the main unit is turned OFF when connecting/disconnecting the cable.

❑Connecting the Exhaust Tube

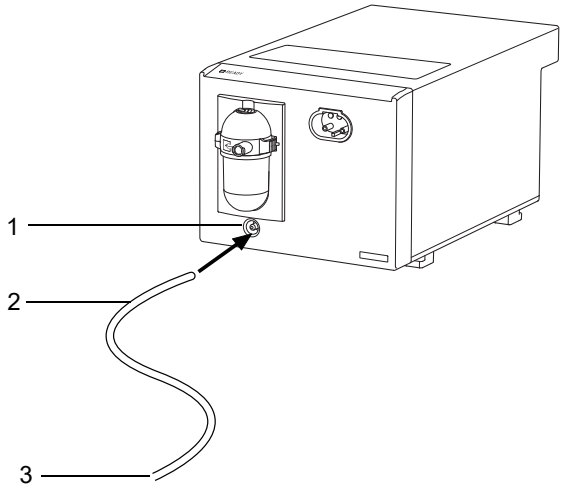
1 Connect the exhaust tube to the MGU-800/MGU-810 series.

▸ Connect one end of the exhaust tube (60-12120-00) 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 (60-12120-00)

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.

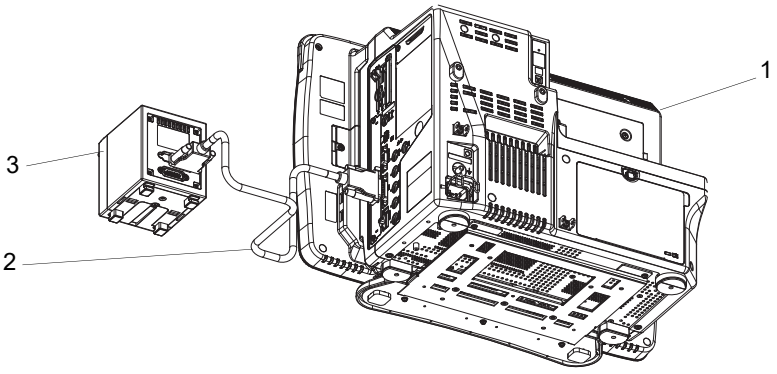
❑HR-800 Recorder Unit Connection Example 1

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

1 Main Unit

2 Unit Connection Cable (CJO-09SSxx)

3 HR-800



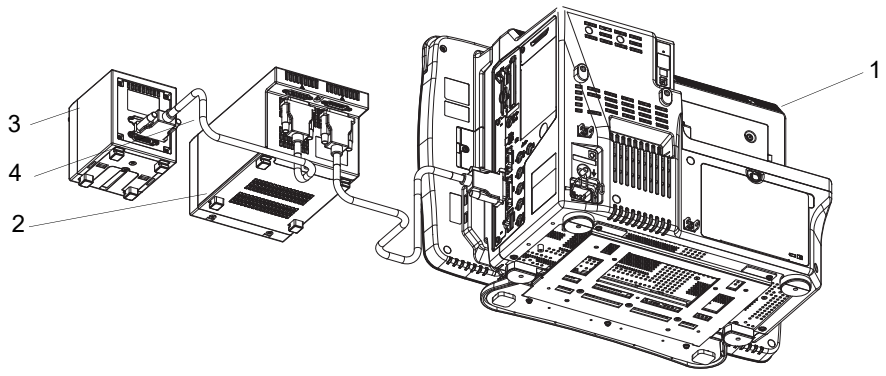
⚠ CAUTION

- 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

2 MGU-800/MGU-810

3 HR-800

4 Unit Connection Cable (CJO-09SSxx)

⚠ CAUTION

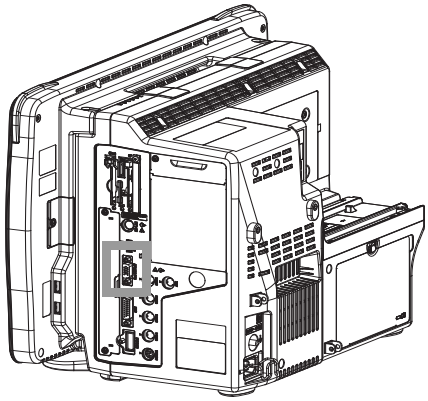
- When connecting the connection cable, make sure to secure the connector with screws. If the connection is not secure, contact failure may occur.
- Make sure that the power of the main unit is turned OFF when connecting/disconnecting the cable.
- When not connecting the MGU-800/MGU-810 series, make 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.
- When connecting the Recorder Unit to U-LINK connector, select [U-LINK] for "HR-800" on the [Menu>Initial Settings>System>Others].

NOTE

- About the Setup
  (☞"Connecting the MGU-800/MGU-810" P4-7)

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 your nearest service representative.



WARNING

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

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

When LC-8018TC is connected

Resolution	:	WXGA (1366 dot ×768 dot)
Horizontal Frequency	:	48.36 kHz
Vertical Frequency	:	60.00 Hz

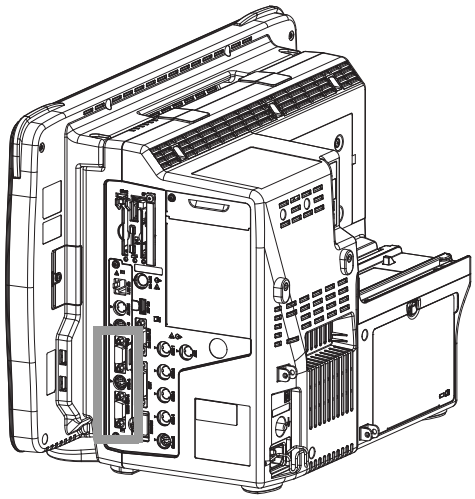
When LC-8016TC is connected

Resolution	:	WXGA (1366 dot ×768 dot)
Horizontal Frequency	:	48.36 kHz
Vertical Frequency	:	60.00 Hz
Cable Length	:	10 m (max)*

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

Connecting the Extended Display Unit

When the optional CC-84 Expansion Board is installed, maximum of two extended display units can be connected.
Video output connector and touch panel connector allows connecting the optional extended display unit.
When connecting, contact your nearest service representative to calibrate the touch panel.



The above illustration is when the optional CC-84 Expansion Board is installed. .

Model Type	External Output	Extended Display Unit Output	LAN (TCP/IP IF)
DSC-8410	Yes	No	No
DSC-8410 (with CC-84)	Yes	2 ch	1 ch

❑Connecting the Extended Display Unit

Connect the extended display unit using the accessory cable.

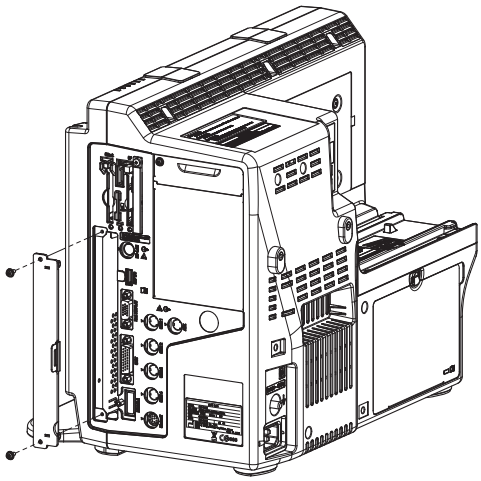
Extended Display Unit Type	Video Output Cable	Touch Panel Cable
Extended Display 1	VIDEO-OUT-A Connector	COM-A Connector
Extended Display 2	VIDEO-OUT-B Connector	COM-B Connector

❑Procedure to Install the CC-84 Expansion Board

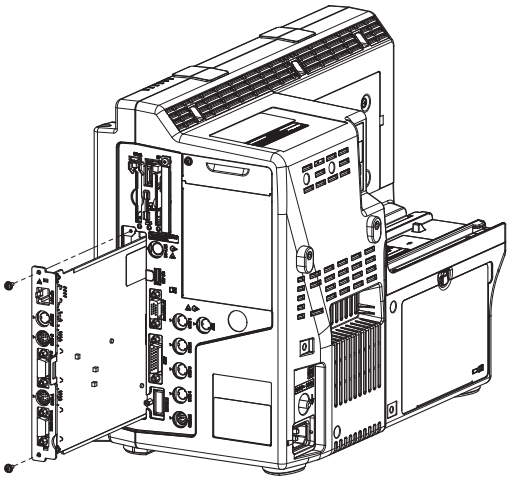
⚠ WARNING

- Make sure that the power of the DSC-8400 Main Unit is turned OFF and that the power cable is removed before installation.
  Also make sure to take precautions regarding electrostatic as it may damage the CC-84.

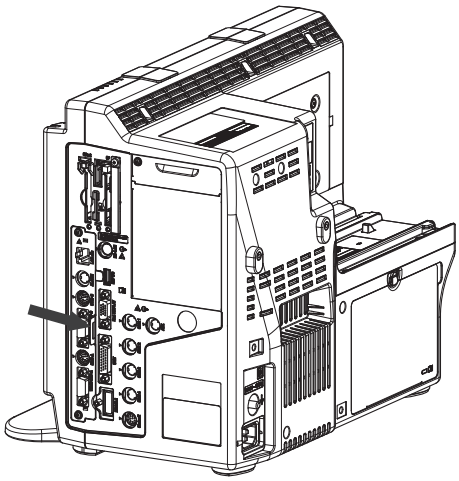
1 Remove the dummy panel on the left side of the DSC-8400 series main unit. (2 screws).



2 Insert the CC-84 board along the guide inside the main unit. Make sure of the correct orientation.



3 Insert the CC-84 board along the guide inside the main unit. Make sure of the correct orientation.



❑Extended Display Unit Setup

Select the extended display unit type.

NOTE

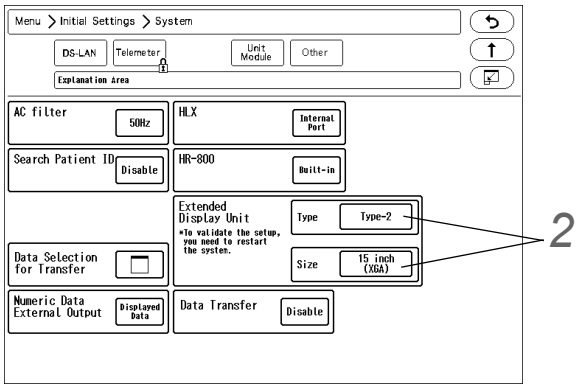
- To validate the setup, the system needs to be restarted. The change in type will become effective after the system is restarted.
- If the type is not correctly set, touch panel operation cannot be performed from the extended display unit.

- The size of the extended display unit that can be connected is 15 inch (XGA) or 19 inch (SXGA).
- Use the extended display unit specified by Fukuda Denshi.
- The extended display unit 1 and 2 should be the same size.
- 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] or [Type-3].



3 The touch panel calibration can be performed in the maintenance menu. Refer to your nearest service representative.

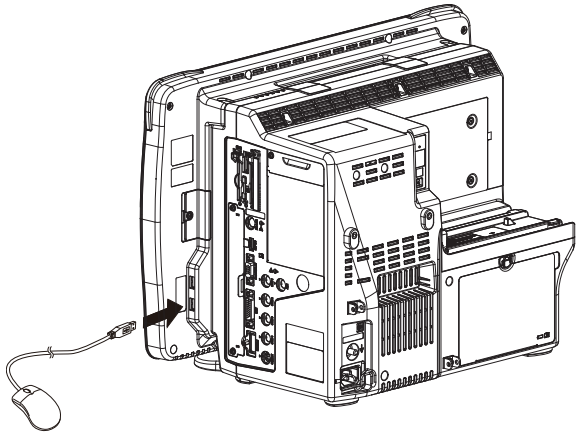
NOTE

- The calibration must be performed after connecting the extended display unit. If the calibration is not performed, the touch panel will not function properly.

Connecting the Mouse (Optional)

By connecting a specified mouse, touch keys can be controlled using the 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

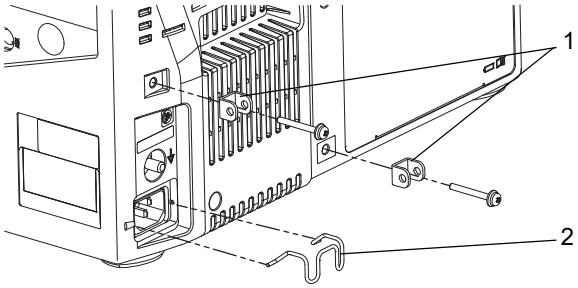
WARNING

- Use only the supplied 3-way AC power cable. Use of other cables may result in electric shock to the patient and the operator.
- The power cable must be connected to a hospital grade outlet.
- When using multiple ME equipment simultaneously, perform equipotential grounding to prevent potential difference between the equipments.Even a small potential difference may result in electric shock to the patient and the operator.

1 Attach the cable retainer and fall-prevention bracket to the main unit.

1 Fix the fall-prevention bracket to the main unit with screws (double washer sems screw: M4x30).

2 Attach the cable retainer to the main unit in a direction shown in the illustration.

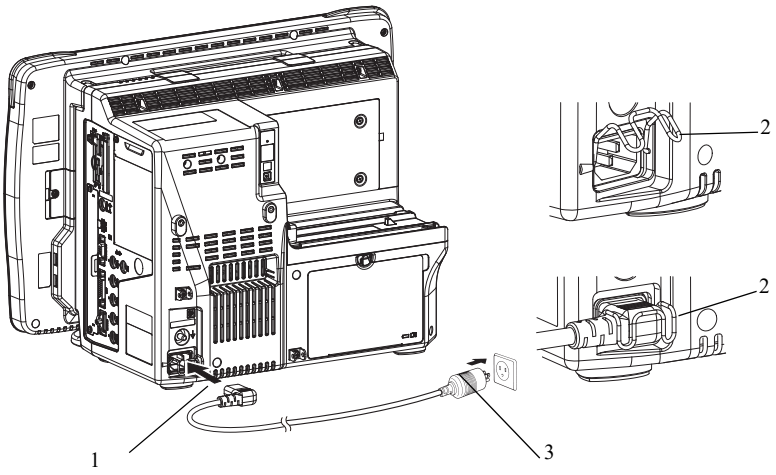


2 Connect the power supply cable to the main unit.

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

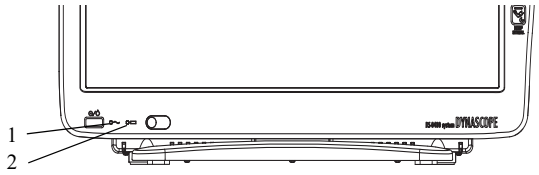
2 Press down the lever to lock the cable retainer.

3 Connect the power cable to a hospital grade outlet (3-pin grounded outlet).



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

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.



1 Power Supply LED
Green: In normal operation
Orange: Standby Mode
Light Off: During battery operation

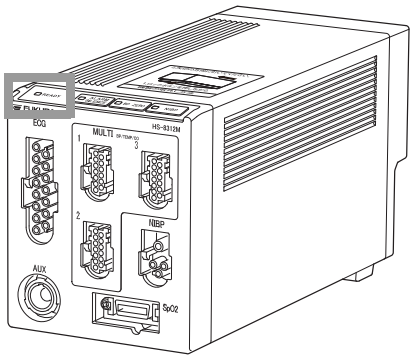
2 Battery Charging LED
Green: Charging is complete
Orange: Charging is in process
Light Off: During battery operation, or when battery is not installed, or when battery charging is ceased (due to temperature, etc.)
Flash: Battery charging error

NOTE

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

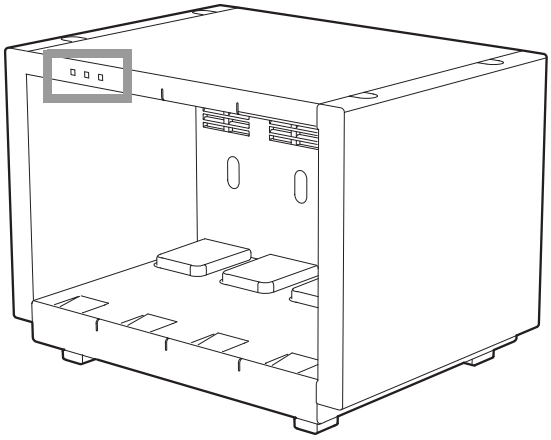
Power Connection of the Super Unit

When the 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



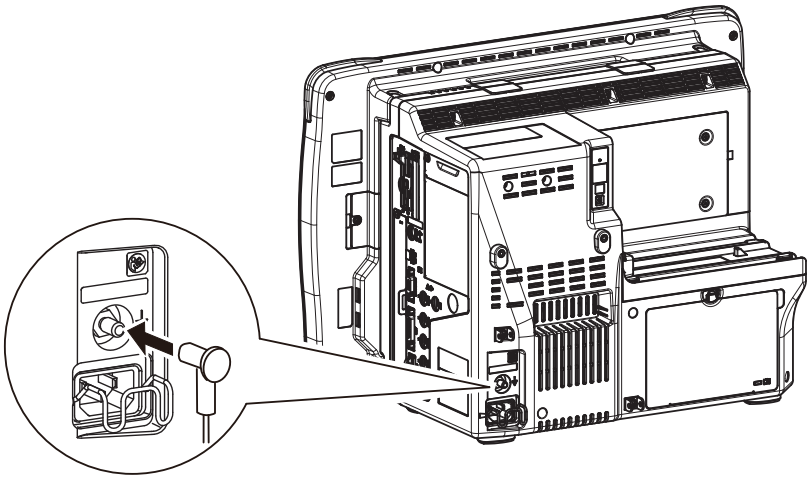
Power Connection of the Input Box

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

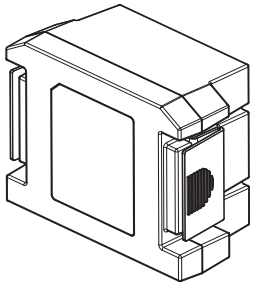
When connecting multiple devices, electrical potential difference may be generated between the devices. This may result in electric shock to the patient connected to these devices. Pay special attention for use in operating room, ICU, CCU, cardiac catheter laboratory, and cardiovascular X-ray room. To 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 a connector which can be connected/disconnected manually without using tools.



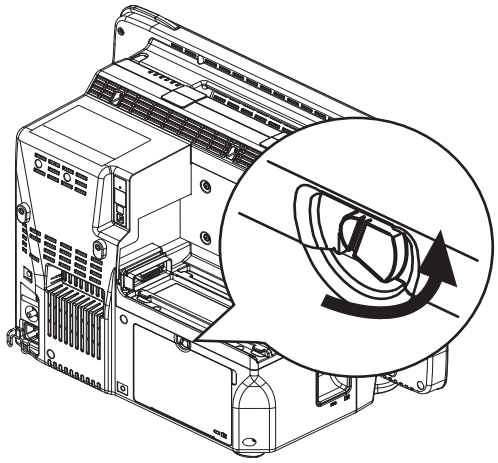
Installing the Battery Pack (BTO-005)

WARNING

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



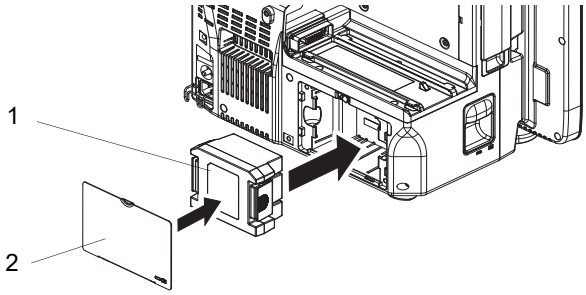
1 Turn the battery lever on the rear side of the main unit to right, and remove the battery cover.



2 Insert the BTO-005 to the main unit and close the battery cover.

1 Battery

2 Battery Cover



NOTE

- Make sure to insert the battery in a correct direction.

Chapter 2 Network System Construction

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

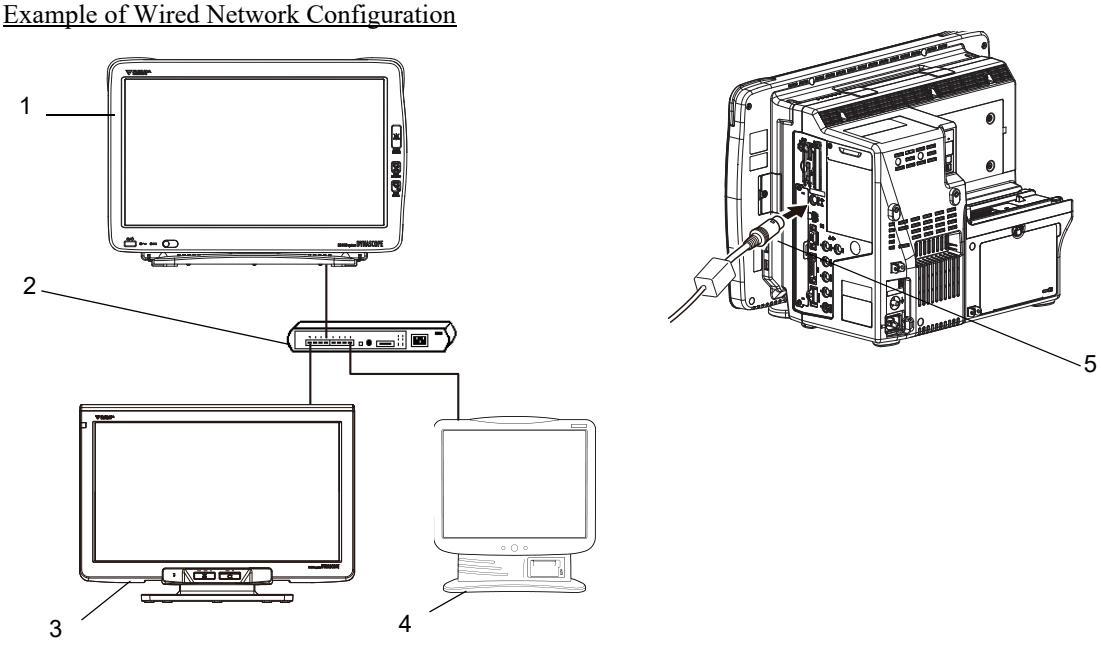
- Do not connect unspecified equipment to the wired network.
- Do not mix devices with DS-LAN II and DS-LAN III setting in the same wired network. The network may cease and proper monitoring may not be performed.

⚠ 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 CO_2 concentration is mmHg and [99 mmHg] is selected for "Upper Limit of CO_2 (mmHg) Transmission" under [Initial Settings>System>DS-LAN], the CO_2 value of 100 mmHg or above will be transmitted as 99 mmHg.
- 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.

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

Example of Wired Network Configuration



1 Bedside Monitor: DS-8400 System

2 HUB

3 Central Monitor: DS-8900 System (DS-LAN III only)

4 Central Monitor: DS-7600 System

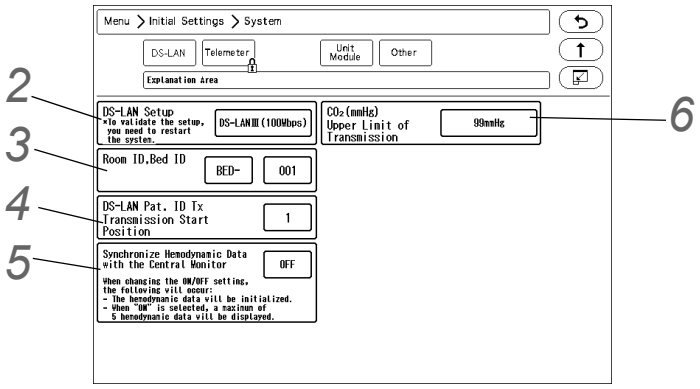
5 Ethernet Branch Cable (CJ-522)

DS-LAN Setup

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

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

▸ The DS-LAN menu will be displayed.



2 Set the DS-LAN. Select the DS-LAN network type.

⚠ 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-LAN II network only. When connecting these central monitors, make sure all monitors in the same wired network is set to DS-

LAN II. DS-5700, DS-5800N/NX/NX^{MB}, DS-7600/7600W (software version up to V05)

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

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

▸ On the confirmation window, press the [OK] key.

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-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.

NOTE

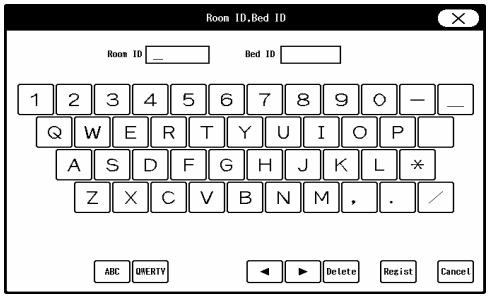
- Make sure to set the Room ID/Bed ID when connecting to the wired network. The set Room ID/Bed ID will be saved even after the power is turned OFF.

1 Press the key for "Room ID, Bed ID" to display the "Room ID, Bed ID" setup window.

2 Enter the Room ID, Bed ID using the alphanumeric keypad.

3 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-8400 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-LAN II network.
  On the DS-LAN III 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. The 10 digits restriction is only for printing, and all 20 digits can be transmitted on the DS-LAN III network.

▸ Enter the starting position in the range from 1 to 20.

5 Set the "Synchronize Hemodynamic Data with the Central Monitor".

▸ [ON]: 5 latest hemodynamic data will be synchronized between this monitor and the central monitor. Other hemodynamic data will be deleted.
When the hemodynamic data is edited on this monitor, the result will be also reflected on the central monitor, and vice versa.

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

6 Set the "CO_2 (mmHg) Upper Limit of Transmission".

REFERENCE

- If the CO_2 measurement unit is "mmHg", and the CO_2 value is 100 mmHg or above, whether or not to limit the value for transmission to the central monitor can be set.

▸ [No limit]: Actual CO_2 value will be transmitted to the central monitor even if the value is 100 mmHg or above.

▸ [99mmHg]: 99 mmHg will be transmitted as the CO_2 value if the value is 100 mmHg 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 [CO_2] (Or, if [Auto] selects a setting other than [CO_2]), the CO_2 waveform will not be transmitted on a wired network.
  - For the numeric data displayed as "xxx", maximum or minimum value of measurable range will be transmitted.
  - The numeric data displayed as "--- " will be treated as not measured data.
  - If the measurement unit of CO_2 concentration is mmHg and [99 mmHg] is selected for "Upper Limit of CO_2 (mmHg) Transmission" under [Initial Settings>System>DS-LAN or Telemeter), the CO_2 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-8410, 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

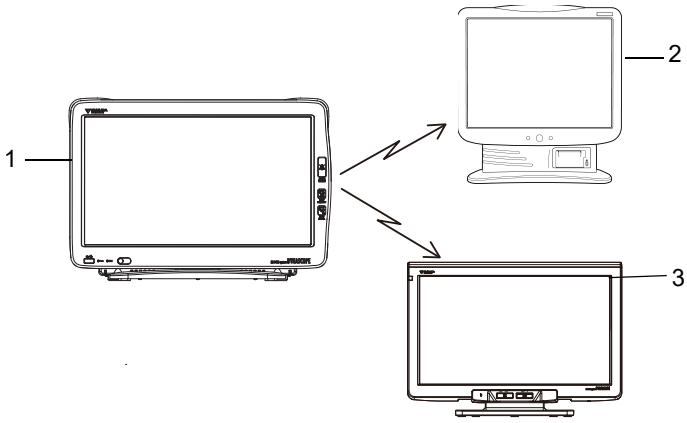
CAUTION

- 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-8400 System

2 Central Monitor
DS-7700 system

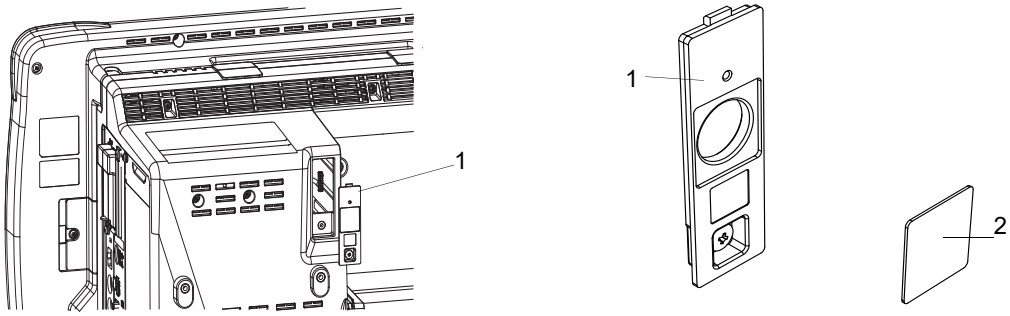
3 Central Monitor
DS-8900 system



Module Attachment and Serial Communication Setup

❑Installing the HLX-801 (FA) / HLX-801 (G) to the Main Unit

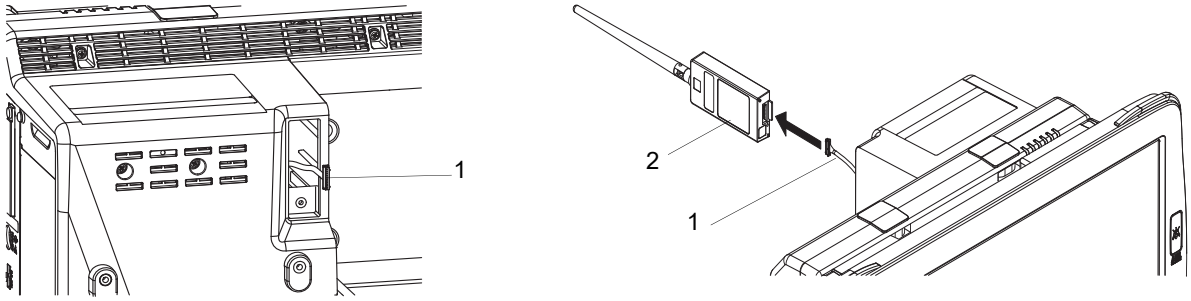
1 Loosen the screw, and remove the telemeter cover. Peel off the sheet on the telemeter cover.



1 Telemeter Cover

2 Sheet

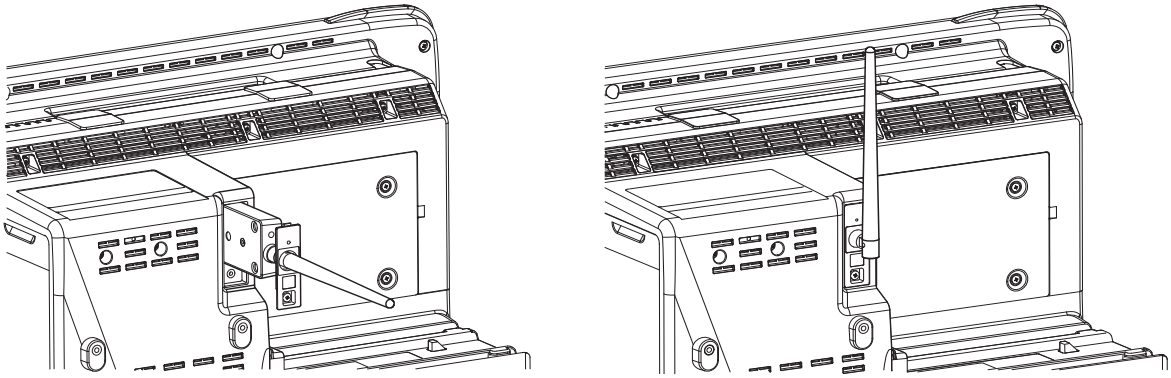
2 Pull out the connection cable, and connect the telemetry transmitter module (HLX-801 (FA) / HLX-801 (G)).



1 Connection Cable

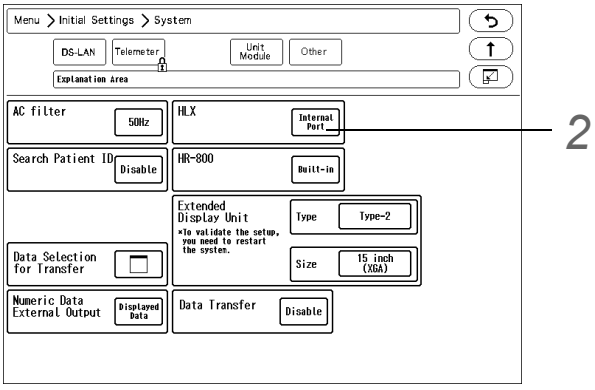
2 Telemetry Transmitter Module (HLX-801 (FA) / HLX-801 (G))

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



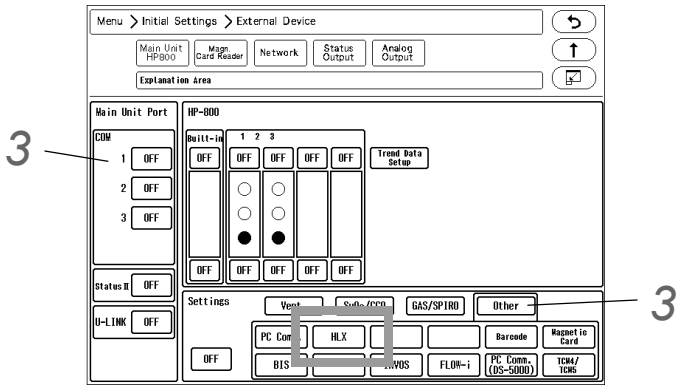
❑Connection Port Setup

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



2 If the HLX-801 (FA) / HLX-801 (G) is installed in the internal slot, select [Internal Port].
If connecting to external serial port, select [COM Port].

3 When [COM Port] is selected, further setting is required.
On the [Menu>Initial Settings>External Device>Main Unit/HP-800] screen, assign [HLX] to the connected COM port.



Channel ID and Telemetry Wave Setup

In this section, channel ID and telemetry wave setup when using the HLX-801 (FA) / HLX-801 (G) 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

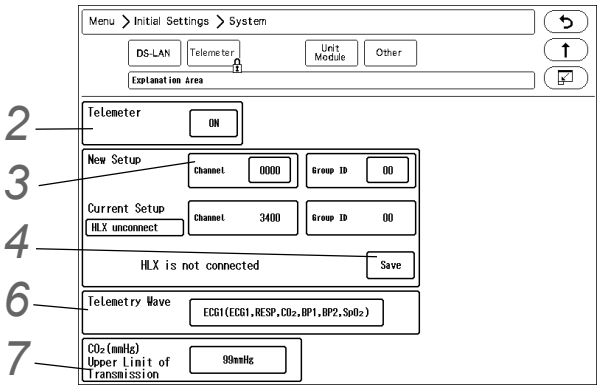
- A password can be set to restrict access to the channel ID setup menu so that only the telemetry channel administrator can change the channel ID.
- Some type of wireless combinations may generate interference with other telemetry.
- Before selecting the wireless channel, verify it does not cause interference.
- 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 neighboring facility must make agreements on the setting of telemetry channels to prevent telemetry interference.

NOTE

- To change the setting, enter the password.
  (☞"Administrator Setup" P5-2)
- Before using the telemetry transmitter module (HLX-801 (FA) / HLX-801 (G)), set the port to connect the HLX-801 (FA) / HLX-801 (G) 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.

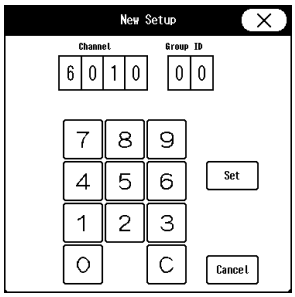
▸ [ON]: Telemetry transmission will be performed.

▸ [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. (shown on right)



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 Press the [Save] key to save the channel ID and group ID.

▸ The channel ID and group ID will be saved.

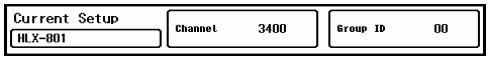
▸ <Complete> will be displayed.

▸ 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> 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 saved channel ID and group ID.



NOTE

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

	Value Outside the Measurement Range	Central Monitor Display
HR	301 bpm and above	Calculated on the central monitor based on ECG waveform.

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

6 Select the transmitting waveform.

- [ECG1]: ECG1, RESP, CO_2, BP1, BP2, SpO_2 will be transmitted. However, RESP waveform will not be transmitted if the apnea source is CO_2.
- [ECG2]: ECG1, ECG2, RESP/CO_2, BP1, SpO_2 will be transmitted. One of either CO_2 or RESP waveform will be transmitted in accordance with the apnea source setting.

7 Set the "CO_2 (mmHg) Upper Limit of Transmission".
(☞"DS-LAN Setup" P2-2)

⚠ CAUTION

- When the BP measurement unit is kPa, the corresponding waveform and numeric data will not be transmitted. When using the wireless network, the BP measurement unit should be set to "mmHg".
- The BP waveform with a scale above the set scale cannot be properly transmitted. When transmitting the BP waveform, pay attention to the displayed BP scale.
- If the measurement unit of CO_2 concentration is mmHg and [99 mmHg] is selected for "Upper Limit of CO_2 (mmHg) Transmission" under [Initial Settings>System>Telemeter], the CO_2 value of 100 mmHg or above will be transmitted as 99 mmHg.
- When using the Nellcor unit, the PR value of 255 bpm or above will be transmitted to the central monitor as 254 bpm.

REFERENCE

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

Chapter 3 Using the External Media

Chapter 3 Using the External Media

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 CFast card (FCS-64G), full disclosure waveform data can be saved.

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.
- Use only the specified CF card.
- The CF card formatted for the full disclosure waveform data of the central monitor or DS-8500 system cannot be used on the DS-8400 System.

NOTE

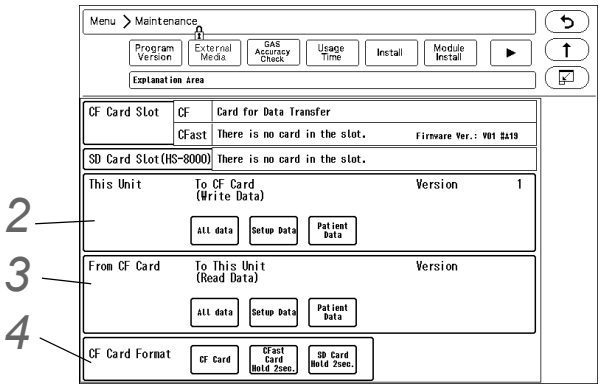
- Cancel the write-protect function before using the CF card.
- If the same card is repeatedly used without formatting, card capacity shortage may occur. Make sure to format the card before saving the data to the CF card.

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], [External Media] keys.

▸ The "External Media" 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 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 setting can be verified on the information display area.

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.
   - [Data Transfer]: The CF card will be formatted for data transfer.
4. Press the [Format] key and start the format process.

❑Data that can be Backed Up/Copied

The setup data such as monitoring condition, alarm setting, and patient data such as graphic trend and tabular trend can be backed up/copied.
By selecting [All Data], setup data and patient data can be both backed up/copied.

Setup Data

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

Patient Data

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

The following items will not be backed up/copied.

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

Formatting the Full Disclosure Waveform Card

In this section, formatting of CFast card to be used for saving the full disclosure waveform is explained.
By formatting the specified CFast card for full disclosure waveform, the card can be used for saving the full disclosure waveform data. By inserting the formatted card to the card slot, storing of the full disclosure waveform data will automatically start, and reviewing of the full disclosure waveform will become possible.

⚠ CAUTION

- The full disclosure waveform card formatted on other bedside monitors and central monitors cannot be used on this equipment.
- The CFast card formatted on this equipment cannot be used on other bedside monitors and central monitors.
- Make sure that the CFast card is inserted in the CFast card slot when formatting.
- While saving the data to the CFast card, avoid removing/inserting the card beyond necessity.
  Remove/insert the CFast card while the main unit is in standby mode.
- It will take about 7 minutes to format the full disclosure waveform card.During the format process, do not turn OFF the power, enter into standby mode, or remove the CFast card. It may damage the CFast card.

1 Press the [Menu], [Maintenance], [External Media] keys.

2 Format the full disclosure waveform card.

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

2 Press the [CFast Hold 2 sec.] key for 2 seconds.

3 Wait until the format completes.
The format process will take about 7 minutes. During the process, do not remove the CFast card or turn OFF the power.

4 When the format completes, the [CFast Hold 2 sec.] key will become effective, and saving of the full disclosure waveform data will automatically start.

Formatting the SD Card

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

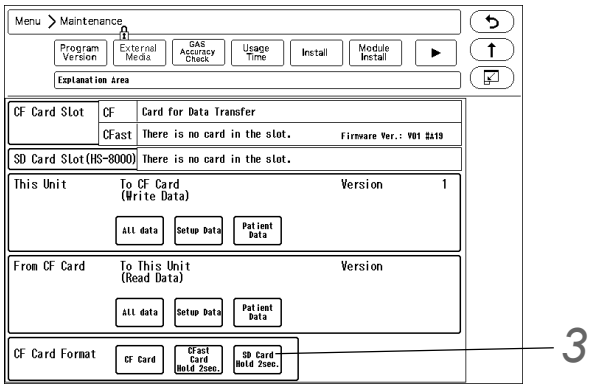
⚠ CAUTION

- 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.
- The SD card inserted in the DS-8007 cannot be formatted on this equipment.
- The SD card slot on the main unit is for future function enhancement and 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], [External Media] keys.

The "External Media" menu 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

Chapter 4 Connection to the External Devices

Ventilator Measurement and Alarm Input

A ventilator can be connected to the DS-8400 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-8400 system and ventilator, and to input the ventilator measurement and alarm.

Ventilator	Connection Cable
	For Connection to DSC-8410 Status II/HP-800
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

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

Ventilator	Corresponding Software Version
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-8400 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-300:
  airway pressure upper limit alarm, high continuous pressure alarm, O_2 concentration lower limit alarm, expiratory minute volume upper/lower limit alarm, apnea alarm, gas supply alarm, air supply alarm, O_2 supply alarm, battery alarm, limited battery alarm, no battery alarm, overrange alarm
- SERVO-i:
  airway pressure upper limit alarm, high continuous pressure alarm, O_2 concentration lower limit alarm, expiratory minute volume upper/lower limit alarm, apnea alarm, gas supply alarm, O_2 supply alarm, battery alarm, no battery alarm, limited battery alarm, overrange alarm, expiratory cassette disconnected alarm, backup ventilation alarm, regulation pressure limited alarm, respiratory rate alarm, PEEP low alarm, $EtCO_2$ upper limit alarm, $EtCO_2$ lower limit alarm
- SERVO-s:
  airway pressure upper limit alarm, high continuous pressure alarm, O_2 concentration lower limit alarm, expiratory minute volume upper/lower limit alarm, apnea alarm, gas supply alarm, air supply alarm, O_2 supply alarm, backup ventilation alarm, respiratory rate alarm, PEEP low alarm
- SERVO-U: airway pressure upper limit alarm, expiratory minute volume upper/lower limit alarm, apnea alarm, gas supply alarm, O_2 supply alarm, overrange alarm, overrange alarm, PEEP low alarm
- PB 740/PB 760/PB 840:
  The PB740/PB760/PB840 acquires alarm information from the nurse call port. The ventilator alarm that cannot be acquired from the nurse call port is not guaranteed. For corresponding alarm, refer to the service representative of the ventilator manufacturer.

- This equipment is not compatible to the following alarms generated on the Evita 2 dura/Evita 4/Evita XL.
  - O_2 monitoring disabled alarm, CO_2 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-8400 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-8400 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-8400. If the connection cable is disconnected from the ventilator, <Vent. Alarm> will generate, but <VENT_COMM> alarm will not generate on the DS-8400.

⚠ CAUTION

- The ventilator operation should be performed by well-trained and authorized personnel.
- When connecting the DS-8400 system and the ventilator, use only the specified connection cable.
- Make sure that the ventilator is connected to the specified connector on the DS-8400 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" P3-19)
- 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

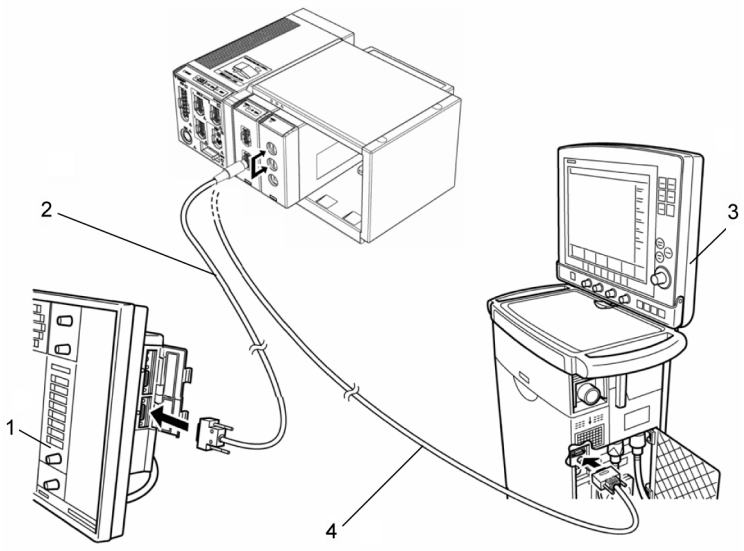
⚠ CAUTION

- Only one ventilator can be connected to each DS-8400 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-300, SERVO-i/s

1 Connect the SV-300 or SERVO-i/s to Status II connector on the DS-8400, 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 DS-8400, 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 DS-8400, or one of Status II connector A or Status II connector B on the HP-800.

❑In Case of PB740/760/840

⚠ CAUTION

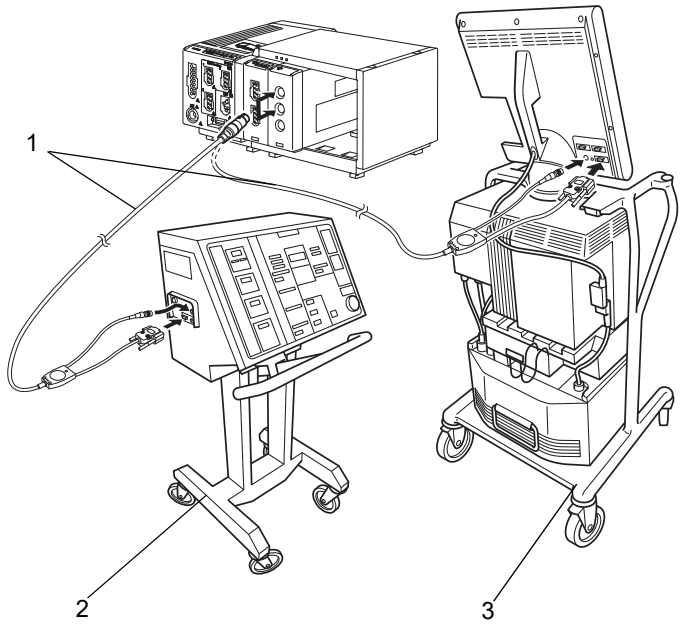
- When connecting the PURITAN-BENNETT ventilator, follow the precautions below.The serial port (RS-232C) of the ventilator should be set as follows. Refer to the service representative of the ventilator manufacturer.
  Baud Rate: 9600 bps
  Data Bit: 8bit
  Parity Bit : None
  (Stop Bit): (1)
- This 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-8400, 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 CJ-403RI-70PB

2 PB740/760

3 PB840



❑In Case of Evita

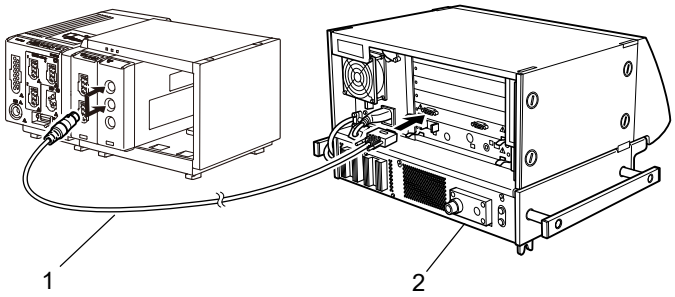
⚠ CAUTION

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

1 Connect the Evita 2 dura/Evita 4/Evita XL to Status II connector on the DS-8400, 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)

SvO_2/CCO Monitor Connection

This section describes the procedure on how to connect the DS-8400 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 SvO_2/CCO Monitor to one of the following ports, SvO_2/CCO Monitor data can be monitored on the DS-8400 System.

*COM1 to COM4 port on the main unit (COM1 to COM3 port when the HLX-801 is installed to the internal slot.)

*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

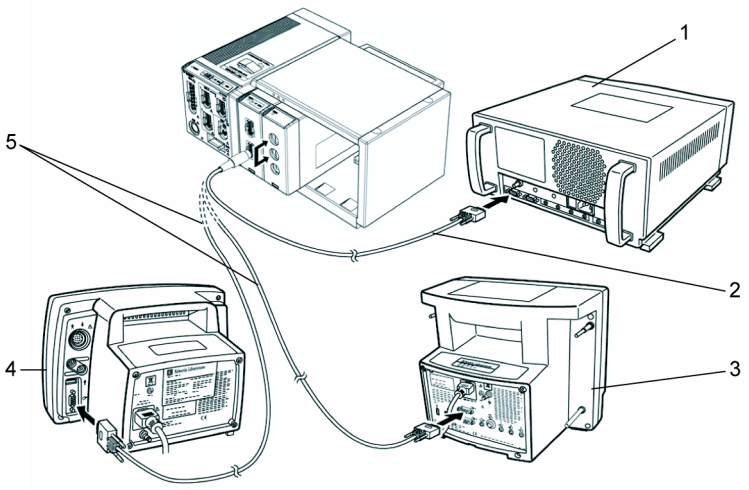
- When connecting this system and the SvO_2/CCO monitor, use only the specified connection cable.
- Make sure that the SvO_2/CCO monitor is connected to the specified connector on this system. When connecting the cable, verify that the main power of this system and the SvO_2/CCO monitor is OFF.

SvO_2/CCO Monitor Connection

❑In Case of Vigilance

1 Connect the Vigilance to the DS-8400 system. (The illustration is example of connection with the HP-800.)

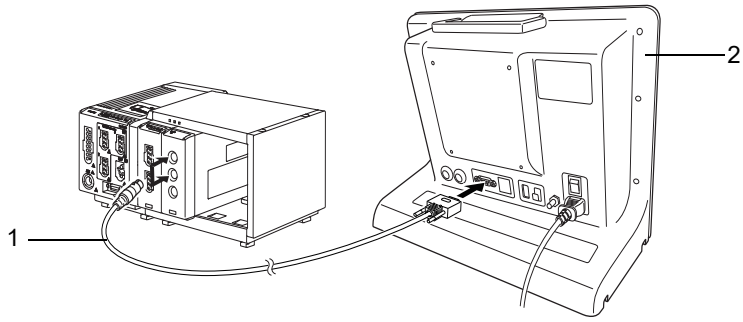
1 Vigilance
2 CJ-406RI-70Vigi
3 Vigilance II
4 Vigileo
5 CJ-402RI-70SVi



❑In Case of PiCCO

1 Connect the PiCCO to the DS-8400 system. (The illustration is example of connection with the HP-800.)

1 CJO-19RS5
2 PiCCO



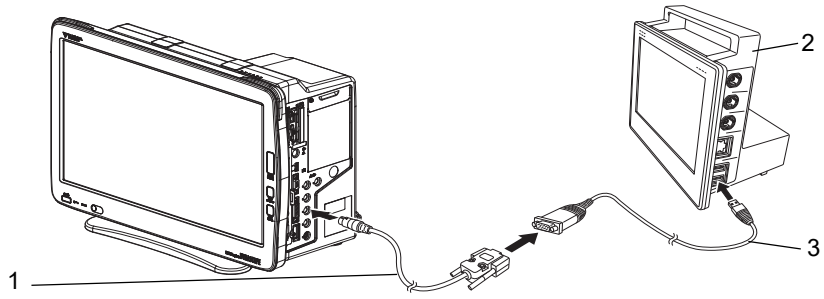
❑In Case of PulsioFlex

1 Connect the PulsioFlex to the DS-8400 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)

CO_2 Concentration Data Input

By connecting the Multigas Unit (MGU-800/810 series), Gas Unit I/F (HPD-800/HPD-810/HPD-820), or CO_2 Gas Unit (HCP-800/HCP-810/HCP-820), waveform and numeric data of CO_2 concentration can be monitored on the DS-8400 System.

Connecting the MGU-800/MGU-810

The MGU-800/810 series Multigas Unit can be connected to the DS-8400 system via U-LINK connector.
By connecting the Multigas Unit (MGU-800 series), CO_2, anesthetic agent, O_2, N_2O concentration measurement performed by the sidestream method can be monitored.
By connecting the Spiro Unit (MGU-810 series), spirometry measurement can be additionally monitored.

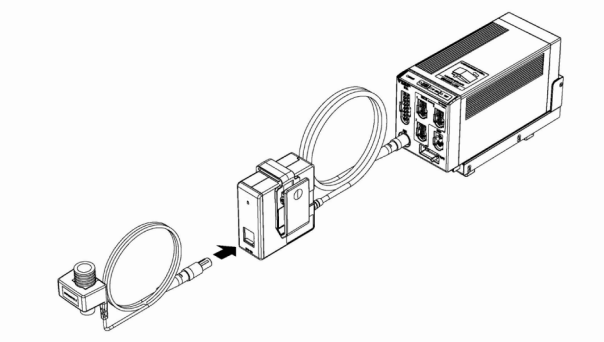
Multigas Unit	Unit Connection Cable
MGU-801P/MGU-811P	CJO-09SS0.3, CJO-09SS1.5, CJO-09SS5

⚠ 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

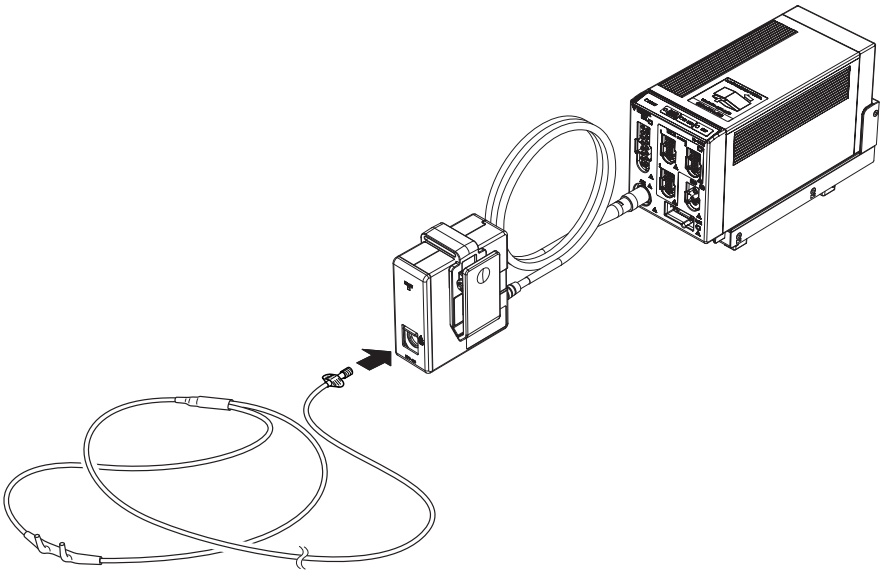
By connecting the Capnostat 5 via Gas Unit I/F (HPD-800/HPD-810/HPD-820), CO_2 concentration measured by mainstream method can be monitored.
In Case of HPD-800/HCP-810
Connect to the AUX connector of the HS-8000.



Mainstream Method
Capnostat 5 (Philips)

Connecting the Sampling Line (Covidien)

By connecting the FilterLine CO_2 sampling line series, CO_2 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 or DS-8007.
In Case of HCP-820:
Connect to the CO_2 I/F connector on the DS-8007.



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

CO_2 Source Priority

When the MGU-800 and HS-8000 or MGU-800 and DS-8007 are connected simultaneously, the CO_2 source to prioritize the measurement can be set.

NOTE

- When the CO_2 is measured on both the HS-8000/DS-8007 and HM-801, the measurement of the HS-8000/DS-8007 will be prioritized.

REFERENCE

- The setup can be performed on the "Gas" menu.
  (☞Operation Manual "Multigas Unit Data Setup (Multigas Concentration/Spirometry)" P7-89)

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

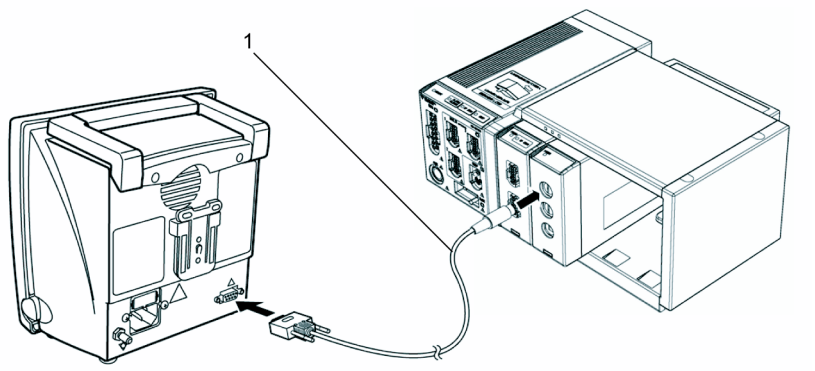
Connecting to the Main Unit

1 Use the BIS connection cable (CJ0-03RS4) to connect the serial port, status port on the main unit 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 the HP-800.)

1 CJ-407RI-70BIS



External Device Setup

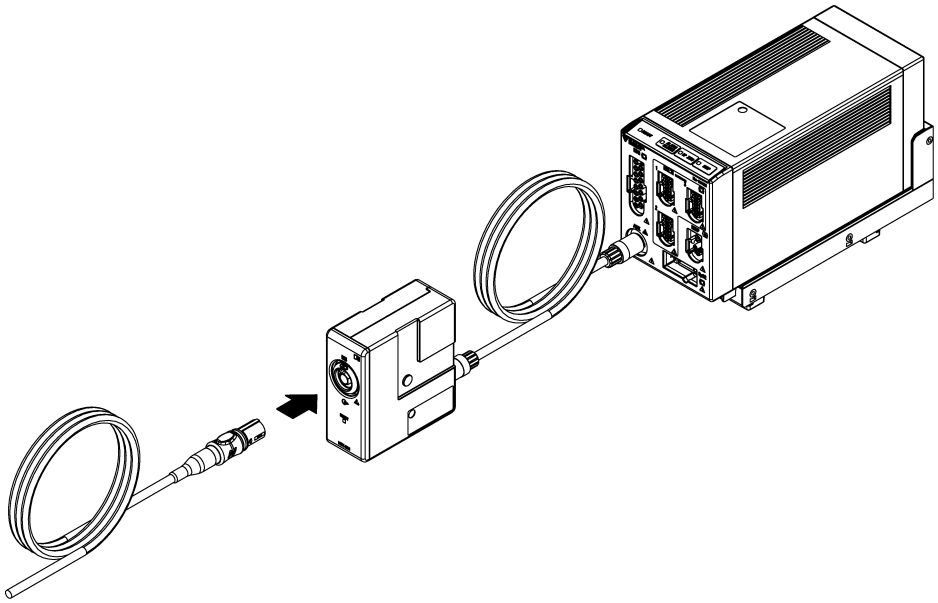
To display the BIS monitor data, external device setup is required.

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/DS-8007.



HBX-800 and HS-8000

NOTE

- When the BIS data is measured on both the HS-8000/DS-8007 and HM-801, the measurement of the HS-8000/DS-8007 will be prioritized.

INVOS Data Input

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

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

⚠ CAUTION

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

Connecting to the INVOS

1 Connect the INVOS 5100C to the serial connector or status connector on the left side of the DSC-8410 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-8400 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-8400 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-8400 System.

⚠ CAUTION

- The operation of anesthesia delivery system should be performed by well-trained and authorized personnel.
- When connecting the DS-8400 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-8400 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

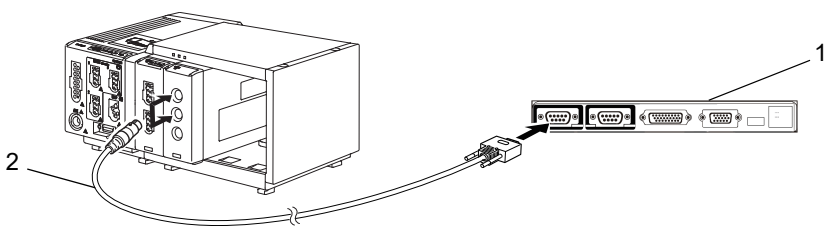
⚠ CAUTION

- Only one anesthesia delivery system can be connected to each DS-8400 system. Do not connect more than one anesthesia delivery systems.
- The anesthesia delivery system and Multigas Unit (MGU-800, MGU-810 series) cannot be connected simultaneously.
- The anesthesia delivery system and ventilator cannot be connected simultaneously.

1 Connect the FLOW-i to Status II connector on the main unit, 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 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-8400 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-8400 System is as follows.

- TCM4: 3.04
- TCM5 FLEX: 1.18

⚠ CAUTION

- When connecting the DS-8400 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-8400 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-8400 System. Do not connect more than one transcutaneous blood gas monitors.

❑In case of TCM4:

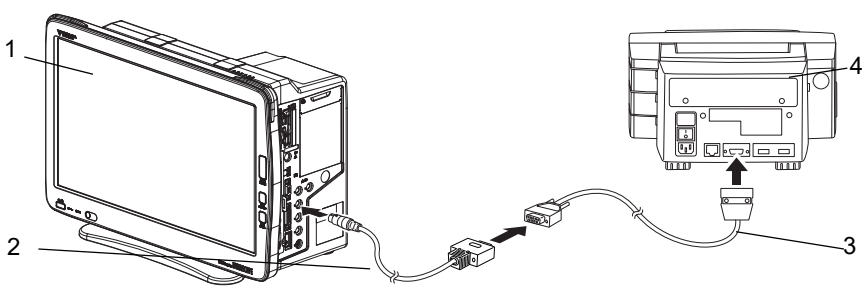
1 Use the CJ-726 connection cable and the cable specified by Radiometer Medical ApS to connect the TCM4 to the serial connector on the DSC-8410.

1 DSC-8410

2 CJ-726

3 Cable specified by Radiometer Medical ApS

4 TCM4



❑In case of TCM5 FLEX:

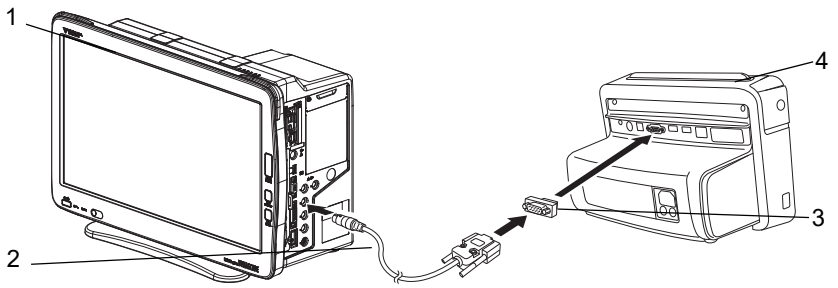
1 Use the CJ-725 connection cable and the D-sub 9-pin male to male gender changer to connect the TCM5 FLEX to the serial connector on the DSC-8410.

1 DSC-8410

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.

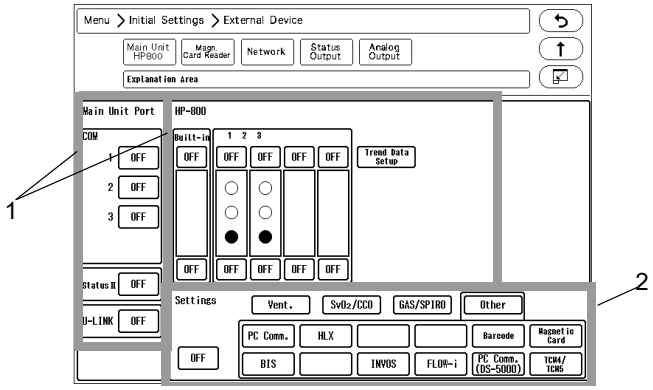
External Device Setup

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.], [SvO_2/CCO], [GAS/SPIRO], [Other] from the upper area, the corresponding selection will be displayed at the lower area.



Selectable External Device for Each Port

Port	Selectable External Device
COM1 to COM4	Vigilance, PiCCO, PulsioFlex, PC Comm., HLX, Barcode, Magnetic Card, BIS, INVOS, Flow-i, PC Comm. (DS-5000), 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.
- When using the built-in telemeter, COM4 port cannot be used.
- If the same external device is set to multiple ports, it may take time to identify the device.
- For the HP-800 and the main unit port, the setting needs to be different.
- 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 MGU-800/810 is selected, the anesthesia delivery system (FLOW-i) cannot be assigned to Status II or HP-800.
- 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-8400 system. Make sure to power cycle the main unit when the HP-800 setting is changed.
- When [HLX] is selected, perform telemetry setup (channel ID, etc.) on the "Telemeter" setup menu. (☞"Wireless Network" P2-5)
- When [Magnetic Card] is selected, perform further settings on the "Magnetic Card Reader" setup menu. (☞"Magnetic Card Reader Setup" P4-22)
- 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.

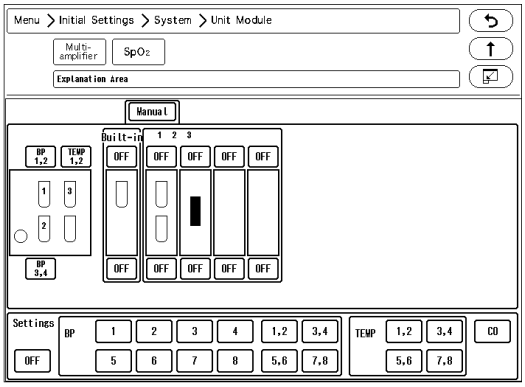
Unit Module Setup

❑Multiparameter Connector Setup

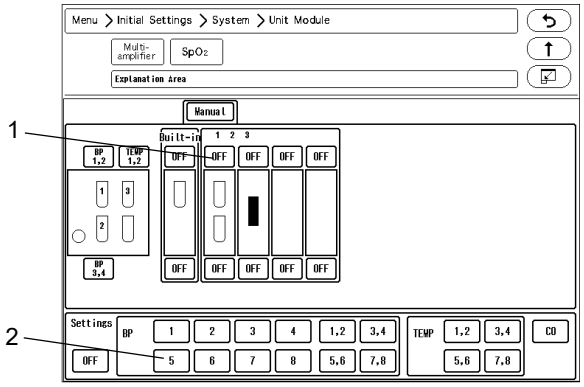
On the "Multiamplifier" setup menu, the parameter to measure on each multiparameter connector can be set.
When the Input Box is not connected, the measuring parameters will be automatically set by connecting the relay cable to the multiparameter connector on the HS-8000 series Super Unit.
If the Input Box is connected with the HM-800/HM-801 Multi Module, it is necessary to manually set the measuring parameter for each multiparameter connector.

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

▸ The "Multiamplifier" setup menu will be displayed.



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



1 Select the multiparameter connector location. The selected location will be displayed in blue.

2 Assign the parameter to the selected location. In this case, select [5] for "BP".
The parameter will be assigned to the selected connector.

CAUTION

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

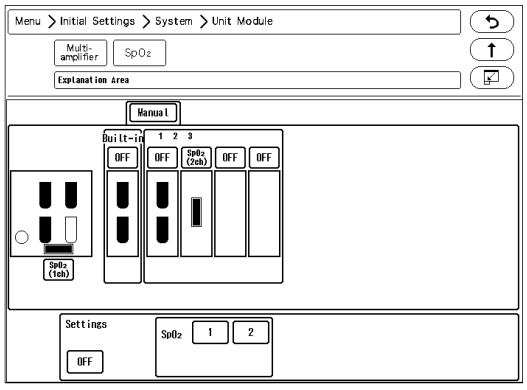
❑SpO_2 Connector Setup

When using the SpO_2 Module (HG-810, HG-820), it is necessary to set the SpO_2 channel manually.

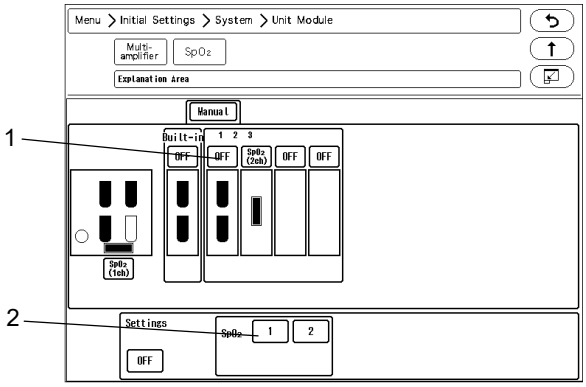
1 Press the [Menu], [Initial Settings], [System], [Unit Module], [SpO_2] keys.

▸ The SpO_2 setup menu will be displayed.

2 SpO_2 channel can be assigned to any module.



Example:
To measure 1 channel of SpO_2 on the Super Unit, 2 channels of SpO_2 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 "SpO_2".
2 channels of SpO_2 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

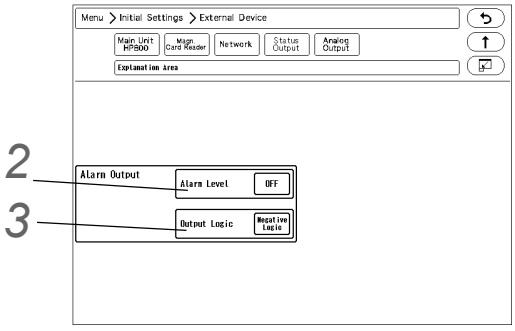
- Users should not perform the software update for the unit or module. To update the software, contact your nearest service representative.

Status Output Setup

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

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.

- [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 Set the "Output Logic".

- [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)" P6-37 for connector pin assignments of the alarm output.
- The equipment status alarm will be output as level L.To output the equipment status alarm, select [Level H,M,L].

Analog Output Setup

The Super Unit (HS-8000), 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

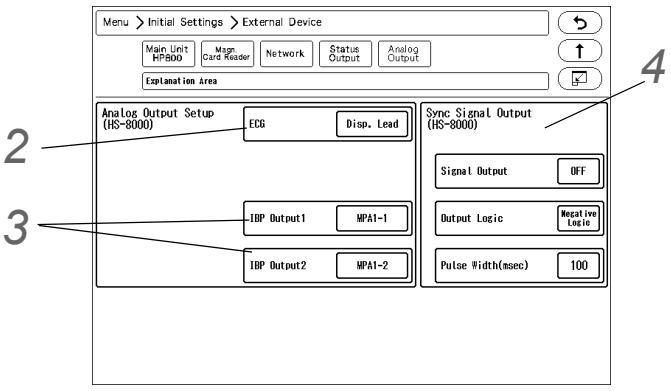
1 Press the [Menu], [Initial Settings], [External Device], [Analog Output] keys.

- 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, SpO_2) 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.

3 Select the "Pulse Width" from [100]/[60]/[20] msec.

▸ The synchronized signal will be output with the selected pulse width.

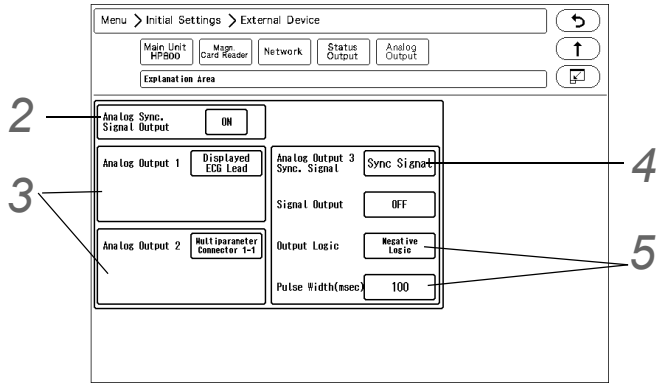
REFERENCE

- 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.

3 Select the "Pulse Width" from [100]/[60]/[20] msec.

▸ The synchronized signal will be output with the selected pulse width.

⚠ CAUTION

- To use the pulse width selecting function, the software version of the connecting DS-8007 should be the version which supports the pulse width selecting function. For details, contact your nearest service representative.
- If this equipment is connected to the external device, and the DS-8007 is changed to the software version not supporting the pulse width selecting function, communication failure with the external device may occur.

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" P5-4)

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.

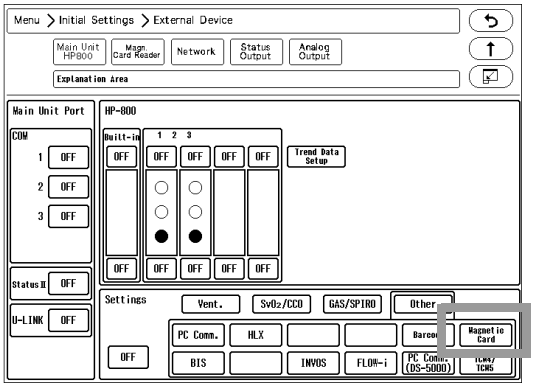
▸ The "External Device" setup menu will be displayed.

2 Select the port (COM1 to 4) for the magnetic card reader.

NOTE

- When the HLX-801 is installed to the internal slot, COM4 port cannot be used.

3 Select [Magnetic Card Reader] in the [Other] category.

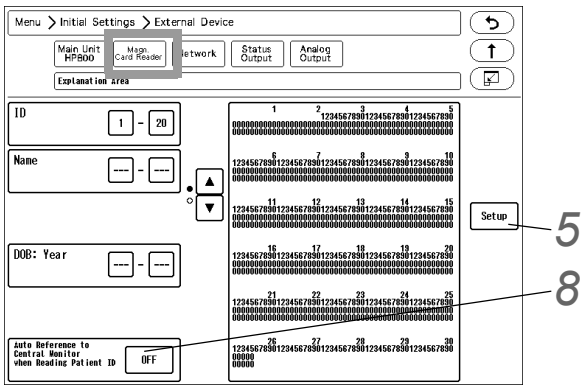


Since the data formats of magnetic card vary for each institution, it is necessary to set the digit location of each information.

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 Analyze the starting and ending digit of the data (patient ID, etc.) 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

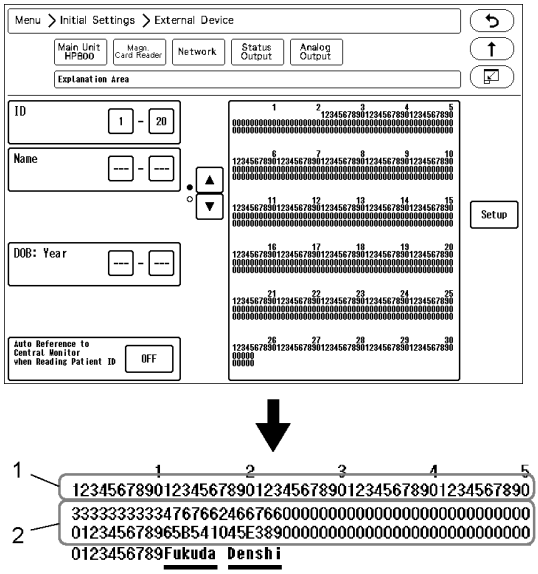
- On the "Magnetic Card Reader" setup menu, starting and ending digit of each data such as [ID], [DOB: Year] can be set.
  - From: Starting digit number of the data to be read from the magnetic card
  - To: Ending digit number of the data to be read from the magnetic card.

REFERENCE

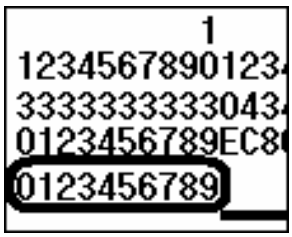
- The analyzing procedure is explained using the example of patient data below.
  Patient ID:0123456789
  Patient Name: FUKUDA DENSHI
  Date of Birth: Jan. 1, 1980
  Sex: Male

1 While the first page of the "Magnetic Card Reader" setup menu is displayed, scan the magnetic card.

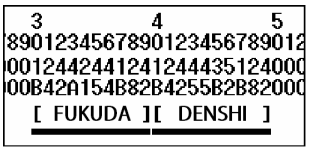
- At the first and second row, the data read from the card will be displayed in hexadecimal. At the third row, the characters converted from the data will be displayed.



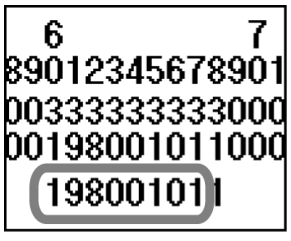
2 From the displayed result, specify the data position.



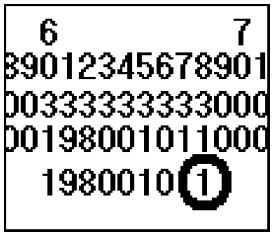
The patient ID, "0123456789" is displayed at 1st to 10th digit.



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.



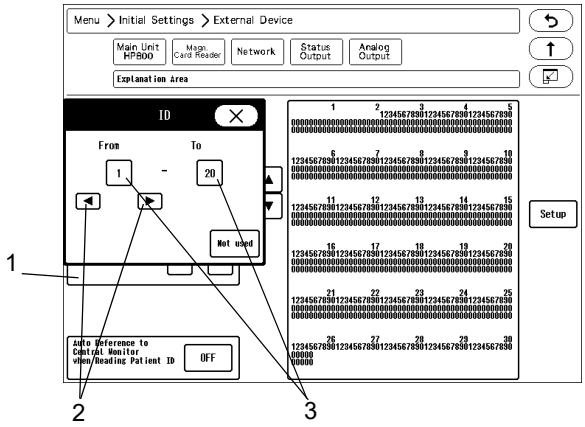
"1" which is displayed at the 68th digit can be estimated as the character string for male.
It will be more definite if compared with the data of female.

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.

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



1 Select the item to enter from the list displayed at left.

2 Enter the starting digit or ending digit in the range of 1 to 255 using the left or right button.

3 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.

4 Repeat step 1 to 3.

7 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. This function is available only when the DS-LAN III network is constructed.
- [OFF]: Patient information cannot be received.

NOTE

- 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

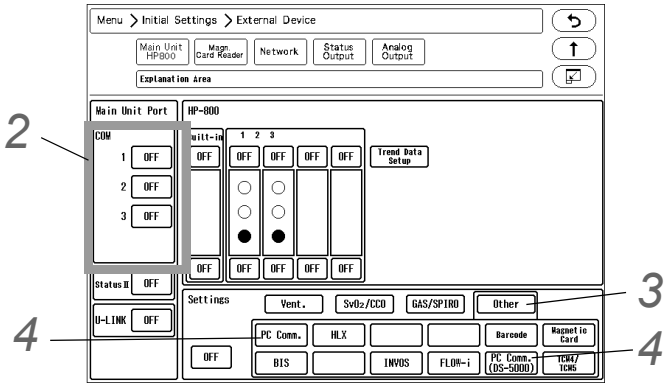
1 Connect the accessory cable to the serial connector (COM1 to COM4) on the main unit.
When the HLX-801 is installed to the internal slot, connect to COM1 to COM3.

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 (COM1 to COM4) which the PC was connected.
When the HLX-801 is installed to the internal slot, select from COM1 to COM3.

3 Press the [Other] key.

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

NOTE

- If the PC communication is disconnected, <Check System Conn.> 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)

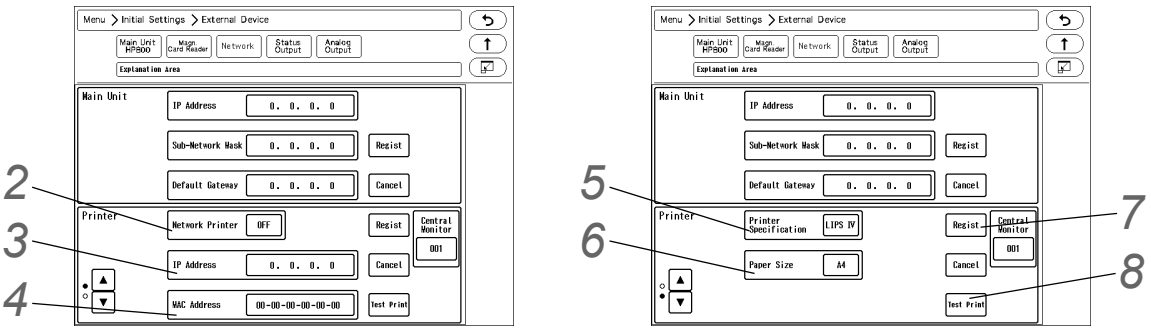
Laser Printer Setup

❑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 "Network" setup menu 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 the central monitor connected to the DS-LAN III 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.

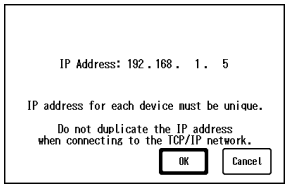
5 Select the printer specification.

- [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

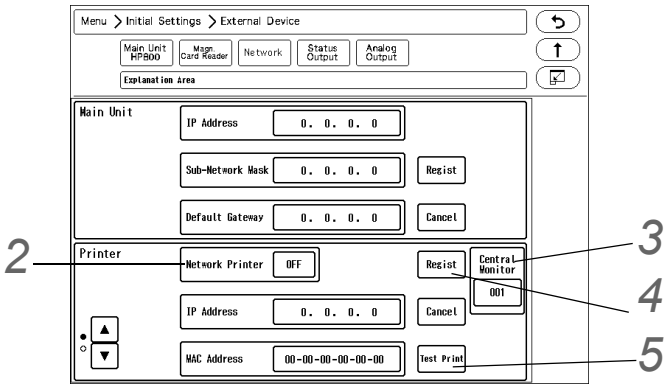
- If the output characters are garbled, printer specification may be incorrectly set. Refer to the operation manual of the printer and check the printer specification.

❑To Output on the DS-LAN Printer

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

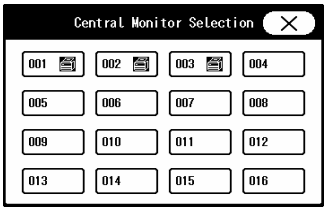
1 Press the [Menu], [Initial Settings], [External Device], [Network] keys.

- The "Network" setup menu will be displayed.



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

3 Press the key for "Central Monitor", and specify the central ID of the central monitor to perform the printing. The central ID with the printer icon displayed can be selected.



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

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

5 Perform test printing. Verify that the printing is properly performed.

⚠ CAUTION

- If the output characters are garbled, printer specification may be incorrectly set on the central monitor. Refer to the operation manual of the printer and check the printer specification.
- On the central monitor, 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-LAN III] is set for "DS-LAN Setup". If the "DS-LAN Setup" setting is changed to [DS-LAN II], the "Network Printer" setting will change from [DS-LAN] to [OFF].

Chapter 5 Initial Settings

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 multiamplifier 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

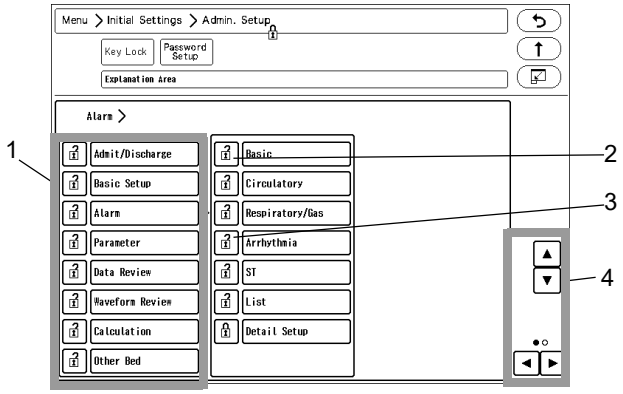
- To display the administrator setup menu, a password is required. There are 3 levels of password with different operation authorization. With higher level password, the lower level settings can be changed.
- For details of the password, contact Fukuda Denshi service representative.

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

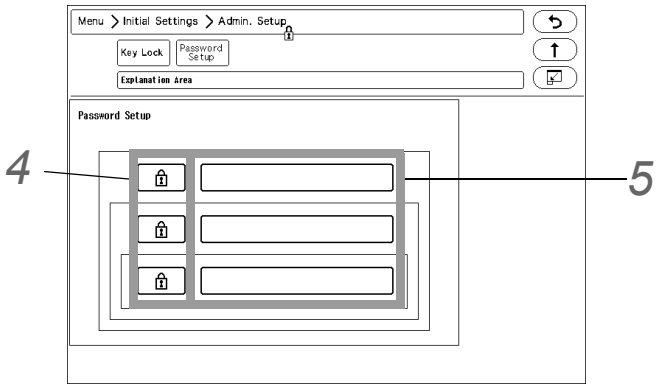
- The default passwords are set as follows.
  Red Key: 11111111
  Yellow Key: 22222222
  Green Key: 33333333
- Before using the equipment, make sure to change the password.
- For details of the password, refer to your nearest service representative.

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

2 Enter the password.

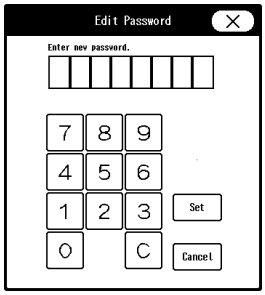
3 Press the [Password Setup] key.

▸ The password setup window will be displayed.



4 Enter the password.

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



1 By pressing the key for the level to change the password, "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.Maximum of 8 digits can be set for the password.

NOTE

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

5 For confirmation, enter the new password again.

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 "Admin. Setup" menu.

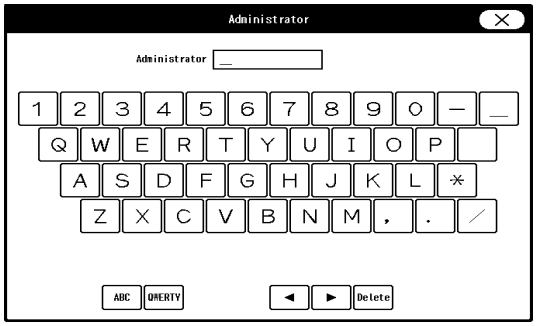
5 Set the administrator name.

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

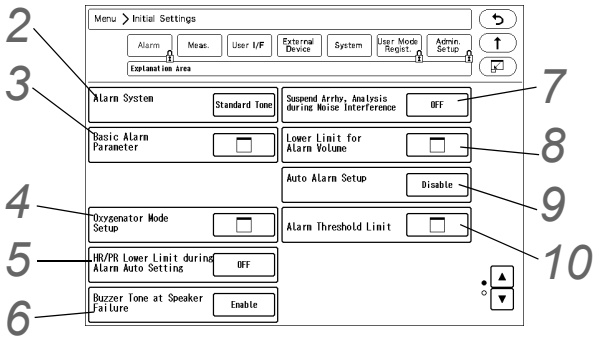


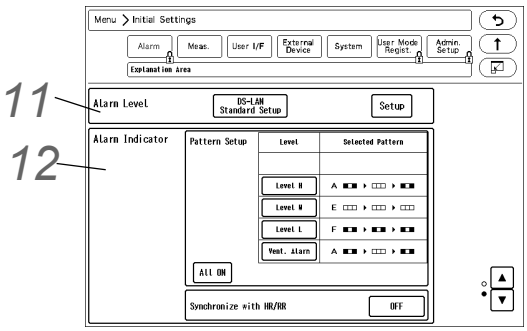
Alarm Related Setup

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.

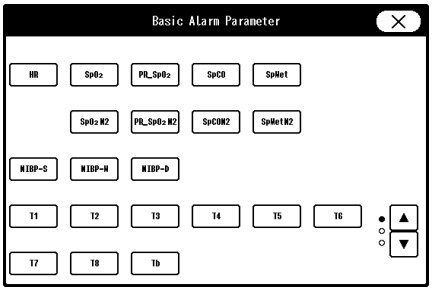
▸ [Fukuda Tone]: The alarm tone common to DS-7000 series bedside monitor will be set.

▸ [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".

- 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.



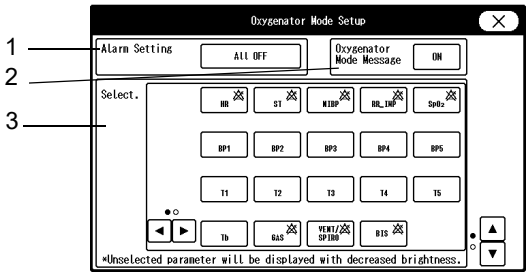
4 Set the "Oxygenator Mode Setup" .

WARNING

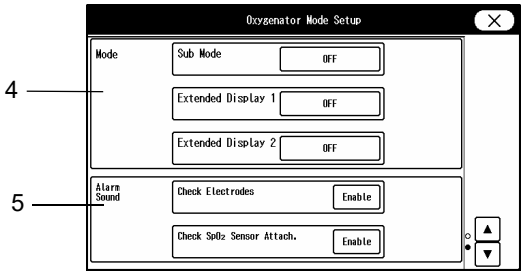
- The oxygenator mode is intended to prevent alarms during cardiopulmonary bypass surgery. Pay special attention when using this mode as the alarm generation will not be the same as to the standard monitoring mode.
- If the "Alarm Setting" under the Oxygenator Mode Setup is set to [All OFF], all vital 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 <SpO_2 Check Sensor Attach.> alarm during oxygenator mode.

- If [Disable] is selected, alarms will not generate during the oxygenator mode.

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

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

6 Set the "Buzzer Tone at Speaker Failure".

- [Enable]: A buzzer tone will be generated instead of an alarm sound under the following condition.
  - Speaker is malfunctioning.
  - Night mode volume is not set to [Silence].
  - Vital alarm (level S, H, M, L) or ventilator alarm is generating.
- A buzzer tone can be silenced by pressing the [Alarm Silence] key.
- [Disable]: A buzzer tone will not be generated even during speaker failure.

7 Set the "Suspend Arrhy. Analysis during Noise Interference" .

- [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.

8 Set the "Lower Limit for Alarm Volume".

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

⚠ 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.

- 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.

9 Set the "Alarm Auto Setup".

- [Enable]: [Auto] key will be displayed on the alarm setup menu.

▸ [Disable]: [Auto] key will not be displayed on the alarm setup menu.

10 Set the "Alarm Threshold Limit".

▸ The alarm threshold range for each parameter can be set.

▸ For the parameter set to [Enable], the alarm threshold level outside the set range cannot be set.

NOTE

- If the alarm threshold set on the central monitor exceeds the threshold limit set on the bedside monitor, the alarm threshold set on the central monitor will be applied. In such case, the threshold limit is deactivated.
- If the alarm threshold of the transport monitor exceeds the alarm threshold limit of the DS-8400, the exceeded alarm threshold will be applied to the DS-8400. Make sure to check the alarm setting on the DS-8400 as the alarm threshold limit status will be changed to "Limit Deactivating Mode".
- If the alarm threshold of "Setup at Discharge" exceeds the alarm threshold limit, the exceeded alarm threshold will be applied. Make sure to check the alarm setting at admittance as the alarm threshold limit status will be changed to "Limit Deactivating Mode".
- If the monitor mode is changed, and the alarm threshold of the current monitor mode exceeds the threshold limit, this alarm threshold will be applied. In such case, the threshold limit is deactivated.

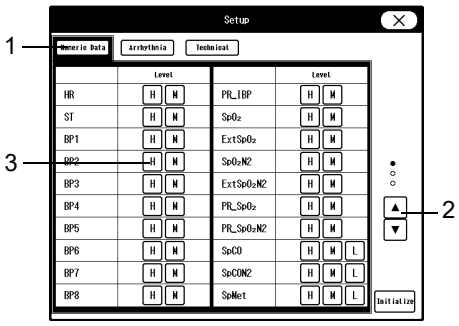
11 Set the "Alarm Level".

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)

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.)



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

1 Select [Numeric Data]/[Arrhythmia]/[Technical] to set the alarm level.

2 Press [▲]/[▼] to switch the page.

3 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.
- When [DS-LAN Standard Setup] is set, only the technical alarm level can be changed.

⚠ CAUTION

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

12 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.

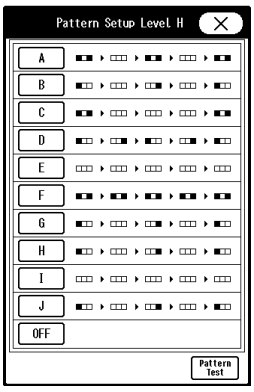
Alarm Indicator Flashing Pattern

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

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

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

- The pattern setup window will be displayed. (Shown on Right: Display Example for Level H)



2 Select from [A] to [J].
When not using the alarm indicator function, select [OFF].

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

4 Press (X).

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 Set the "Synchronize with HR/RR".

- [Sync. to HR]: The alarm indicators at left and right will flash in green synchronizing to HR.
- [Sync. to RR]: The alarm indicators at left and right will flash in green synchronizing to RR.
- [OFF]: The alarm indicator will not light.

NOTE

- If the asystole alarm generates while [Sync. to HR] is selected, the alarm indicators at left and right will remain lit in green. When the PR synchronized mark is displayed, 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.

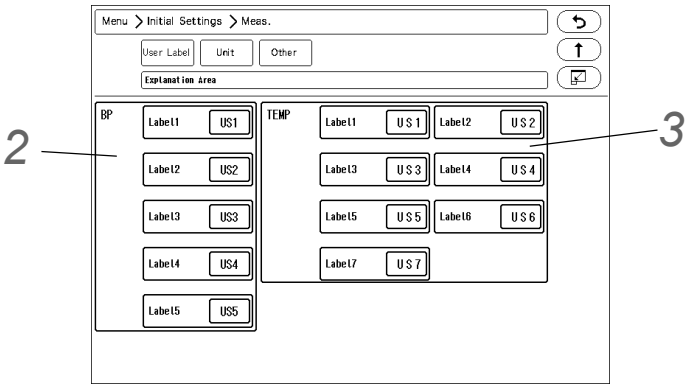
Measurement Related Setup

User Label Setup

On the "User Label" menu, the user labels for BP and TEMP can be set.

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

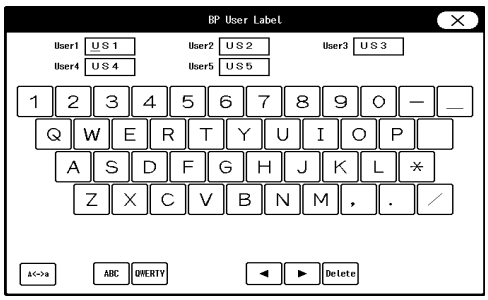
▸ The "User Label" menu will be displayed.



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.

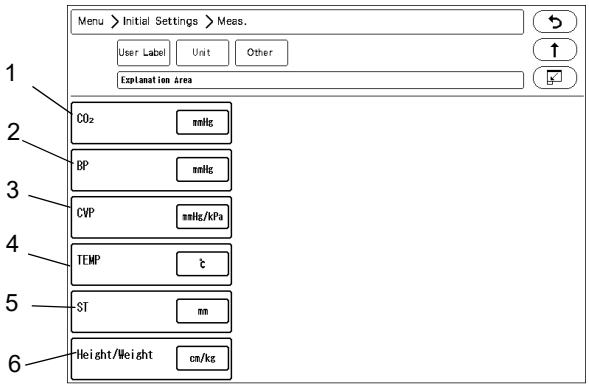
Measurement Unit

The measurement unit can be set on the "Unit" menu.

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

▸ The "Unit" menu will be displayed.

2 Select the unit for each parameter.



1 Select the CO_2 measurement unit from [mmHg]/[kPa]/[%].

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

3 CVP
When the BP label is CVP (Central Venous Pressure), select the measurement unit from [mmHg/kPa]/[cmH_2O].

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

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

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

NOTE

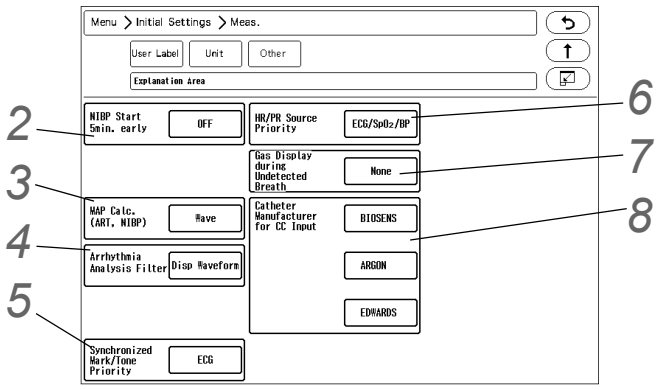
- When the BP, CVP unit is changed, the tabular/graphic trend data with the previous measurement unit will be deleted. Also, when the unit is changed, it is necessary to perform the alarm setup for the new measurement unit.
- The measurement unit of $tcpO_2$, $tcpCO_2$ can be set on the TCM4 or TCM5 FLEX. When the measurement unit is changed, the tabular trend data of $tcpO_2$ and $tcpCO_2$ 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.



2 NIBP Start 5 min. early

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

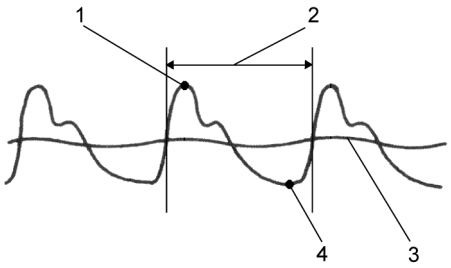
- This setting will be disabled when [Meas.] is set for "Periodic Measurement Starting Time" on the NIBP setup menu.

3 MAP Calculation (ART, NIBP)

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

[Calc.]: Calculates the mean BP from the following calculation. Mean BP (MAP) = (Systolic BP + Diastolic BP x 2) / 3

[Wave]: The following measurement will be performed.



1: Systolic BP

2: HR interval

3: Mean Value (MAP)

4: Diastolic BP

4 Arrhythmia Analysis Filter

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].

5 Synchronized Mark/Tone

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

[ECG]: The priority of synchronizing mark/tone will be set in the order of ECG>SpO_2-1>SpO_2-2>BP.
[SpO_2]: The priority of synchronized mark/tone will be set in the order of SpO_2-1>SpO_2-2>ECG>BP.

6 HR/PR Source Priority

Set the display priority of the parameter to be displayed inside the HR/PR numeric data box.
This priority setting will be applied when [Auto] is selected for "HR/PR", or when [HR/PR] user key is used to switch the HR/PR source.

Select the priority order from the dropdown list.
For example, if [ECG/SpO_2/BP] is selected, HR/PR source will be set in the priority of ECG>SpO_2-1>SpO_2-2>BP.

7 GAS Display during Undetected Breath

- [None]: When a respiration is not detected, inspiratory and expiratory data will become invalid and the bar marks will be displayed instead.
- [Insp. Only] : When a respiration is not detected, only the inspiratory data display will become valid and the bar marks will be displayed for expiratory data.

8 Catheter Manufacturer for CC Input

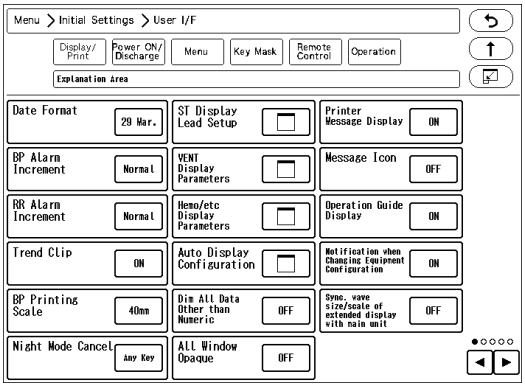
Set the "Catheter Manufacturer for CC Input".
Press one of the keys, and enter the manufacturer name on the displayed window.
(Max. 8 characters)

User I/F

Display/Print Setup

On the "Display/Print" menu, initial settings for displaying/printing can be performed.
Press the [Menu], [Initial Settings], [User I/F] keys to display the "Display/Print" menu.

1 Perform the setup on the first page.



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

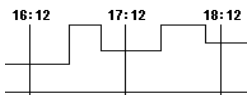
2 BP Alarm Increment
Select from [Normal]/[Small].

	[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	

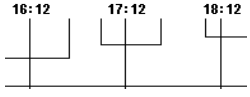
3 RR Alarm Increment
[Normal]: 5 Bpm (Adult), 2 Bpm (Child, Neonate)
[Small]: 1 Bpm

4 Trend Clip
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.



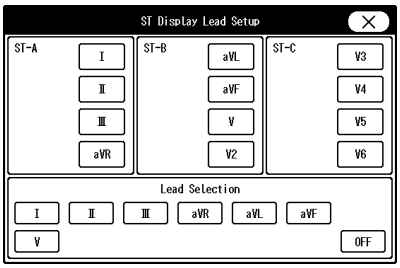
- [OFF]: The exceeded portion of the vertical axis scale will not be displayed.



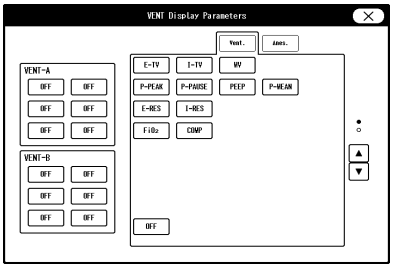
5 BP Printing Scale
Select the printing scale height for the BP1 to 8 waveform.

6 Night Mode Cancel
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.

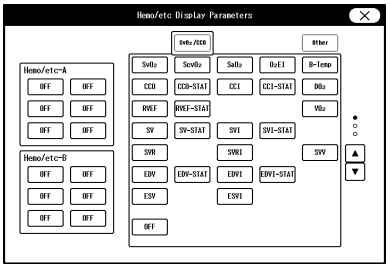
7 ST Display Lead
The ST lead to be displayed for ST-A to ST-C in the numeric data box can be set.
Set the lead to the key displayed in blue.



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

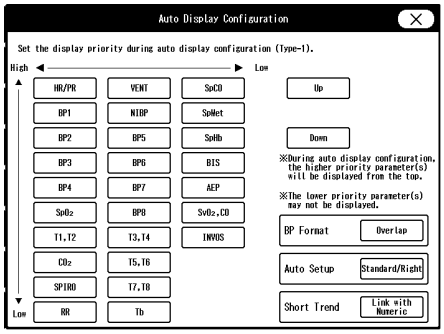


9 Hemo/etc Display Parameters
The parameters to be displayed for Hemo/etc-A, B numeric data box can be set.



10 Auto Display Configuration (shown on right)
"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 Dim All Data Other than Numeric
[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.

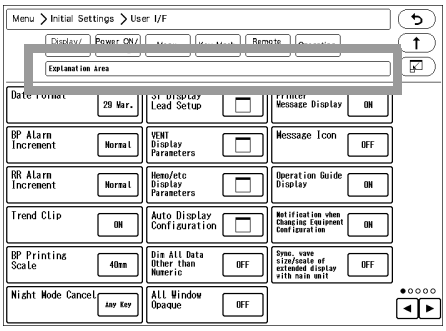


12 All Window Opaque
[OFF]: The window will become translucent allowing to view the waveform displayed behind the window. However, the key display will not become translucent.
[ON]: The window will not become translucent.

13 Printer Message
[ON]: The printer status will be displayed on the home display.
[OFF]: The printer status will not be displayed.

14 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.
By selecting [ON], a message icon will be displayed instead to notify that a message is present.
(☞Operation Manual "Numeric Data Box Display (for all parameters)" P3-8)

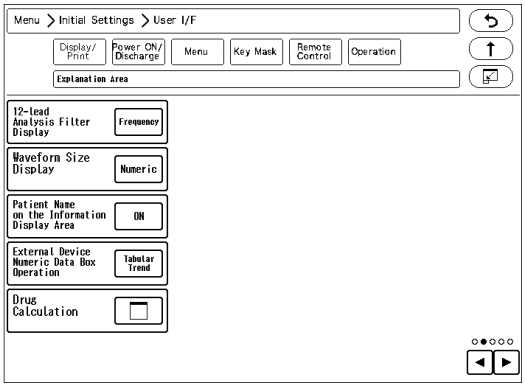
15 Operation Guide Display
[ON]: Operation guide message will be displayed in the window message area. (shown on right)
[OFF]: Operation guide message will not be displayed.



16 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.

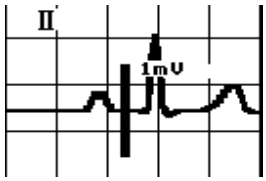
17 Select [ON]/[OFF] for "Sync wave size/scale of extended display with main unit".
[ON]: Changing the waveform size/scale displayed on the main unit will also change the waveform size/scale on the extended display unit.
[OFF]: Changing the waveform size/scale displayed on the main unit will not change the waveform size/scale on the extended display unit.

2 Perform the setup on the second page.



1 12-Lead Analysis Filter Display
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.

2 Select the display type of the waveform size.
[Numeric]: The waveform size for the ECG, RESP, SpO_2 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)

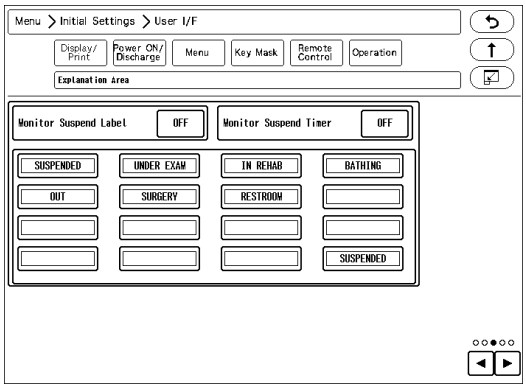


3 Patient Name on the Information Display Area
[ON] : Patient name will be displayed on the information display area.
[OFF] : Patient name will not be displayed on the information display area.

4 External Device Numeric Data Box Operation
[Tabular Trend]: The tabular trend will be displayed.
[Parameters]: The parameter setup menu will be displayed.

5 Drug Calculation (☞"Drug Calculation" P5-27)

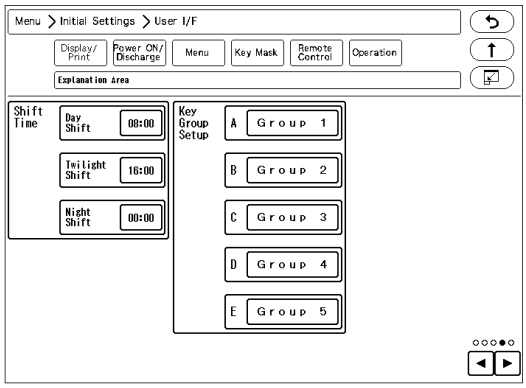
3 Monitor Suspend Label Setup (☞"Monitor Suspend Setup" P5-16)



4 Perform the setup on the fourth page.

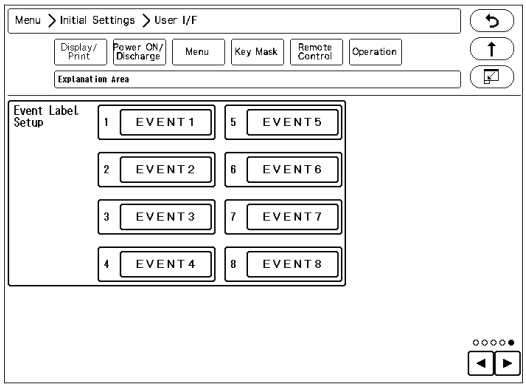
1 Time Shift
By setting the time for "Day Shift", "Twilight Shift", "Night Shift", the time bar displayed at the upper part on the data/waveform review screen will be displayed in different colors by each shift time.
Day Shift: Yellow
Twilight Shift: Green
Night Shift: Blue

2 Key Group Setup
8 user keys can be registered for each group. The label for the key group can be also set.



5 Perform the setup on the fifth page.

1 Event Label Setup
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.

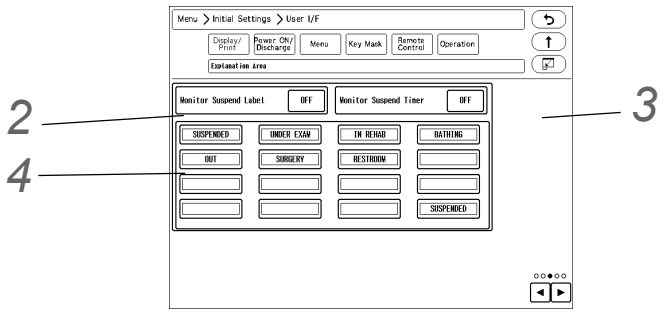


❑Monitor Suspend Setup

During monitoring suspended status, different messages in different colors according to the patient's destination can be displayed. Suspend timer function can be also used. When using the monitoring suspend timer function, alarm sound will generate after the preprogrammed duration to remind the user to resume monitoring.

The labels and colors to be displayed when monitoring is suspended, and monitor suspend time can be set. Maximum of 15 labels can be set.

1 Display the "Monitor Suspend Label" screen. [Menu>Initial Settings>User I/F>Display/Print]



2 Select ON/OFF for "Monitor Suspend Label".

- [ON]: [Mon. Suspend Setup] key will be displayed when the monitoring is suspended to allow monitor suspend label setup.
- [OFF]: Monitor suspend label function will be ineffective.

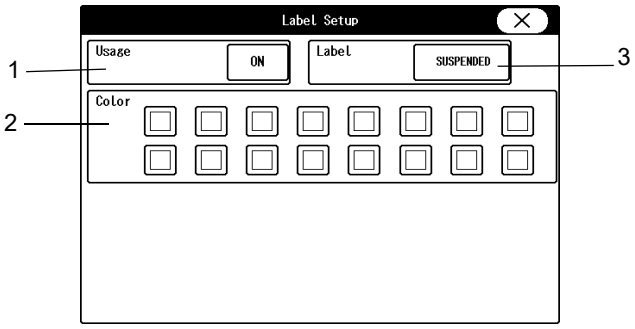
3 Set the "Monitor Suspend Timer".

- [ON] will turn ON the monitor suspend timer function, and timer will start when monitoring is suspended. (☞Operation Manual "Suspend Monitoring" P5-9)
- By setting "Monitor Suspend Label" and "Monitor Suspend Timer" to [ON], an alarm sound can be generated after the set duration (15 min./30 min./1 hr./1.5 hr./2 hr.).

NOTE

- If "Monitor Suspend Label" is set to [OFF], "Monitor Suspend Timer" function cannot be used.
- If "Monitor Suspend Label" is set to [OFF], "Monitor Suspend Timer" function will also automatically set to [OFF].

4 Select the key to edit the monitor suspend label.



1 Usage
"Usage": Select whether or not to use this monitor suspend label.

2 Color Setup
Select the color for the label. The background of the monitor suspend label will be displayed with the selected color.

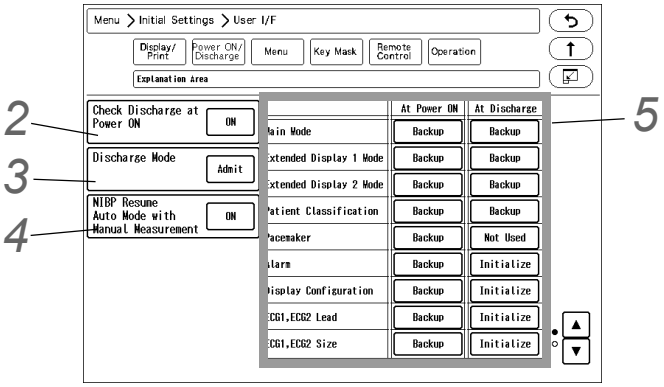
3 Label
Set the label. Maximum of 14 alphanumeric characters can be entered.

Power ON/Discharge

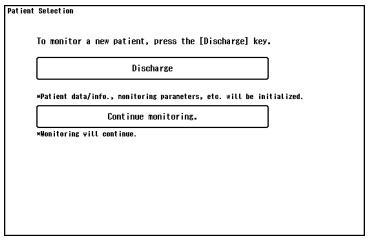
On this menu, monitoring operation when the power is turned ON or when a patient is discharged can be performed.

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

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



2 Check Discharge at Power ON



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.

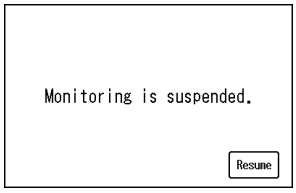
3 Discharge Mode

The monitoring condition after the patient has been discharged can be set.

[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

4 NIBP Resume Auto Mode with Manual Measurement

[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.

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

[Backup]: The setting will be backed up.

[Initialize]: 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.
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).
When the discharge process is performed on the central monitor, alarm will be reset according to the settings made under "Admit Setup" of the central monitor.

NOTE

- The operation after the power is turned ON will be according to the setting made on [Initial Settings] > [User I/F] > [Power ON/Discharge]. However, if the power was turned OFF for less than 30 seconds, the setting before the power was turned OFF will remain.
- If the "Main Mode" setting is other than [Backup], the following cannot be set.
  Patient Classification, Alarm, Display Configuration, ECG1, ECG2 Lead, ECG1, ECG2 Size, Impedance Mode ON/OFF, CVA Detect, NIBP Auto Mode, BP Scale, SpO_2 Averaging, CO_2 Scale, $EtCO_2$ Peak Duration

6 When "Link with Patient Class." is set to [ON], the operation will differ depending on the "Main Mode" setting under "Power ON/Discharge". (☞"To Program the User Mode" P5-31)

- If [Backup] is set for "Main Mode" under "Power ON/Discharge", the settings will be as follows.
  When "Link with Patient Class." is set to [ON], it is recommended to set [Initialize] for "Alarm" under "Power ON/Discharge".

Power ON/Discharge		Operation	
Patient Classification	Alarm Settings		
Backup	Backup	Patient Classification:	Current patient classification will be maintained.
		Alarm Settings:	Current alarm settings will be maintained.
	Initialize	Patient Classification:	Current patient classification will be maintained.
		Alarm Settings:	Alarm settings of the main mode selected for "Link with Patient Class."
Adult	Backup	Patient Classification:	Patient classification will be set to "Adult".
		Alarm Settings:	Current alarm settings will be maintained.
	Initialize	Patient Classification:	Patient classification will be set to "Adult".
		Alarm Settings:	Alarm settings of the main mode selected for "Link with Patient Class."
Child	Backup	Patient Classification:	Patient classification will be set to "Child".
		Alarm Settings:	Current alarm settings will be maintained.
	Initialize	Patient Classification:	Patient classification will be set to "Child".
		Alarm Settings:	Alarm settings of the main mode selected for "Link with Patient Class."
Neonate	Backup	Patient Classification:	Patient classification will be set to "Neonate".
		Alarm Settings:	Current alarm settings will be maintained.
	Initialize	Patient Classification:	Patient classification will be set to "Neonate".
		Alarm Settings:	Alarm settings of the main mode selected for "Link with Patient Class."

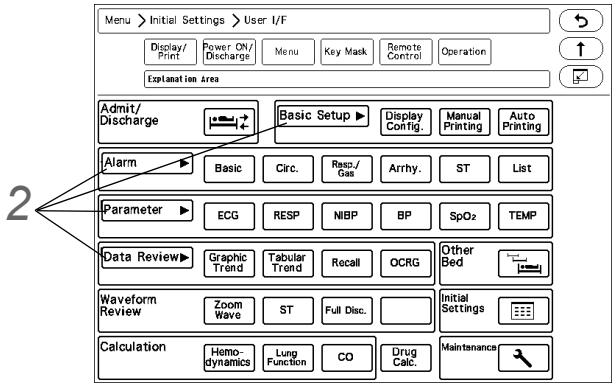
- If settings other than [Backup] is set for "Main Mode" under "Power ON/Discharge", the selected main mode settings will be applied regardless of the ON/OFF setting of "Link with Patient Class.".

Menu Setup

On the "Menu" setup, the keys displayed on the "Menu" screen can be customized.
The "Menu" screen is composed of 9 groups, which are "Admit/Discharge", "Basic Setup", "Alarm", "Parameter", "Data Review", "Waveform Review", "Calculation", "Initial Settings", "Maintenance".
The keys displayed for each group except "Initial Settings" and "Maintenance" can be customized.

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

- The "Menu" setup screen will be displayed.



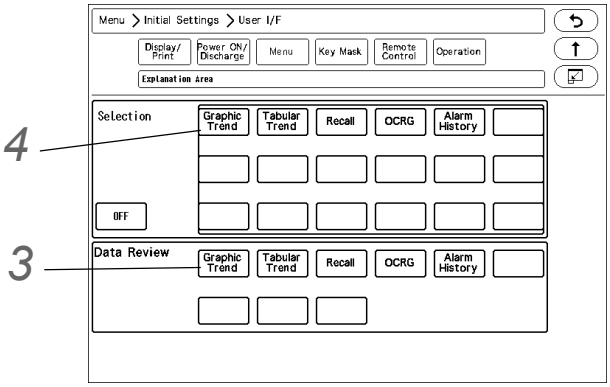
2 Press the group area to customize the keys.

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

3 Select the key position from the lower area.

- The selected key position will be displayed in blue.

4 Select the key from the upper area to be assigned to the selected key position.
The set key position will be automatically updated, but it can be also changed by pressing the key.



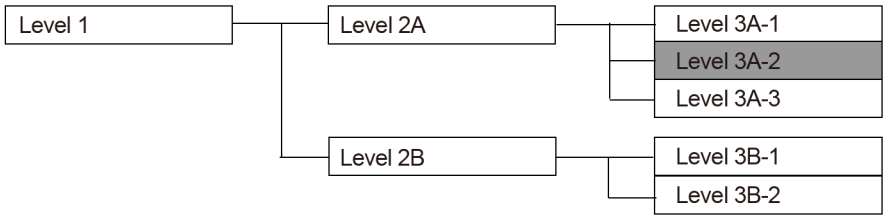
Key Mask

On the "Key Mask" setup, unnecessary keys and tabs can be masked.

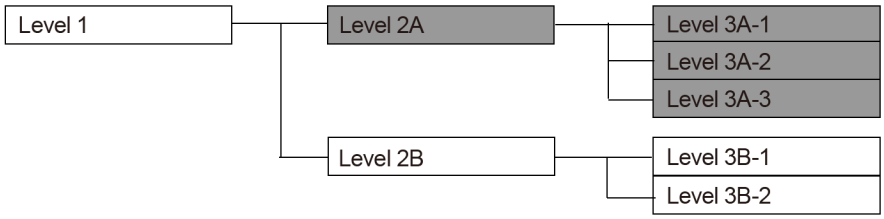
NOTE

- The masked key operation will be disabled on this system, but it will not affect the key operation from the central monitor. The setting can be changed from the central monitor even when the corresponding key is masked on this system.

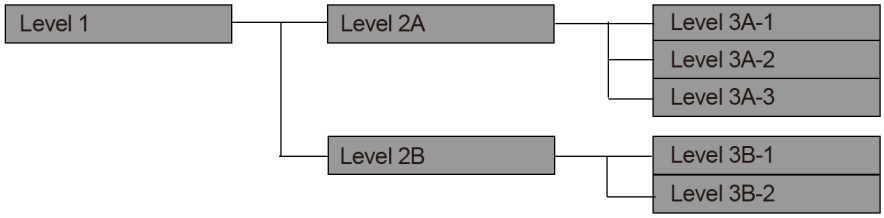
The setup items are in tree structure.
If the upper level key is masked, the lower level key will be also masked.
For the following tree structure, if "Level 3A-2" is masked, only this item will be masked.



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

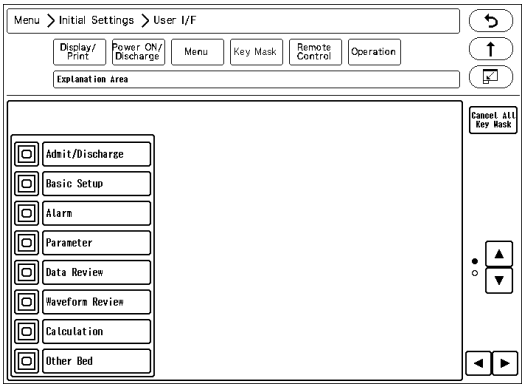


If "Level 1" is masked, the masked items will be as follows.



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

▸ The "Key Mask" menu will be displayed.

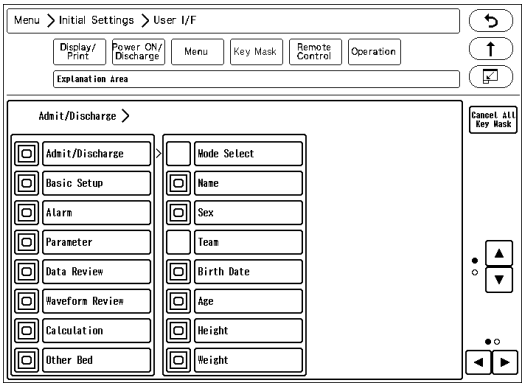


2 Select the item to perform the setting.

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.

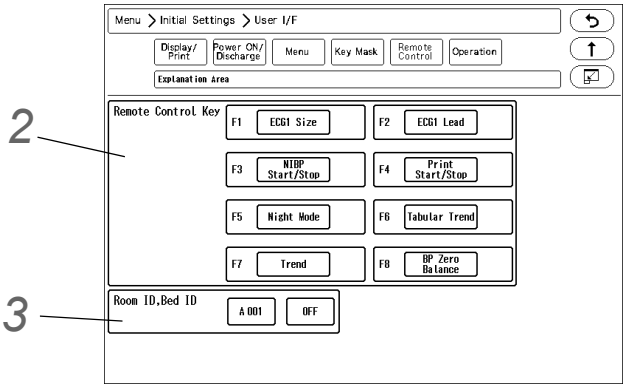
4 Press ☐ for the item to display.

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.

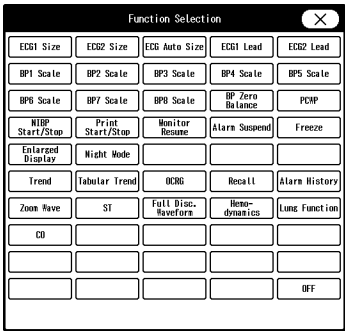
▸ The "Remote Control" menu will be displayed.



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" P7-26)
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	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.

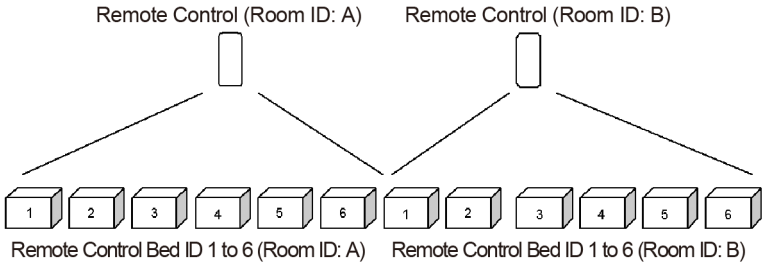
3 Set the Room ID/Bed ID.

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.

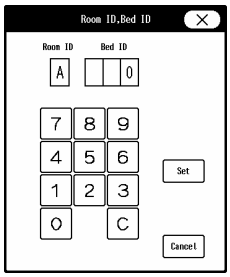


1 Press the key for "Room ID, Bed ID".

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

2 Press the [A 000] key.

- The "Room ID, Bed ID" window will be displayed. (shown on right)



3 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.

4 Use the numeric keys to enter the Bed ID.
Set the Bed ID in the range from 1 to 32.

5 Press the [Set] / [Cancel] key.

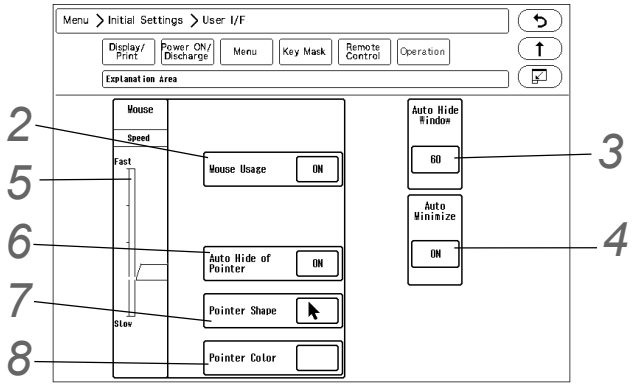
- [Set]: The entered Room ID/Bed ID will be set.
- [Cancel]: The entered Room ID/Bed ID will be canceled.

Operation Related Setup

The initial settings for the operation can be performed.

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

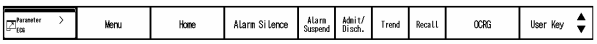
▸ The "Operation" menu will be displayed.



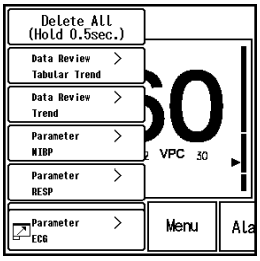
2 Mouse (optional) can be used for monitor operation.
[ON]: Mouse operation will be enabled when connected.
[OFF]: Mouse operation will be disabled even if connected.

3 The window can be automatically closed after fixed duration.
[OFF]: The window will not automatically close.
[5] to [60]: If no operation was performed for the set duration, the window will automatically close. However, the windows for "Data Review", "Waveform Review", "Calculation", "Initial Settings" will not automatically close.

4 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 redisplay the minimized window, press this key and select the window.



NOTE

- Maximum of 8 windows can be minimized. If exceeded, the minimized condition from the oldest window will be canceled respectively.
- To redisplay the minimized window, the [Restore Window] key needs to be displayed on the user key area.

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

6 Select ON/OFF for "Auto Hide of Pointer".
[ON]: Automatically hides the pointer if the mouse is not used for 5 minutes.By moving or clicking the mouse, the pointer will be displayed again.
[OFF]: Pointer will not be automatically hidden.

7 The pointer shape can be selected from standard/large.

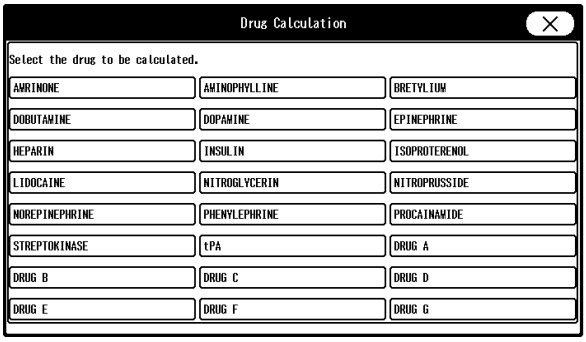
8 The color of the mouse pointer can be selected from black or white.

Drug Calculation

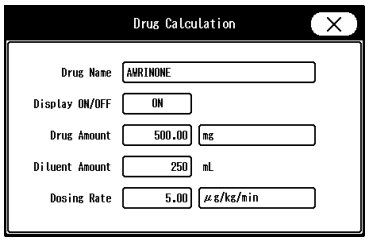
The following initial settings can be performed for the drug calculation.
*Drug Name
*Initial value to be entered when a drug is selected on the drug calculation menu (drug amount, drug amount unit, diluent amount, dosing rate, dosing rate unit)
*Display ON/OFF for each drug

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

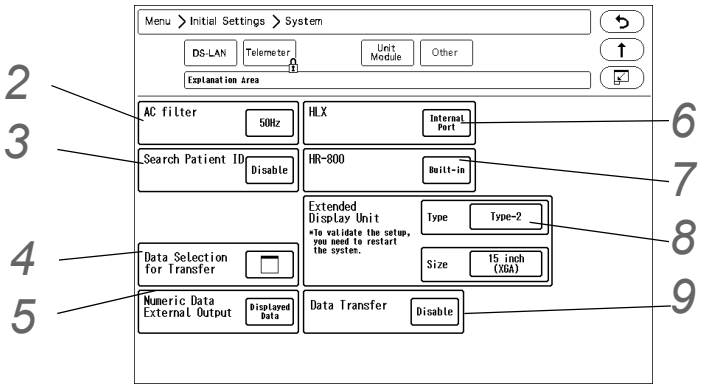
On the "System" menu, system related setup can be performed.

REFERENCE

- For the setup procedures of DS-LAN, telemeter, unit module setup, and data transfer among the DS-8007, DS-8400 system, 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)" P4-4)

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

▸ The system setup menu will be displayed.



2 Select [50Hz]/[60Hz] for "AC Filter".

3 Set the "Search Patient ID".

▸ [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)" P5-4)

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

4 Select the data to transfer when the Super Unit is connected.

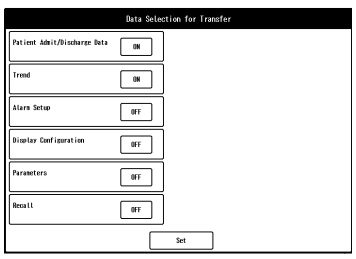
The data to be transferred can be changed on the patient selection screen which will be displayed when connected to the Super Unit.

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

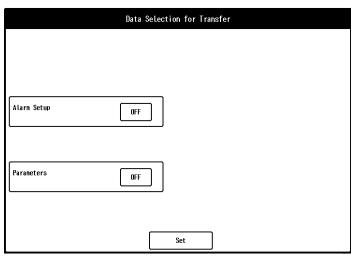
1 Press the key for "Data for Transfer".

▸ The "Data Selection for Transfer" menu will be displayed.

When the HS-8000 is connected



When the DS-8007 is connected



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)

5 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.

- [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-8016TC/LC-8018TC).
For the parameters which requires alarm monitoring on the extended display unit/central monitor, make sure to display those on the display unit.

6 Set the HLX connection.

- [COM Port]: The HLX connected to the external COM port will be used.
- [Internal Port]: The HLX connected to the internal serial port will be used. When [Internal Port] is selected, external serial port (COM4) cannot be used.

7 Set the HR-800 connection.

- [Built-in]: The HR-800 installed to the internal slot will be used.
- [U-LINK]: The HR-800 connected to the external U-LINK connector will be used.

8 Set the "Extended Display Unit".

REFERENCE

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

9 Set the data transfer function when the HS-8000 or DS-8007 is connected.

- [Enable]: The data transfer function will be enabled.
- [Disable]: The data transfer function will be disabled.
- [Transport]: The data transfer function with the DS-8007 will be enabled.

CAUTION

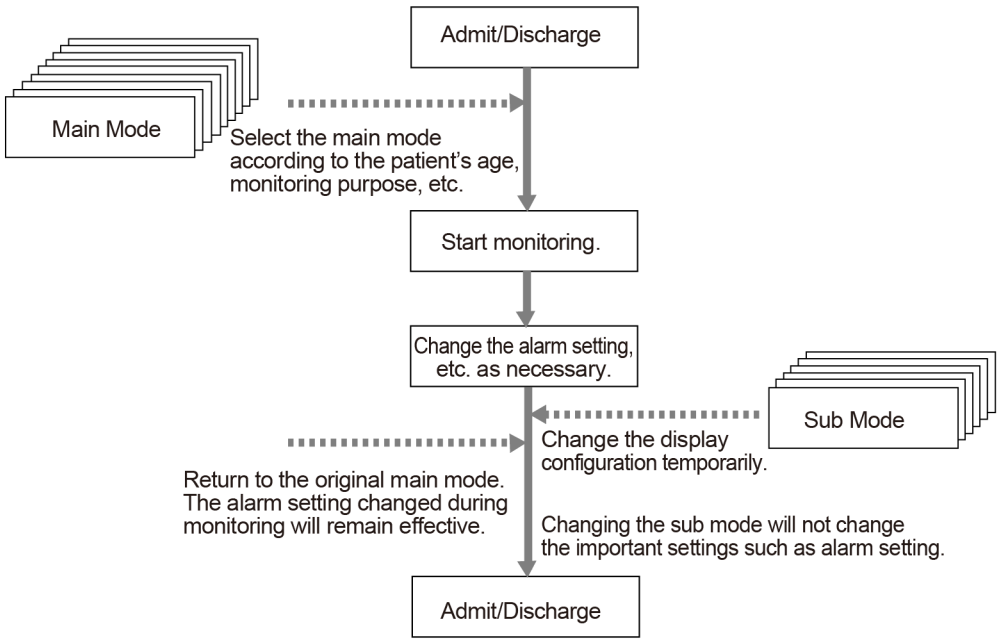
- If the data transfer function is enabled and alarm sound suspend function is ON, the alarm sound will be automatically suspended for 5 minutes when the Super Unit is connected.

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.

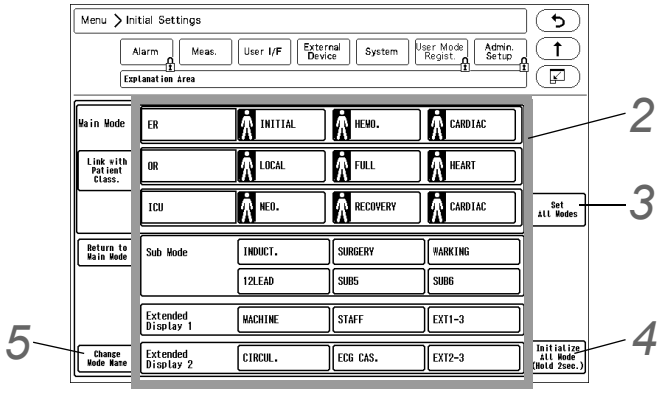
- Mode Name
- Display Configuration

To Program the User Mode

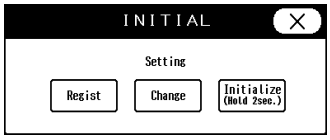
This section explains how to register/change the user mode.

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

- The "User Mode Regist." menu 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]: The 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.

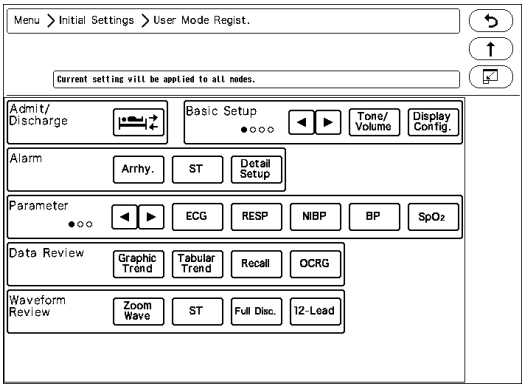
NOTE

- 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.

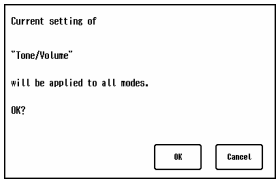
1 Press the [Set All Modes] key.

▸ 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. (shown on right)

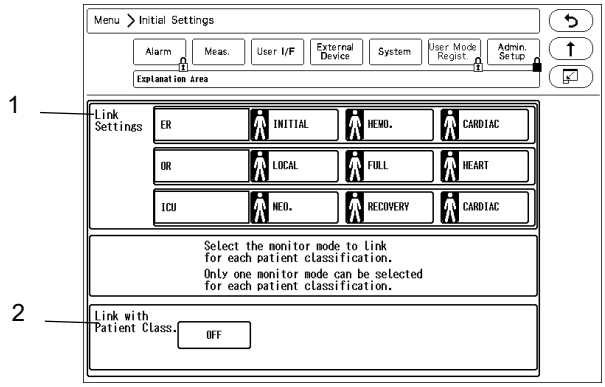


3 Press [OK] to apply the current setting to all modes.

4 All user modes will be initialized.

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

6 By pressing the [Link with Patient Class.], the main mode to link with the patient classification can be set.



▸ The patient icon indicates the patient classification registered for each main mode.
When the main mode is linked with the patient classification, the patient icon will change to blue.

1 Link Settings

▸ Select the main mode to link with each patient classification. One main mode per each patient classification can be set.

NOTE

- When [Regist] or [Initialize] key is pressed on the main mode setup window, the link setting for that main mode will be canceled.
- When patient classification is changed by pressing the [Set All Modes] key, link settings for all main modes will be canceled.
- When [Initialize All Modes] key is pressed, link settings for all main modes will be canceled, and "Link with Patient Class." will be set to OFF.

2 ON/OFF of "Link with Patient Class."

- [ON]: The monitor mode will change when the patient classification is changed.
- [OFF]: The monitor mode will not change when the patient classification is changed.

NOTE

- When selecting [ON] for "Link with Patient Class.", set the following in advance.
  *On the "Link Settings", select the main mode to link with each patient classification.
  *Set the appropriate alarm limits for the linked main mode.
  *Check the settings for "Power ON/Discharge". (☞"Power ON/Discharge" P5-18)

Chapter 6 Setup Item/Default Value

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, $EtCO_2$	○
HR/PR Lower Limit during Alarm Auto Setting		OFF, 30 bpm, 40 bpm	OFF	○
Auto Alarm Setup		Enable, Disable	Disable	○
Alarm Threshold Limit	Parameter	HR, Ext Tachy, Ext Brady, SpO_2, Ext SpO_2, SpO_2-2, Ext SpO_2-2, PR-SpO_2, PR-SpO_2-2, PR_IBP, NIBP-S, BP1-S, RR, APNEA, $EtCO_2$	All Disable	○
	Setting Range	(Standard alarm setting range will be applied.)		
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	○

Item		Description	Default	Backup
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	○
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_2In*3	H, M	M	○
	CO_2Et*3	H, M	M	○
	O_2In*3	H, M	M	○
	O_2-Exp*3	H, M	M	○
	N_2O In*3	H, M	M	○
	N_2O 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	○

Item		Description	Default	Backup
Numeric Data	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	○
	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	○

Item		Description	Default	Backup
	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	US1	○
	Label 2		US2	
	Label 3		US3	
	Label 4		US4	
	Label 5		US5	
TEMP User Label	Label 1	3 alphanumeric characters	US1	○
	Label 2		US2	
	Label 3		US3	
	Label 4		US4	
	Label 5		US5	
	Label 6		US6	
	Label 7		US7	
Measurement Unit	CO_2	mmHg, kPa, %	mmHg	○
	BP	mmHg, kPa	mmHg	
	CVP	mmHg/kPa, cmH_2O	mmHg/kPa	
	TEMP	°C, °F	°F	
	ST	mm, mV	mm	
	Height/Weight	cm/kg, in/lb	in/lb	

Item		Description	Default	Backup
Catheter Manufacturer for CC Input	Manufacturer 1	8 alphanumeric characters	BIOSENS	○
	Manufacturer 2		ARGON	
	Manufacturer 3		EDWARS	

❑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	○
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, V, 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_2O	VENT-A: All OFF VENT-B: All OFF	○
Hemo/etc Display Parameters Setup		OFF [SvO_2/CCO] SvO_2, $ScvO_2$, SaO_2, O_2EI, 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 Display		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	○

Display/Print

Item		Description	Default	Backup
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	○
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	

Display/Print

Item		Description	Default	Backup
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	
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	
	NOREPINEPHRINE		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	
Monitor Suspend Setup	Monitor Suspend Label	ON, OFF	OFF	○
	Monitor Suspend Timer	ON, OFF	OFF	○

Display/Print

Item		Description	Default	Backup
Monitor Suspend Setup	Label 1	ON/OFF Label: 7 characters Color: 16 colors	ON (SUSPENDED/Red)	○
	Label 2		ON (UNDER EXAM/Pink)	○
	Label 3		ON (IN REHAB/Green)	○
	Label 4		ON (BATHING/Orange)	○
	Label 5		ON (OUT/Light Orange)	○
	Label 6		ON (SURGERY/Violet)	○
	Label 7		ON (RESTROOM/Light Blue)	○
	Label 8 to Label 15		reserved	○
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	○
Event Label Setup	Event 1	8 alphanumeric characters	EVENT	○
	Event 2		EVENT	○
	Event 3		EVENT	○
	Event 4		EVENT	○
	Event 5		EVENT	○
	Event 6		EVENT	○
	Event 7		EVENT	○
	Event 8		EVENT	○

*: 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	Patient Classification	Backup, Adult, Child, Neonate	Backup	○
	Main Mode	Backup, Current Mode, Mode 1 to 9	Backup	○

Power ON/ Discharge

Item		Description	Default	Backup
At Power ON Backup/Initialize	Extended Display 1	Backup, Mode 1 to 3	Backup	○
	Extended Display 2	Backup, Mode 1 to 3	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	○
At Discharge Backup/Initialize	Patient Classification	Backup, Adult, Child, Neonate	Backup	○
	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	○
	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, External Device	ECG, RESP, NIBP, BP, SpO_2, TEMP, GAS, CO_2, BIS, External Device	○
	Data Review	OFF, Trend, Tabular Trend, Recall, OCRG, Alarm History	Trend, Tabular Trend, Recall, OCRG, Alarm History	○
	Waveform Review	OFF, Zoom, ST	Zoom, ST	○
	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: 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	○
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/n/air, PB, Evita, Vigilance, PiCCO, PulsioFlex, PC Comm., HLX, Barcode Reader, Magnetic Card Reader, BIS, INVOS, FLOW-i, PC Comm. (DS-5000), TCM4/TCM5*	OFF	○
		COM2		OFF	○
		COM3		OFF	○
		COM4		OFF	○
		Status II		OFF	○
		U-LINK	OFF, MGU-800, MGU-810	OFF	○
Network	Main Unit	IP Address	Numeric (0 to 9)	0.0.0.0	○
		Sub-Network Mask		0.0.0.0	○
		Default Gateway		0.0.0.0	○
	Printer	Network Printer	ON, OFF, DS-LAN	OFF	○
		IP Address	Numeric (0 to 9)	0.0.0.0	○
		MAC Address	Alphanumeric (0 to 9, A to F)	00.00.00.00.00.00	○
		Printer Spec.	LIPS IV, ESC/page, PCL 5	LIPS IV	○
		Paper Size	A4, Letter	Letter	○
		Central Monitor	001 to 016	001	○
Status Output Setup	Alarm Output Setup	Alarm Level	OFF, APNEA, Level H, Level H,M, Level H,M,L	OFF	○
		Output Logic	Positive Logic, Negative Logic, Pulse	Negative Logic	○
Analog Output Setup (HS-8000)	Analog Output	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	○
	Sync. Signal	Signal Output	HR, RR	HR	○
		Output Logic	Positive Logic, Negative Logic	Negative Logic	○
		Pulse Width	100, 60, 20	100	○

Item			Description	Default	Backup
Analog Output Setup (DS-8007)	Analog Synchronized Signal Output		ON, OFF	OFF	○
	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	Synchronized Signal	○
		Signal Output	HR, RR	OFF	○
		Output Logic	Positive Logic, Negative Logic	Negative Logic	○
		Pulse Width	100, 60, 20	100	○
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	○

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

❑Initial Settings (System)

Item		Description	Default	Backup
DS-LAN	DS-LAN Setup	DS-LANII (10Mbps) , DA-LANIII (100Mbps)	DS-LANIII (100Mbps)	○
	Room ID	4 alphanumeric characters	BED-	○
	Bed ID	3 numerics	000	○
	DS-LAN Pat. ID Transmission Start Position	1st to 20th character	1st character	○
	Synchronize Hemodynamic Data with the Central Monitor	ON, OFF	ON	○
	CO_2 (mmHg) Upper Limit of Transmission	No limit, 99mmHg	99mmHg	○

Item		Description	Default	Backup
Telemeter	Usage	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	Manual	Manual 1: BP1,2 2: BP3,4 3: TEMP1,2	○
	SpO_2	Settings for 1ch, 2ch	1ch: HS, 2ch: OFF	○
Other	AC Frequency	50Hz, 60Hz	60 Hz	○
	Search Patient ID	Enable, Disable	Disable	○
	Extended Display Unit Type Size	 Type1, Type2, Type3 19 inch (SXGA), 15 inch (XGA)	 Type3 15 inch (XGA)	○
	Data Transfer	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	○
	Numeric Data External Output	Displayed Data, All Data	Displayed Data	○
	HLX	COM Port, Internal Port	Internal Port	○
	HR-800	Built-in, U-LINK	Built-in	○

❑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	Backup
Item		Initial	
Layout		Numeric Data/Bottom 2 rows	
Numeric Data		HR, SpO_2, NIBP, BP1, CO_2, RR_IMP	
Waveform		ECG1, SpO_2, BP1, CO_2, RESP	
User Key	Numeric Data Area	-	
	Right Side of Display	Home, Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/ Stop, NIBP Auto Mode, Alarm Setup (All), NIBP Cont., Alarm History, NIBP List, Recall, Tabular Trend, Graphic Trend, Print Start/Stop, Key Lock, Night Mode	
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	
Detail Setup (Waveform)	Grid	OFF	
	Thickness	Regular	
	Clip	OFF	
	Fill CO_2 Waveform	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 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	Backup
Item		Hemodynamics	
Layout		Numeric Data/Right	
Numeric Data		HR, SpO_2, NIBP, BP1, BP2, BP3, CO_2, RR_IMP, SvO_2/CO	
Waveform		ECG1, SpO_2, BP Overlap 1, CO_2, RESP	
User Key	Numeric Data Area	-	
	Right Side of Display	Home, Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, Alarm Setup (All), NIBP Cont., Alarm History, NIBP List, Recall, Tabular Trend, Graphic Trend, Print Start/Stop, Key Lock, Night Mode	
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	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 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	Backup
Item		Cardiac	
Layout		12-Lead, BP1	
Numeric Data		Right: HR, SpO_2, NIBP, BP1, CO_2, RR_IMP	
Waveform		ECG12 Lead	
User Key	Numeric Data Area	Below HR: 12-Lead Print, Print Cancel, 12L Analysis	
	Right Side of Display 1/2	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	
	Right Side of Display 2/2	Home, Menu, Alarm Silence, Alarm History, Recall, Tabular Trend, Graphic Trend, Key Lock, Night Mode, Print Start/Stop, User Key Up/Down	
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	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 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	Backup
Item		Local	○
Layout		Numeric Data/Bottom 2 rows	
Numeric Data		HR, SpO_2, BP1, CO_2, RR_IMP, NIBP, NIBP List, TEMP1/2	
Waveform		ECG1, SpO_2, BP1, CO_2, RESP	
User Key	Numeric Data Area	-	
	Right Side of Display	Home, Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, Alarm Setup (All), NIBP Cont., Alarm History, NIBP List, Recall, Tabular Trend, Graphic Trend, Print Start/Stop, Key Lock	
Short Trend		(Same as Main 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	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 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	Backup
Item		Full	
Layout		Numeric Data/Right & Bottom	
Numeric Data		Right: HR, SpO_2, NIBP, BP1, BP2, BP3, GAS, SvO_2/CO Bottom: BIS, TEMP1/2	
Waveform		ECG1, SpO_2, BP1, BP Overlap 1, CO_2	
User Key	Numeric Data Area	-	
	Right Side of Display	Home, Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, Alarm Setup (All), NIBP Cont., Alarm History, NIBP List, Recall, Tabular Trend, Graphic Trend, Print Start/Stop, Key Lock	
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	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 3	N/A	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	
	Graphic/Tabular Trend	OFF	
	Graphic/Tabular Trend Size	Small	

Main Mode (Mode 6)

Item		Default	Backup
Item		Heart	
Layout		Numeric Data/Right & Bottom	
Numeric Data		Right: HR, SpO_2, NIBP, BP1, BP2, BP3, BP4, BP5, BP6, GAS, SvO_2/CO Bottom: BIS, TEMP1/2	
Waveform		ECG1, SpO_2, BP1, BP Overlap 1, BP Overlap 2, CO_2	
User Key	Numeric Data Area	-	
	Right Side of Display	Home, Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, Alarm Setup (All), NIBP Cont., Alarm History, NIBP List, Recall, Tabular Trend, Graphic Trend, Print Start/Stop, Key Lock	
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	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 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	Backup
Item		NEO.	
Layout		Standard/Right	
Numeric Data		Right: HR, SpO_2, NIBP, BP1, CO_2, Agent, RR_IMP, TEMP1/2	
Waveform		ECG1, SpO_2, BP1, CO_2, RESP	
User Key	Numeric Data Area	-	
	Right Side of Display	Home, Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, Alarm Setup (All), NIBP Cont., Alarm History, NIBP List, Recall, Tabular Trend, Graphic Trend, Print Start/Stop, Key Lock, Night Mode	
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	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 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	Backup
Item		Recovery	
Layout		Numeric Data/Right & Bottom	
Numeric Data		Right: HR, SpO_2, NIBP, BP1, BP2, BP3, GAS, SvO_2/CO Bottom: BIS, TEMP1/2	
Waveform		ECG1, SpO_2, BP1, BP Overlap 1, CO_2	
User Key	Numeric Data Area	-	
	Right Side of Display	Home, Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, Alarm Setup (All), NIBP Cont., Alarm History, NIBP List, Recall, Tabular Trend, Graphic Trend, Print Start/Stop, Key Lock, Night Mode	
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	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 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	Backup
Item		Cardiac	
Layout		12-lead	
Numeric Data		HR, SpO_2, TEMP1/2, NIBP, BP1, CO_2, RR_IMP	
Waveform		ECG 12-Lead, BP1	
User Key	Numeric Data Area	Below HR: 12-Lead Print, Print Cancel, 12L Analysis	
	Right Side of Display 1/2	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	
	Right Side of Display 2/2	Home, Menu, Alarm Silence, Alarm History, Recall, Tabular Trend, Graphic Trend, Key Lock, Night Mode, Print Start/Stop, User Key Up/Down	
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	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 3	N/A	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	
	Graphic/Tabular Trend	OFF	
	Graphic/Tabular Trend Size	Small	

❑Initial Settings (Link with Patient Classification)

Item		Description	Default	Backup
Link Settings	Adult	Main Mode1 to 6	OFF	
	Child		OFF	○
	Neonate		OFF	
Link with Patient Class.		ON, OFF	OFF	

Sub Mode (Mode 1)

Item		Default	Backup
Item		Induct.	
Layout		Numeric Data/Bottom 2 rows	
Numeric Data		HR, SpO_2, NIBP, BP1, CO_2, RR_IMP	
Waveform		ECG1, SpO_2, BP1, CO_2, RESP	
User Key	Numeric Data Area	-	
	Right Side of Display	Home, Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, Alarm Setup (All), NIBP Cont., Alarm History, NIBP List, Recall, Tabular Trend, Graphic Trend, Print Start/Stop, Key Lock, Night Mode	
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	
Detail Setup (Waveform)	Grid	OFF	
	Thickness	Regular	
	Clip	OFF	
	Fill CO_2 Waveform	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 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	Backup
Item		Surgery	
Layout		Numeric Data/Right & Bottom	
Numeric Data		Right: HR, SpO_2, NIBP, BP1, BP2, BP3, GAS, SvO_2/CO Bottom: BIS, TEMP1/2	
Waveform		ECG1, SpO_2, BP1, BP Overlap 1, CO_2	
User Key	Numeric Data Area	-	
	Right Side of Display	Home, Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, Alarm Setup (All), NIBP Cont., Alarm History, NIBP List, Recall, Tabular Trend, Graphic Trend, Print Start/Stop, Key Lock	
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	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 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	Backup
Item		Waking	
Layout		Standard/Right	
Numeric Data		HR, SpO_2 PR, NIBP, BP1, BP2, RR_IMP, TEMP1 2	
Waveform		ECG1, SpO_2, BP Overlap 1, RESP	
User Key	Numeric Data Area	-	
	Right Side of Display	Home, Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, Alarm Setup (All), NIBP Cont., Alarm History, NIBP List, Recall, Tabular Trend, Graphic Trend, Print Start/Stop, Key Lock	
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	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 3	N/A	
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	
	Graphic/Tabular Trend	OFF	
	Graphic/Tabular Trend Size	Small	

Sub Mode (Mode 4)

Item		Default	Backup
Item		12-lead	
Layout		12-lead	
Numeric Data		HR, SpO_2, NIBP, BP1, CO_2, RR_IMP	
Waveform		ECG 12-Lead, BP1	
User Key	Numeric Data Area	Below HR: 12-Lead Print, Print Cancel, 12L Analysis	
	Right Side of Display 1/2	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	
	Right Side of Display 2/2	Home, Menu, Alarm Silence, Alarm History, Recall, Tabular Trend, Graphic Trend, Key Lock, Night Mode, Print Start/Stop, User Key Up/Down	
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	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 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	Backup
Item		Sub Mode 5	
Layout		Numeric Data/Right	
Numeric Data		HR, SpO_2 PR, BP1, BP2, NIBP, CO_2, TEMP1 2, RR_IMP, GAS, SvO_2 CO	
Waveform		ECG1, SpO_2, BP1, BP2, Graphic/Tabular Trend	
User Key	Numeric Data Area	-	
	Right Side of Display	Home, Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, Alarm Setup (All), NIBP Cont., Alarm History, NIBP List, Recall, Tabular Trend, Graphic Trend, Print Start/Stop, Short Trend ON/OFF, Graphic/Tabular Trend ON/OFF	
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	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 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	Backup
Item		Sub Mode 6	
Layout		Numeric Data/Right	
Numeric Data		HR, Recall List, SpO_2, NIBP, CO_2, TEMP1, VENT, SvO_2 CO, RR_IMP, P-V Loop, F-V Loop	
Waveform		ECG1, SpO_2, CO_2, Graphic/Tabular Trend	
User Key	Numeric Data Area	-	
	Right Side of Display 1/2	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	
	Right Side of Display 2/2	Home, Menu, Alarm Silence, Alarm History, Recall, Tabular Trend, Graphic Trend, Graphic/Tabular Trend ON/OFF, Night Mode, Print Start/Stop, User Key Up/ Down	
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	ON	
	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, 3	N/A	
	RR Overlap 1	CO_2, O_2, Agent	
	RR Overlap 2, 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	
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, SpO_2, BP1, RESP	ECG1, SpO_2, BP1, RESP	
User Key	Numeric Data Area	-	-	
	User Key Down 1/2	Extended 1 Mode 1, Extended 1 Mode 2, Extended 1 Mode 3, 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 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	
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	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	-	-	
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)		
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		
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	

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

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
Main Unit	
Lithium-Ion Battery Pack: BTO-005	300 times of charge/discharge or 1 year of usage whichever earlier
HS-8000 Series (Super Unit), DS-8007 System	
NIBP Unit	100,000 times of measurement or 6 years, whichever earlier
HCP-800/HCP-810/HCP-820	
CO_2 Unit	30,000 hours
MGU-800/MGU-810 Series	
Water Trap	1 month
DRYLINE Receptacle	1 year

To Check the Periodic Replacement Period

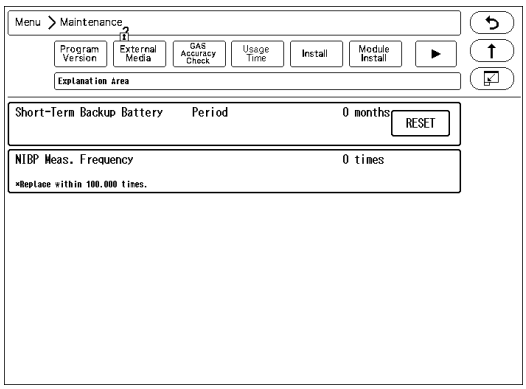
The usage hours for the part which requires periodic replacement can be displayed.
It can be used as an indication of replacement period for each part.

1 Press the [Menu], [Maintenance], [Usage Time] keys.

- The Usage Time window will be displayed.
- The usage period or NIBP measurement frequency for each part will be displayed.

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

- The displayed value will reset.



⚠ CAUTION

- To replace the parts, contact your nearest 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

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.
- As the touch panel is vulnerable, do not scratch or rub it with 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-8400 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.

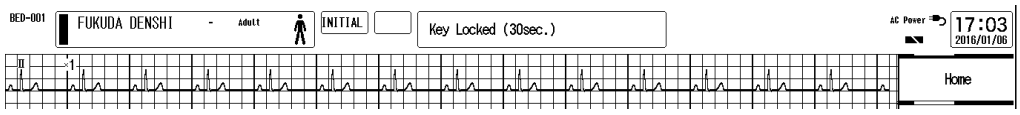
NOTE

- Assign the [Key Lock] key to the user key area in advance.
  (☞Operation Manual "To Configure the Display" P10-4)
- 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.

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.

SpO_2 Sensor

Disinfect the SpO_2 sensor according to the manufacturer's guidelines. Do not reuse/resterilize the disposable SpO_2 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 / resterilize the cardiac output catheter.
- When cleaning, follow the procedure below.

1 Wipe the cable using 70% isopropyl alcohol cotton.

2 Dry it completely with air before reusing.

Airway Adapter for Capnostat 5

- 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.

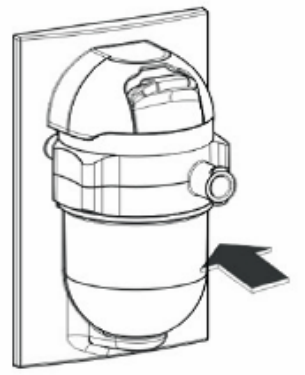
2 Unscrew the reservoir from the filter to separate them

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

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 using the following list.

- 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. Cleanness, Cleaning (Note: Turn OFF the power, and disconnect the power cable and battery before cleaning.)			
01	Cleanness	If contamination is found, perform proper disinfection before the daily check.	No contamination should be found.
02	Cleaning	Visually check the exterior, and perform proper cleaning. For details, refer to "Chapter 8 Cleaning/ Disinfecting/Storing" of Maintenance Manual.	It should be clean.

No.	Check Items	Check Procedure	Criteria
2. External Appearance			
01	External Appearance	Visually check the exterior for scratches, cracks, and rust.	No abnormality should be found.
02	Cables	Check that the cables are intact and firmly connected.	The cables should be intact and firmly connected.
03	Installation	Check whether the equipment is installed on a level surface.	The installation area must be level and free from vibration and shock.
04	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, and check that the equipment operates normally.	The home display should appear, and the power supply LED should light.
			The date and time should be correct.
02	Function	Turn ON the power, and check that the equipment operates normally.	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.
03	Function	(When HPD-810/820, HCP-810/820 are used)	The home display should appear, and the power supply LED should light in green.
			When the sampling tube is connected, "0" should be displayed in the numeric data box.
04	CO_2 Calibration (When HCP-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] > [Parameter] > [CO_2]> [CO_2 Cal.]	Should not be 0 hrs.
05	Alarm Indicator	Check the alarm indicator operation by pressing the [Indicator Test] key.	It should light with the set pattern.
06	Alarm Sound	Check the alarm sound by pressing the [Test] key. ([Menu] > [Tone/Volume])	The alarm sound should be properly generated from the speaker.

No.	Check Items	Check Procedure	Criteria
07	Recorder Unit (When HR-800 is used)	Visually check the installed condition of the paper.	The paper should be correctly installed.
			Neither damage nor discoloration should be found.
		Check if the printing operation is smooth, and no abnormal sound is occurring.	The operation should be smooth and no abnormal sound should occur.
08	When the 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.

No.	Check Items	Check Procedure	Criteria
4. Other Items			
01	Periodic Replacement Parts	Check the number of measurements or date of first usage.	It should not exceed 100,000 times, or six (6) years from the first usage.
		Check the number of charging/discharging times or the first usage date of the BTO-008 Lithium-Ion Battery Pack.	The number of charging/discharging times should not exceed 300 times, or usage duration should not exceed one year.
		Check the operation hours of the CO_2 unit (HCP-810/HCP-820).	It should not exceed 30,000 hours.
02	Periodic Inspection	Check the date of the previous periodic inspection.	Should be within one year.
03	Operation Manual	Check that accompanying documents (operational manual, etc.) are stored in specified location.	Should be stored in specified location.

⚠ CAUTION

- If the CO_2 gas calibration is not performed at a specified interval, CO_2 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.
- 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 the external media.
- Some models of commercially available bench top functional testers and patient simulators can be used to verify the proper functionality of SpO_2 monitoring system, sensors, cables, but they are incapable of properly evaluating the SpO_2 measurement accuracy. SpO_2 measurement accuracy can only be evaluated by comparing measurement data with SaO_2 measurements obtained from simultaneously sampled arterial blood using a laboratory Co-oximeter.

No.	Check Items	Check Procedure	Criteria
1. Preparation, Cleaning			
01	Data Backup, etc.	Before the check procedure, back up the setup data and patient data on the external media. If backup is not possible, write down the setting information, etc. before the check procedure, and restore the settings to original state after the check procedure.	The data should be properly backed up. Or, the setting information, etc. should be written down.
02	Cleanness	If contamination is found, perform proper disinfection before the daily check.	No contamination should be found.
03	Cleaning	Visually check the exterior, and perform proper cleaning. For details, refer to "Chapter 8 Cleaning/Disinfecting/Storing" of Maintenance Manual.	It should be clean.

No.	Check Items	Check Procedure	Criteria
2. External Appearance/Accessories			
01	External Appearance	Visually check the exterior for scratches, cracks, deformation, and rust.	No scratches, cracks, deformation, and rust should be found on the exterior.
02	Label	Visually check the rating label and caution label of the equipment.	Should be neither peeled nor stained nor unclear.
03	Cables	Check that neither damage nor broken wire is found in all cables. Check that the connection is smooth and secure.	Neither damaged nor broken wire should be found. Should be securely connected.
04	Printing Paper (When HR-800 is used)	Visually check the installed condition. Check that extra printing paper is stored.	The paper should be correctly installed. No discoloration should be found. Extra printing paper should be stored.
05	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
3. Power Supply			
01	Standby Switch	Check by connecting the power cable to AC and turning the power ON/OFF using a standby switch.	Check that the power supply LED lights. ON: Green, OFF: Orange

02	Battery-Charging Operation (When a battery is installed)	Install the battery, and check the charging operation.	Check that the battery charging LED lights. Charging is in process: Orange, Fully charged: Green No battery: Light Off
03	Battery Operation (When a battery is installed)	After charging the battery, unplug the power cable, and change to battery operation.	Check that the battery-operating condition is as specified on the operation manual.
04	Replacing the Battery (When a battery is installed)	Check the battery replacement date.	Should be within one year from start of usage.

No	Check Items	Check Procedure	Criteria
4. Display/Operation/Print			
01	Operation, Switch	Check by operating the control switches and keys on the touch panel.	Should operate correctly.
02	LCD	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.
03	Alarm Indicator	Check if the alarm indicator lights when the power is turned ON.	Should light when the power is turned ON.
04	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.
05	Date/Time	Check the year, month, day, and time on the display.	The year, month, day, and time should be correctly displayed.
06	Printing Status (When HR-800 is used)	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.
07	Paper Speed (When HR-800 is used)	Perform test printing on the maintenance menu. Check by measuring the length of printed grid.	Error should be within ±3% for 25 mm/sec and 50 mm/sec waveform traces.
08	Telemetry Transmission	Perform telemetry transmission, and check the reception condition and waveform on the receiver side.	Correct waveforms and numeric data should be displayed and receiving condition should be stable.

No	Check Items	Check Procedure	Criteria
5. 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 ± 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 ± 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
6. 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 : 1500Ω, Detection Lead: II (LL), Respiration Waveform: Normal, Amplitude: 1 Ω	The displayed RR should be within 20 Bpm ± 3 Bpm.

No	Check Items	Check Procedure	Criteria
7. 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 ± 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 ± 5 mmHg.

No	Check Items	Check Procedure	Criteria
8. 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 ± 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 ± 3 bpm.

No	Check Items	Check Procedure	Criteria
9. 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 ± 10 mmHg for SYS, 80 mmHg ±10 mmHg for DIA, 90 mmHg ±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 ± 3 bpm.

No	Check Items	Check Procedure	Criteria
10. Temperature			
01	Temperature display error	Input the temperature signal of 37°C/98.6°F from the simulator, and check the displayed temperature value on the monitor.	The displayed temperature value should be within 37°C±0.2°C/98.6°F±0.4°F.

No	Check Items	Check Procedure	Criteria
11. Cardiac Output (Blood Temperature, Injectate Temperature)			
01	Blood Temperature Measurement	Input the blood temperature signal of 37°C/ 98.6°F from the simulator, and check the displayed blood temperature value on the monitor.	The displayed blood temperature value should be within 37°C±0.3°C/98.6°F±0.5°F.
02	Injectate Temperature Measurement	Input the injectate temperature signal of 15°C/ 59.0°F from the simulator, and check the displayed injectate temperature value on the monitor.	The displayed injectate temperature value should be within 15°C±0.5°C/59.0°F±0.9°F.

No	Check Items	Check Procedure	Criteria
12. CO_2 Concentration (Optional)			
01	CO_2 Concentration Calibration (HCP-810/820)	Perform calibration according to the procedure explained in "Chapter 9 Maintenance Check [CO_2 Calibration]" (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 ± 2 mmHg.

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

No	Check Items	Check Procedure	Criteria
14. 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 ± 0.1 V (2 Vp-p ± 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 ± 0.1 V at 0 mmHg, The displayed output voltage should be within 1 V ± 0.1 V at 100 mmHg,

No	Check Items	Check Procedure	Criteria
15. Periodic Replacement Parts, Aftertreatment			
01	NIBP Unit	Check the number of measurements or date of first usage.	It should not exceed 100,000 times, or six (6) years from the first usage.
02	Lithium-Ion Battery Pack BTO-005	Check the number of charging/discharging times or the first usage date.	The number of charging/discharging times should not exceed 300 times, or usage duration should not exceed one year.
03	CO_2 Unit (When HCP-810/ HCP-820 is used)	Check the usage hours.	It should not exceed 30,000 hours.
04	Restore Backup Data	After the check procedure, restore the setup data from the external media. If the setting information before the check procedure have been written down, restore the settings to original state as written.	The settings should be properly restored to original state.

No	Check Items	Check Procedure	Criteria
16. 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.	Earth Leakage Current (NC) Should be 5mA 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.	Earth Leakage Current (SFC) Should be 10mA or less
03	Touch Current (NC)	Measure the touch current under normal condition using a leak measurement safety tester. Test according to the test method of IEC 60601-1.	Touch Current (NC) Should be 100μA or less
04	Touch Current (SFC)	Measure the touch current under single failure condition using a leak measurement safety tester. Test according to the test method of IEC 60601-1.	Touch Current (NC) Should be 500μA or less
05	Patient Leakage Current (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] Type CF Applied Part Patient Leakage Current (NC) Should be10μA or less
06	Patient Leakage Current (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] Type CF Applied Part Patient Leakage Current (SFC) Should be50μA or less
07	Total Patient Leakage Current (NC)	Measure the total patient leakage current under normal condition using a leak measurement safety tester. Test according to the test method of IEC 60601-1.	[AC/DC] Type CF Applied Part Patient Leakage Current (NC) Should be 50μA or less
08	Total Patient Leakage Current (SFC)	Measure the total 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] Type CF Applied Part Patient Leakage Current (SFC) Should be 100μA or less

09	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.	Patient Auxiliary Current (NC) Should be10μA or less
10	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.	Patient Auxiliary Current (SFC) Should be 50μA or less

Handling the Lithium-Ion Battery Pack (BTO-005)

This section describes the handling and storage of the BTO-005 Battery Pack. Refer also to the BTO-005 Operation Manual.

❑Handling the Battery

- For uninterrupted monitoring, charge the battery when the battery level is low.
- When the battery operation time becomes short even after it is fully charged, the battery needs to be replaced.
- The battery should be charged at room temperature (10ºC to 30ºC).
- The lithium-ion battery can only be charged in the specified operational temperatures of the equipment. Refer to the operation manual of the lithium-ion battery (BTO-005) for details.
- When using the battery for the first time, or using after leaving it for a while, make sure to fully charge the battery before use.

❑Storing

To take advantage of the characteristic of the battery pack, pay attention to the following when storing.

Storage Temperature and Humidity for the Battery

- Store in an environment specified below without corrosive gas.

Storage Period	Storage Temperature	Storage Humidity
Within 30 days	-20ºC to 50ºC	20% to 85% (non-condensing)
Within 90 days	-20ºC to 40ºC	
Within 1 year	-20ºC to 20ºC	

- Do not store in an environment outside the specified temperature range or excessive high humidity. This may result in leakage caused by expansion/contraction inside the battery or rusting of the metal part.

❑Long-Term Storage

- If the battery is left installed in the monitor without use for a long period of time, the capacity recovery after storage may be degraded.
  When storing the monitor for a long period, remove the battery from the monitor.

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

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

⚠ CAUTION

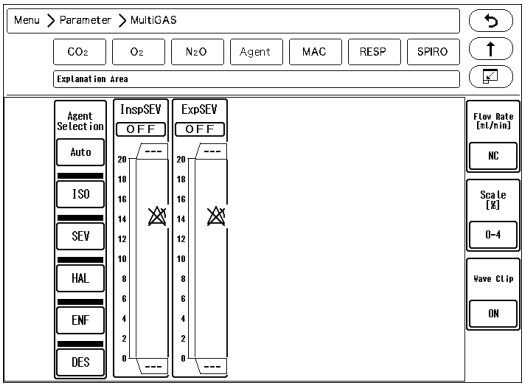
- Perform the gas measurement accuracy check when the multigas unit is connected.
- Warm up the multigas unit sufficiently before updating the checked date of gas measurement accuracy.To acquire maximum measurement accuracy, 10 minutes of warm up is required after the power is turned ON.
- If the accuracy 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 Calibration" 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.

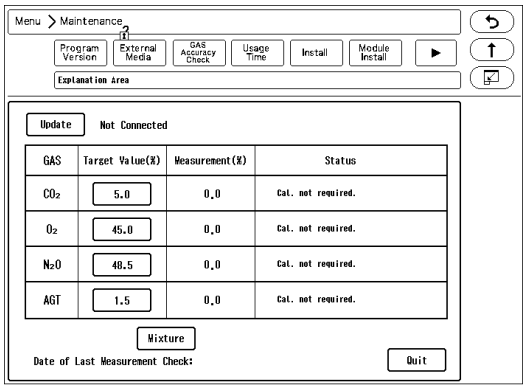
1 Attach the water trap for adult/pediatric to the MGU-800/810, and set the "Flow Rate" to 200 mL/min.

- 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 CO_2, O_2, N_2O, Agent setup screen.



2 Press the [Menu], [Maintenance], [GAS Accuracy Check] keys.

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



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

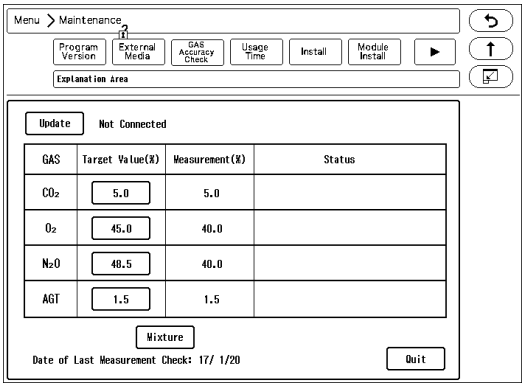
4 Supply the calibration gas, and wait for 30 seconds until the gas measurement value becomes stable.

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_2O: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.

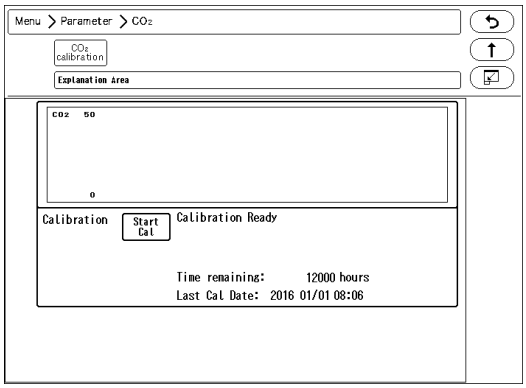


7 Set the "Flow Rate" to initial value.

CO_2 Calibration (HCP-800/HCP-810/HCP-820)

This section describes about the procedure of CO_2 gas calibration.
Perform calibration when 1 year has elapsed from the last calibration, or accumulated $EtCO_2$ measurement time exceeds 4,000 hours, or any measurement error is found.

1 Press the [Menu], [CO_2] ("Parameter"), [CO_2 Calibration] to display the CO_2 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/ HCP-820.
- Do not disconnect the sampling tube during calibration. If the sampling tube is disconnected, calibration will cease.
- Conduct CO_2 calibration for the following case.
  If the CO_2 gas calibration is not performed at a specified interval, CO_2 measurement accuracy may be affected and also subsequent gas calibration may not be possible.
  - When the accumulated measurement time exceeds 1,200 hours from the first use. However, if the first calibration was performed before the accumulated measurement time reaches 720 hours, another calibration is required when the accumulated measurement time exceeds 1,200 hours from the first calibration.
  - When 12 months has elapsed or the accumulated measurement time has exceeded 4,000 hours from the previous calibration.
  - When $EtCO_2$ measurement is not stable or accuracy is degraded compared with other measuring device.
  - When the patient monitor was not used for a while, or when $EtCO_2$ was not measured

for a while.

- When a message, <HCP-800 Calibration> is displayed at power ON.

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

Self-Diagnosis Function

This section explains about the self-diagnosis function of this equipment.
This equipment is provided with the following self-diagnosis function (including the assistance function).

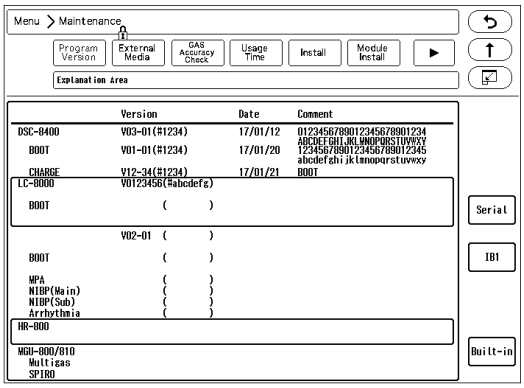
- Failure judgment, message display based on the voltage and temperature monitoring.
- Calibration, replacement message display based on the usage duration/frequency judgment
- Touch Panel Detection Test
- VRAM Test (Display Test)
- Printer Output Test
- Module status display
- Operation log
- Error log
- Power switch ON log
- Watchdog timer test

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-8400 system will be displayed.

- DSC-8400 Main Unit Software
- LC-8016TC/LC-8018TC Display Unit Software
- HS-8000/DS-8007 Software
- HR-800 Recorder Unit Software
- MGU-800/810 Multigas Unit Module, Spiro Unit Module Software

▸ [IB1]: The information of the IB-8004 and the modules connected to the IB-8004 will be displayed.

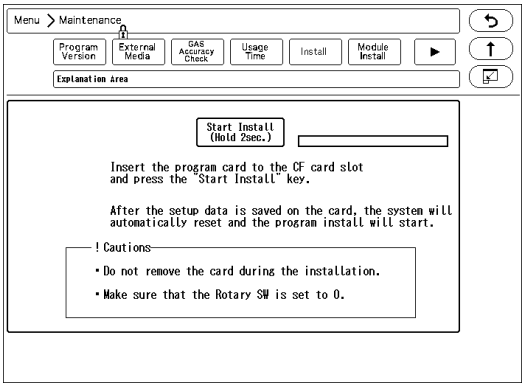
- [Serial]: The information of the equipment connected to the serial connector of the main unit will be displayed.
- [Built-in]: The expansion module installed to the internal slot will be used.

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. Refer to your nearest service representative.

Index

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