# DYNASCOPE 8000 Series Patient Monitor

# DS-8100 system

**Ver. 06** 

# **Maintenance Manual**



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



This manual is for the DS-8100 System Version 06.

**A** CAUTION

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

#### **CAUTION**

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

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Preface Introduction

## **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, non-invasive blood pressure, arterial oxygen saturation, temperature, blood pressure, cardiac output, and monitors patient condition by displaying/recording 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.

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

Preface Important Notice

#### Copyright

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

#### Maintenance, Repair, Replacement

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

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

A full technical description of the DS-8100 System is available from your local Fukuda Denshi sales representative.

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Preface About This Manual

## **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.
F	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.)

Preface About This Manual

## Composition of This Manual

The operation manual is composed of the following chapters.

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

The maintenance manual is composed of the following chapters.

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

# Safety

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# **Safety**

## About the Safety Precautions

## The Meaning of Each Safety Precaution

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

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

Type of Precaution	Description
▲ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
<b>↑</b> 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.

i

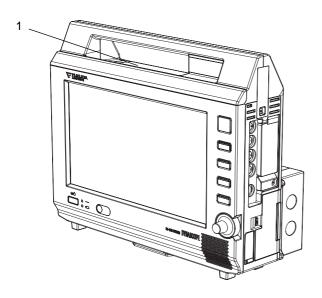
#### Warning Labels Attached to the Unit

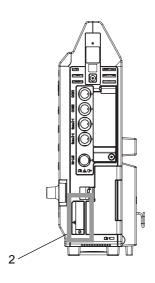
Make sure to read the warning labels attached to the unit and comply with these requirements while operating the unit



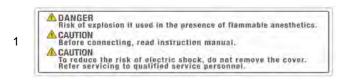
Do not damage or erase the warning labels attached to the unit.
 These warning labels contain important descriptions for handling and operating the equipment properly and safely. A damaged label may compromise safe operation.

#### □DS-8100 Series Main Unit





Warning Labels Attached to the Unit





Warning Label

## Graphic Symbols

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

Symbol	Description
<u> </u>	Warning; indicated in yellow
<b>(3)</b>	Follow operating instructions (Warning); indicated in blue Failure to follow operating instructions could place the patient or operator at risk.
Πi	Follow operating instructions (Information)
$\triangle$	General Precaution
$\Diamond$	Potential Equalization Terminal Indicates the terminal to equalize the potential difference when interconnecting the devices.
4	Protective Earth Indicates the protective earth inside the equipment.
~	Alternating Current (Main Power Input Indicator)
$\odot$	Indicates that the equipment is in normal operation.
Ċ	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.
(大)	Type BF Applied Part with Defibrillation-Proof Indicates the degree of protection against electric shock is Type BF Applied Part with defibrillation-proof.
$\rightarrow$	Signal Output
<b>→</b>	Signal Input/Output
<u></u>	Gas Input
→	GAS Output
4	Battery
	Date of Manufacture Indicates the date of manufacture.
***	Name and Address of Manufacturer Indicates the name and address of manufacturer.
X	WEEE (Waste Electrical and Electronics Equipment) Indicates a separate collection for electrical and electronic equipment.
<u></u>	Alarm Silence Key: Silences the alarm.
<b>♦/७</b>	NIBP Start/Stop Key Starts/stops the NIBP measurement. Stops the measurement if pressed while measurement is in progress.
	Home Key: Displays the home display.
	Menu Key: Displays the menu screen.
$\bigcirc$	Previous Display: Displays the previous display.

## Precautions for Safe Operation of Medical Electrical Equipment



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

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

- Set the monitor to the user's intended position where the user can easily recognize the visual and audible monitoring conditions. Normally it is recommended to set at a distance of 1m from the user.
- Install or store in a place where the equipment will not be exposed to splashing water.
- Install or store in a place where the equipment will not be adversely affected by atmospheric pressure, temperature, humidity, ventilation, sunlight, dust or atmosphere containing salt or sulfur.
- Place the equipment on a stable surface where there is no inclination, vibration, or shock (including during transportation).
- Do not install or store in an area where chemicals are stored or 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 monitor using the stand (OAO-66A), etc.

#### ☐ Precautions Before Using the Equipment

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

#### ☐ Precautions During Using the Equipment

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

#### ☐ Precautions After Using the Equipment

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

#### Precaution when Equipment Failure Occurs

• If the equipment is damaged and in need of repair, the user should not attempt service. Label the unit "OUT

OF ORDER" and contact our service representative.

#### ☐ Precaution about Disassembling/Remodeling the Equipment

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

#### ☐ Precautions about Maintenance Check

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

### ☐ Precautions when Using with Other Equipment

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

#### Precautions about the Maintenance

## **↑** WARNING

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

## **CAUTION** Precautions about Safety Check

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

## Precautions about the Network System

#### Medical Telemetry

#### **⚠** CAUTION

#### Precautions about the Installation

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

#### **⚠** CAUTION

#### Precautions about the Management

- The institution appoints a person to manage the wireless channels for the whole medical institution. And when using telemetry which requires zone location, the Institution should nominate a person to manage the wireless channels in each zone (a "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.

#### Bidirectional Wireless Communications Module (TCON)

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

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

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

- The Institution should appoint a person (hereinafter referred as the "Overall Manager" to manage the wireless devices for the whole facility. The ME engineer is appropriate for the Overall Manager.
- When installing TCON, the Overall Manager has to receive an explanation of the precautions for use of the TCON from the manufacturer or sales representative.
- The Overall Manager is responsible for the maintenance and storage of the equipment.
- The Overall Manager should create a management log (hereinafter referred to as the "log"), which contains a list of the management status of the wireless channels for the whole Institution. When changing a wireless channel, register it in the log and give proper instructions to the Zone Manager or to the user.
- The user needs to verify the transmitting/receiving operation before use.
- If interference or breakdown occurs in the communication, the TCON user is required to stop using the TCON and to inform the Overall Manager of the problem. The Overall Manager is to deal with the problem properly and/or contact the nearest Fukuda Denshi representative for service.

## **CAUTION** Precautions for Operation

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

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

- When the patient's data become mixed with a different patient's data due to interference.
- When there are multiple TCON devices set to the same TCON ID and channel (group).
- When communication failure, unstable communication, or poor reception occur.
- When the radio communication is poor as there are metal, concrete, or other such obstacles between the Bidirectional Wireless Communications Modules (TCON).
- When a different wireless device is using the same frequency (channel).
- When there are other TCON devices nearby using different channels (groups).
- When a cell telephone or other wireless device is being used nearby.
- When citizens broadcast bands such as amateur radio or truck radios are used in the vicinity of the TCON operating area.

- When a computer or word processor, or electrical device that has an internal computer, is used near the TCON device antenna.
- When the TCON device is installed or moved to a location that is outside the radio communication range.
- When the channel settings for the two TCON groups are close to each other.

#### **!** CAUTION Precautions about the Setting

- Follow the instructions from the Overall Manager for the wireless channel when setting the TCON and channel IDs to prevent interference within the same institution.
- If the TCON is set to [OFF], all TCON messages such as <Check TCON Comm.> will not be displayed.
- Even if [ON] is set for "Start NIBP Auto Mode with Start/Stop key" ([Initial Settings]>[User I/F]>[Power ON/Discharge]), "Backup at Discharge (NIBP Auto Mode)" setting will be [ON] since the central monitor will not be in standby mode during TCON communication.
- Make sure that three antenna bar marks ( ) are displayed.
- Make sure that the TCON channels of the bedside monitor and central monitor are the same.
- When using the TCON network, do not move the equipment. The radio waves may not be transmitted.
- There are following restrictions when connecting the DS-8100 System to the TCON network.
  - When the measurement unit of BP is [kPa], the central monitor will not receive the numeric data of NIBP, BP1, and BP2. Also, the alarm setting of NIBP, BP1, and BP2 cannot be changed from the central monitor.
  - The NIBP measurement cannot be started from the central monitor via TCON system if the NIBP measurement interval is set to [5 min] or less, or during the 1-minute or continuous measurement. However, it can be stopped.
  - When the measurement unit of CO<sub>2</sub> concentration is [mmHg], the CO<sub>2</sub> value of 100 mmHg or above will be transmitted as 99 mmHg.

## Precautions when Using with Other Equipment

#### Pacemaker

## **⚠** WARNING

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

#### Reference

"Minute Ventilation Rate-Adaptive Pacemakers"

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

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

#### Non-Explosion Proof

## **▲** DANGER

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

#### Defibrillator

## **↑** WARNING

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

#### **Electrosurgical Instrument**

## **↑** WARNING

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

#### Location:

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

#### Power Supply:

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

#### Electrode Placement

The amount of noise interference is considerably different depending on the electrode position and surgery site. Place the ECG electrodes as far away as possible from the surgery site and the ground plate. Do not place electrodes in the path between the surgery site and the ground plate. If the electrodes are placed in this path, the amount of interference will be quite large. Position (+) and (–) electrodes as close as possible to each other.

#### **Ground Plate**

When using electrosurgical instruments, make sure the contact between the patient and the ground plate is secure. If the connection is incomplete, the patient may suffer from burn at the electrode site.

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

#### MRI (Magnetic Resonance Imaging)

## **↑** WARNING



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

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

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

#### Precautions about Connections to Peripheral Devices

To use the equipment safely and to ensure maximum performance of the equipment, connection of other manufacturer's equipment to this equipment is not authorized, unless the connection is explicitly approved by Fukuda Denshi. It is the user's responsibility to contact Fukuda Denshi to determine the compatibility and warranty status of any connection made to another manufacturer's equipment.

## **↑** WARNING

- When multiple equipments are connected to the patient, it may be necessary to take measures for connection (use of separation device), power supply (use of isolation power), grounding (additional protective earth). If these measures are not properly taken, a leakage current may flow between the equipments, or the total amount of leakage current may exceed the limit specified on IEC 60601-1-1.
- Only the peripheral devices specified by Fukuda Denshi should be connected with the given procedure. Use of an unspecified device may cause electric shock to the patient and/or operator due to excessive leakage current.

## **!** CAUTION

- Although the peripheral device connectors on the DS-8100 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 damaged / unspecified equipment or cable to any I/O connector. If done so by mistake, the device cannot deliver its maximum performance and the connected units may be damaged, resulting in a safety hazard.
- If this equipment is used under an environment not fulfilling the specified condition, not only that the equipment cannot deliver its maximum performance, the equipment may be damaged and safety cannot be ensured. If using the equipment under condition other than specified, contact your nearest representative.
- Use only the supplied 3-way AC power cable. Use of other cables may result in electric shock to the patient and the operator.
- The power cable must be connected to a hospital grade outlet.
- When using multiple ME equipment simultaneously, perform equipotential grounding to prevent potential difference between the equipments. Even a small potential difference may result in electric shock to the patient and the operator.
- Carefully route cables to reduce the possibility of patient entanglement and strangulation.
- When lifting this equipment, hold it by the handle or the bottom part of the main unit.

## **WARNING** Warnings about the monitoring

- The patient classification selection influences the precision of the QRS detection and NIBP measurement. Make sure the 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<sub>2</sub> of patient with high fever or peripheral circulatory insufficiency, check the sensor attachment periodically and change the attachment site. The temperature of the attachment site will rise due to the sensor heat which may result in burn injury.
- For the following case, accurate measurement of SpO<sub>2</sub> may not be possible.
  - Patient with excessive abnormal hemoglobin (COHb, MetHb)
  - Patient with the pigment injected to the blood
  - Patient receiving CPR treatment
  - When a sensor is applied to a limb with NIBP cuff, arterial catheter, or intracatheter
  - When measuring at site with venous pulse
  - Patient with body motion
  - Patient with small pulse
- When a patient is receiving a photodynamic therapy, measuring SpO<sub>2</sub> on a same site for a long duration may cause blisters from the irradiation light of the SpO<sub>2</sub> 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 individual 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<sub>2</sub> 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.

## **WARNING** Warnings about the SpO<sub>2</sub> Monitoring (DS-8100M)

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

#### NOTE

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

- Motion artifact may lead to inaccurate SpMet, SpCO, SpHb, SpOC measurements.
- Severe anemia may cause erroneous SpO<sub>2</sub> readings.
- Very low arterial Oxygen Saturation (SpO<sub>2</sub>) levels may cause inaccurate SpCO and SpMet measurements.
- With very low perfusion at the monitored site, the readings may read lower than core arterial oxygen saturation.
- Do not use tape to secure the sensor to the site; this can restrict blood flow and cause inaccurate readings. Use of additional tape can cause skin damage or damage the sensor.
- If the sensor is wrapped to tightly or supplemental tape is used, venous congestion/pulsations may occur causing erroneous readings.
- Venous congestion may cause under reading of actual arterial oxygen saturation. Therefore, assure proper venous outflow from monitored site. Sensor should not be below heart level (e.g. sensor on hand of a patient in a bed with arm dangling to the floor).
- Venous pulsations may cause erroneous low readings (e.g. tricuspid value regurgitation).
- Loss of pulse signal can occur when:

The sensor is too tight.

The patient has hypotension, severe vasoconstriction, severe anemia, or hypothermia.

There is arterial occlusion proximal to the sensor.

The patient is in cardiac arrest or is in shock.

- The pulsations from intra-aortic balloon support can be additive to the pulse rate on the oximeter pulse rate display. Verify patient's pulse rate against the ECG heart rate.
- Misapplied sensors or sensors that become partially dislodged may cause either over or under reading of actual arterial oxygen saturation.
- Avoid placing the sensor on any extremity with an arterial catheter or blood pressure cuff.
- High intensity extreme lights (including pulsating strobe lights) directed on the sensor may not allow the Pulse CO-Oximeter to obtain readings.
- The Pulse CO-Oximeter can be used during defibrillation, but the readings may be inaccurate for up to 20 seconds.
- Before use, carefully read the sensor's Directions for Use.
- Tissue damage can be caused by incorrect application or use of a sensor, for example by wrapping the sensor too tightly. Inspect the sensor site as directed in the sensor's Directions for Use to ensure skin integrity and correct positioning and adhesion of the sensor.
- The Pulse CO-Oximeter is NOT intended for use as an apnea monitor.
- To avoid cross contamination only use Masimo single use sensors on the same patient.
- Unless otherwise specified, do not sterilize sensors or patient cables by irradiation, steam, autoclave or ethylene oxide. See the cleaning instructions in the directions for use for the Masimo re-usable sensors.

## **WARNING** Warnings about the CO<sub>2</sub> Monitoring (HCP-810, HPD-810)

- Only one of either HCP-810/HPD-810 can be connected.
- When using a sampling line for intubated patients with a closed suction system, do not place the airway adapter between the suction catheter and endotracheal tube. This is to ensure that the airway adapter does not interfere with the functioning of the suction catheter.
- To prevent cross-infection, do not allow the sampling gas to return to the breathing system.
- To protect the hospital staffs from unnecessary anesthetic agent when using the HCP-810, it is strongly recommended to connect the exhaust hole to the gas exhaust system in the hospital.
- Loose or damaged connections of the sampling line may compromise ventilation or cause an inaccurate measurement of respiratory gases. Securely connect all components and check connections for leaks according to standard clinical procedures.
- Do not cut or remove any part of the sampling line. It could lead to erroneous readings.

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

## **CAUTION** Precautions for Installing the Equipment

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

## **CAUTION** Precautions about the System

- Use only the 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, module connection cable and lithiumion battery.
- The lithium-ion battery can only be charged in the specified operational temperatures of the equipment. Refer to the operation manual of the lithium-ion battery (BTO-008) for details.

## **CAUTION** Precautions about the ECG Monitoring

- If any electrodes get detached from the patient after being connected to the lead cable and patient monitor, pay attention that the metal part of the electrode does not get in touch with any metal parts of the bed or any conductive parts. Also, the operator should not touch any conductive parts with bare hands. Otherwise, it may 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  $\mu$ V.
  - When the ECG waveform size is x2 or x4, the arrhythmia detection level is 150  $\mu V$ .
- The leads for arrhythmia detection, central monitor display, printing are fixed as ECG1 and ECG2. Set the most appropriate leads with high QRS for ECG1 and ECG2, especially for arrhythmia detection. If the QRS amplitude for the set lead is low, it may cause erroneous arrhythmia detection.
- In ESIS Mode, artifacts such as electrosurgical noise or EMG can be largely reduced, but QRS amplitude attenuation, waveform distortion, or ST segment change may occur compared with other filter modes.
- The ESIS mode cannot completely reduce the electrical noise, and may erroneously detect the pacemaker

- spike. This mode should be selected only when a high frequency noise largely affects the HR measurement.
- There are some cases when the pacemaker pulse cannot be detected depending on the pacemaker type, pulse voltage, pulse width, electrode lead type (unipolar, bipolar), or electrode placement which causes the pacemaker pulse amplitude to decrease, and disables the pacemaker pulse detection.
- If signals similar to a pacemaker pulse are present, such as electric blanket noise or excessive AC frequency noise, these may be erroneously detected and displayed as a pacemaker pulse.
- When a spontaneous QRS and pacemaker pulse overlap (ex. fusion beat, etc.), QRS detection cannot be performed properly. In this case, the heart rate is degraded.
- If a pacemaker pulse is continuously detected due to AC frequency interference, QRS detection will be suspended and the heart rate will be reduced. Arrhythmia will not be detected either.

#### **!** CAUTION Precautions about the ST Measurement

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

## **!** CAUTION Precautions about the SpO<sub>2</sub> 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<sub>2</sub> connector. Otherwise, the outside light
  may affect to falsely display measurements.
- The pulse wave is normalized for SpO<sub>2</sub> 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<sub>2</sub> sensor instruction manual.
- Precautions for Single-Patient-Use Type Sensors

  The sensor can be reused on the same patient as long as the adhesive tape attaches without slippage. But do not reuse on other patients to avoid cross contamination. It is intended for single patient use only. For details, refer to the SpO<sub>2</sub> sensor instruction manual.

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

## **CAUTION** Precautions about the SpO<sub>2</sub> Monitoring (DS-8100M)

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

## **CAUTION** Precautions about the NIBP Monitoring

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

## **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<sub>2</sub> Monitoring (HCP-810)

- Conduct CO<sub>2</sub> calibration for the following case.
  - If the CO<sub>2</sub> gas calibration is not performed at a specified interval, CO<sub>2</sub> measurement accuracy may be affected and also subsequent gas calibration may not be possible.
  - When the accumulated measurement time exceeds 1,200 hours from the first use.
     However, if the first calibration was performed before the accumulated measurement time reaches 720 hours, another calibration is required when the accumulated measurement time exceeds 1,200 hours from the first calibration.
  - When 12 months has elapsed or the accumulated measurement time has exceeded 4,000 hours from the previous calibration.
  - When EtCO<sub>2</sub> measurement is not stable or accuracy is degraded compared with other measuring device.
  - When the patient monitor was not used for a while, or when EtCO<sub>2</sub> was not measured for a while.
- Perform the calibration 5 minutes after turning ON the power on the HCP-810.
- Do not disconnect the sampling tube during calibration. If disconnected, calibration will cease.
- Dispose of calibration gas according to the regulation of each medical institution.
- Microstream<sup>®</sup> EtCO<sub>2</sub> sampling tubes are designed for single patient use, and are not to be reused. Do not attempt to clean, disinfect, sterilize or flush any part of the sampling tube as this can cause damage to the monitor 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<sup>®</sup> EtCO<sub>2</sub> sampling tube.

• Only use Microstream<sup>®</sup> EtCO<sub>2</sub> sampling lines to ensure the monitor functions properly.

## **CAUTION** Precautions about the CO<sub>2</sub> Monitoring (HPD-810)

- The airway adapter should be attached with the thicker side facing to the patient. If attached oppositely, it may damage the CO<sub>2</sub> sensor or airway adapter.
- Dispose of calibration gas according to the regulation of each medical institution.

## **!** 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-810 and HCP-810, the CO<sub>2</sub> measurement range is 0 to 99 mmHg/0 to 13.3 kPa, and the upper EtCO<sub>2</sub> alarm will not generate if the upper alarm limit is set to 100 mmHg/13.4 kPa and above.
- Whether to use the SpO<sub>2</sub> second alarm function and its threshold selection should be based on the patient's clinical indication/portent and medical evaluation.
- If the SpO<sub>2</sub> alarm and second alarm setup is set to [OFF], the second alarm integral value will be set to 0.
- Pay attention not to set the alarm volume too low to avoid missing any important alarms.
- On a wired network, the alarm generated on the bedside monitor will be output to the network with a maximum delay of 1 second, and to the central monitor with a total delay of 2.5 seconds.
- On a wireless network, the alarm generated on the bedside monitor will be output to the network with a maximum delay of 2 seconds, and to the central monitor with a total delay of 3 seconds to 12 seconds.
- If the same or similar equipments with different alarm settings are used in the same facility or same department, pay attention not to misjudge the alarms.

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

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

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

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

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

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

## **CAUTION** Precautions about the Maintenance

- When cleaning the touch panel, never use strong-acidic cleaning solution.
- 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, benzine, benzine, 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

- When using the wired network transmission, configure the display so that the numeric data corresponded to the waveform is displayed. If not, the displayed waveform or numeric data may not be transmitted.
- The 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".
- There are following restrictions when connecting the DS-8100 System to the wired network.
  - The BP measurement unit setting should be the same for all central monitors and bedside monitors. If the 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 a wired network, numeric data and alarm of TEMP3 to 4 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 PR\_IBP alarm will not be transmitted to the central monitor.
- If the "RR/APNEA Alarm Source" setting is other than [Impedance] (or, if [Auto] selects a setting other than [Impedance]), the RESP waveform will not be transmitted on a wired network.
- If the "RR/APNEA Alarm Source" setting is other than [CO<sub>2</sub>] (Or, if [Auto] selects a setting other than [CO<sub>2</sub>]), the CO<sub>2</sub> waveform will not be transmitted on a wired network.
- For the numeric data displayed as "xxx", maximum or minimum value of measurable range will be transmitted.
- The numeric data displayed as "--- " will be treated as not measured data.
- If the measurement unit of CO<sub>2</sub> concentration is mmHg and [99 mmHg] is selected for "Upper Limit of CO<sub>2</sub> (mmHg) Transmission" under [Initial Settings>System>DS-LAN], the CO<sub>2</sub> value of 100 mmHg or above will be transmitted as 99 mmHg.
- As the DS-8100 System do not have the arrhythmia template display and 12-lead ST display function, waveforms and other data will not be displayed for these displays on the central monitor connected to the DS-LAN network.
- When connected to a wired network, the time/date will synchronize with the central monitor. Even if the time/date is changed on the DS-8100 System, it will be corrected to the time/date of the central monitor.
- The ST display will be distorted on the central monitor if the ECG lead (ECG1 or ECG 2) is changed on the DS-8100 System. Redrawing the ST display will return the display to normal.
- On the central monitor, the respiration waveform and RR value based on the RR/APNEA alarm source selected
  on the DS-8100 System will be displayed. The monitored RR and APNEA will be the same for the central
  monitor and the DS-8100 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<sub>2</sub> concentration is mmHg and [99mmHg] is selected for "CO<sub>2</sub> (mmHg) Upper Limit of Transmission" ([Initial Settings]>[System]>[Telemeter]), the CO<sub>2</sub> value of 100mmHg or above will be transmitted as 99mmHg.

#### RTC and Data Backup

#### **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 your nearest 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, the data is backed up using the secondary battery. The data may not be protected if the power is turned OFF within 30 minutes from power ON, as the secondary battery may not be sufficiently charged.

The data will be protected during the standby state (approx. one hour) with AC power or battery operation.

## Precautions about the Ventilator Monitoring

## **№** WARNING

- The ventilator alarm sound is set to OFF at factory default setting.

  The alarm sound can be turned ON on the Tone/Volume setup screen.
- If the DS-8100 System does not generate an alarm even though the ventilator is generating an alarm, or if any other malfunction occurs, immediately check the ventilator, DS-8100 System, cable, and replace the cable if necessary. If the malfunction persists, stop using the equipment.
- The alarm generation on the DS-8100 System is not guaranteed if the alarm other than specified generates at the ventilator.
  - ( Maintenance Manual "Ventilator Measurement and Alarm Input" P4-1)

## **!** CAUTION

- The ventilator operation should be performed by well-trained and authorized personnel.
- When connecting this equipment and the ventilator, use only the specified connection cable.
- Verify that this equipment and the ventilator are properly connected.
- When connecting the cable, verify that the main power of this equipment and the ventilator is OFF.
- When Servo-i/s or SV-300 is connected, RESISTANCE (Insp, Exp), COMPLIANCE, P-V loop, F-V loop display function is not available.
- When FLOW-i is connected, P-V loop, F-V loop display function is not available.

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

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

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

#### Precautions about the NIBP Cuff

#### **!** 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.
 (\*\*POperation Manual "Specification" P14-1)

## Monitoring after Power Failure

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

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

## To Prepare for Emergency Use

Accessories/Optional Accessories

- The ECG electrodes are consumable products. Always prepare extra supplies of electrodes.
- 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 8 hours during operation, and 4 hours when the power is OFF and AC cable is connected.
- The performance of the battery deteriorates with repeated use. To ensure performance of the battery, it is recommended to replace it once a year.

## Electromagnetic Compatibility

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



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.

## A 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.)

## ☐ Compliance to the Electromagnetic Emissions

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

Guidance and Manufacturer's Declaration - Electromagnetic Emissions			
Emissions Test	Compliance	Electromagnetic Environment - Guidance	
RF Emissions CISPR 11	Group 1	The DS-8100 System uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.	
RF Emissions CISPR 11	Class A		
Harmonic Emissions IEC 61000-3-2	Class A	The DS-8100 System is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network which supplies buildings	
Voltage Fluctuations/ Flicker Emissions IEC 61000-3-3	Complies	used for domestic purposes.	

## ☐ Compliance to the Electromagnetic Immunity (1)

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

Guidance and Manufacturer's Declaration - Electromagnetic Immunity				
Immunity Test	IEC 60601-1-2 Test Level	Compliance Level	Electromagnetic Environment - Guidance	
Electrostatic Discharge (ESD) IEC 61000-4-2	±6kV: contact ±8kV: air	±6kV: contact ±8kV: air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.	
Electrical fast transient/burst IEC 61000-4-4	±2kV: power supply lines ±1kV: input/output lines	±2kV: power supply lines ±1kV: input/output lines	Mains power quality should be that of a typical commercial or hospital environment.	
Surge IEC 61000-4-5	±1kV: differential mode ±2kV:common mode	±1kV: differential mode ±2kV:common mode	Mains power quality should be that of a typical commercial or hospital environment.	
Voltage dips, short interruptions and voltage variations on power supply input lines. IEC 61000-4-11	<5% U <sub>T</sub> * (>95% dip in U <sub>T</sub> ) for 0.5 cycles  40% U <sub>T</sub> (60% dip in U <sub>T</sub> ) for 5 cycles  70% U <sub>T</sub> (30% dip in U <sub>T</sub> ) for 25 cycles  <5% U <sub>T</sub> (>95% dip in U <sub>T</sub> ) for 5 sec.	<5% U <sub>T</sub> (>95% dip in U <sub>T</sub> ) for 0.5 cycles  40% U <sub>T</sub> (60% dip in U <sub>T</sub> ) for 5 cycles  70% U <sub>T</sub> (30% dip in U <sub>T</sub> ) for 25 cycles  <5% U <sub>T</sub> (>95% dip in U <sub>T</sub> ) for 5 sec.	Mains power quality should be that of a typical commercial or hospital environment.  If it is required to continuously operate the DS-8100 System during power failure, it is recommended to operate on an uninterrupted power supply.	
Power Frequency (50/60Hz) Magnetic Field IEC 61000-4-8	3A/m	3A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.	

<sup>\*:</sup> U<sub>T</sub> is the AC mains voltage prior to application of the test level.

## ☐ Compliance to the Electromagnetic Immunity (2)

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

Guidance and Manufacturer's Declaration - Electromagnetic Immunity			
Immunity Test	IEC 60601-1-2 Test Level	Compliance Level	Electromagnetic Environment - Guidance
			Portable and mobile RF communications equipment should be used no closer to any part of the DS-8100 System, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended Separation Distance
Conducted RF IEC 61000-4-6	3Vrms 150kHz to 80MHz	3Vrms	d = 1.2 √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-8100 System is used exceeds the applicable RF compliance level above, the DS-8100 System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the DS-8100 System.
  - \*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-8100 System

The customer or the user of the DS-8100 System can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the DS-8100 System as recommended below, according to the maximum output power of the communications equipment.

Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the DS-8100 System			
Rated Maximum Output	Separation Distance according to Frequency of Transmitter (m)		
Power of Transmitter (W)	150kHz to 80MHz d = 1.2 √ <b>p</b>	80MHz to 800MHz d = 1.2 √p	800MHz to 2.5GHz d = 2.3 √P
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

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

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

Note 2: These guidelines may not apply in all situations.

Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

# **Chapter 1 Installation of the Unit**

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# **Chapter 1** Installation of the Unit

## Precautions for Installing the Equipment

This section describes the environmental condition to use this equipment.

#### **!** CAUTION

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

#### Operating Environment

- The following environmental conditions should be observed when using the equipment.
  - Surrounding Temperature: 10°C to 40°C/50°F to 104°F
  - Relative Humidity: 30% to 85% (non-condensing)
  - Atmospheric Pressure: 80 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 "Main Unit: DS-8100 System" 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 monitor and the wall. If the monitor is embedded in a wall or surrounded by a wall, a minimum space of 10 cm is required.

## **!** WARNING

If this equipment is used under an environment not fulfilling the specified condition, not only
that the equipment cannot deliver its maximum performance, the equipment may be
damaged and safety cannot be ensured. If using the equipment under condition other than
specified, contact your nearest representative.

#### **!** CAUTION

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

## System Construction

This section describes the connection procedure of this equipment.

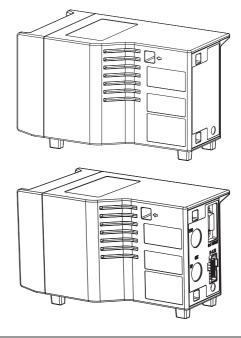
Connect the main unit (DS-8100 system) with necessary units such as Recorder Unit (HR-810), Recorder/Expansion Port Unit (HR-811), Expansion Unit (CU-810).

## Connection with the Recorder/Expansion Port Unit

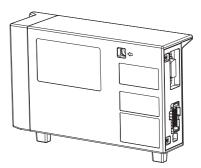
## **!** WARNING

- When lifting this equipment, hold with the handle or the bottom part of the main unit.
- When connecting each unit to the main unit, make sure to secure them with screws.
- Turn OFF the power when connecting the option unit.
- 1 Recorder Unit (HR-810)

2 Recorder/Expansion Port Unit (HR-811)



3 Expansion Port Unit (CU-810)



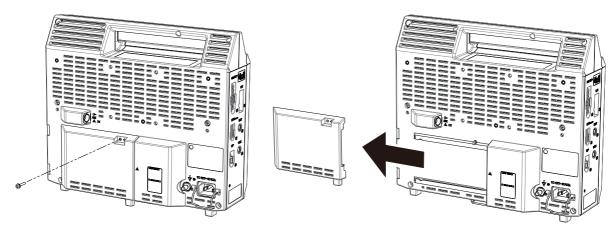
1 Place the DS-8100 main unit upright on a table.

NOTE

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

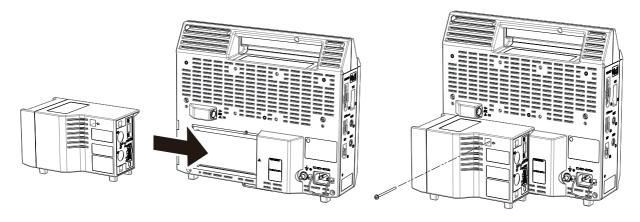
NOTE

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

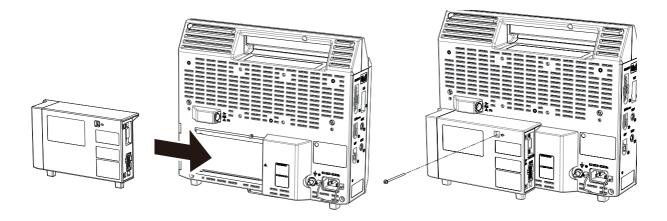


Align the HR-810/HR-811 or CU-810 with the rails on the rear side of the main unit and slide it into place. Fix it using the accessory screw (Double Washer Sems Screw M3 x 50).

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



**2** For CU-810



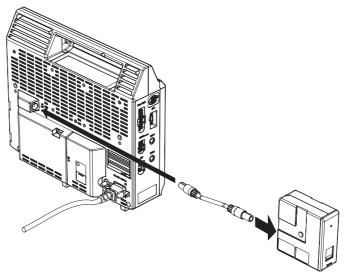
## Connecting the HPD-810, HCP-810

## **!** WARNING

- When lifting this equipment, hold with the handle or the bottom part of the main unit.
- When connecting each unit to the main unit, make sure to secure them with screws.
- 1 Place the DS-8100 main unit upright on a table.

NOTE

- Secure sufficient workspace for installation.
- 2 Connect the HPD-810 or HCP-810 to the DS-8100.

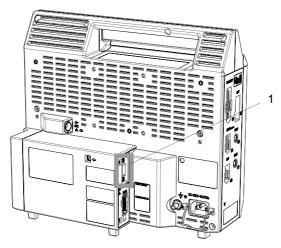


#### Connecting the External Monitor

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

When connecting an external monitor, contact our service representative.

1 Analog Output Connector





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

An external monitor satisfying the following condition should be used.

Specification for External Monitor

Resolution : WSVGA size (1024dot x 600dot)

Horizontal Frequency : 37.5kHz

Vertical Frequency : 60Hz

Cable Length : 10m (max)

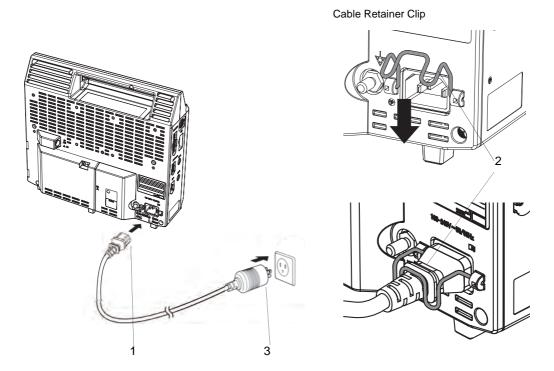
<sup>\*:</sup>If using a cable longer than 3m, use low-loss cable to maintain the performance.

## Power Source and Ground Connection

This section explains about the power connection.

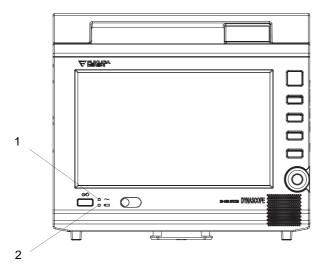
#### Power Connection of the Main Unit

- 1 Connect the power cable to the main unit (DS-8100).
  - 1 Connect the power cable (CS-24) to the rear side of the main unit.
  - 2 Press down the lever to lock the cable retainer clip.
  - **3** Connect the other end of the power cable to the 3-way outlet with ground terminal.



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

 $oldsymbol{2}$  Turn ON the standby switch on the main unit.



•AC power will be supplied and the power supply LED on the front side of the main unit will light.

1 Power Supply LED

Green: In normal operation Orange: Standby Mode Light Off: Battery Operation

2 Battery Charging LED

Green: Charging is complete Orange: Charging is in process

Light Off: During battery operation, or when battery is not installed, or when battery charging is ceased

(due to temperature, etc.)

Flash: Battery charging error

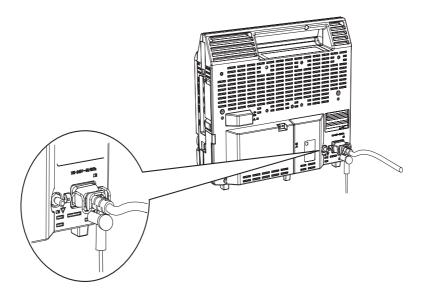
#### NOTE

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

#### **Equipotential Grounding**

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

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



## Attaching the Stand (OAO-66A)

## **!** CAUTION

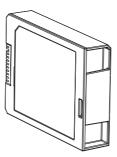
- Make sure to secure the equipment using the stand (OAO-66A), etc. supplied as optional
  accessory. Otherwise, the equipment may fall down, resulting in injury to the operator or
  damage to the equipment. For details of the assembly procedure, refer to the "OAO-66A
  Assembly Instruction".
- 1 DS-8100
- 2 OAO-66A (Stand for DS-8100)



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

## **!** WARNING

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



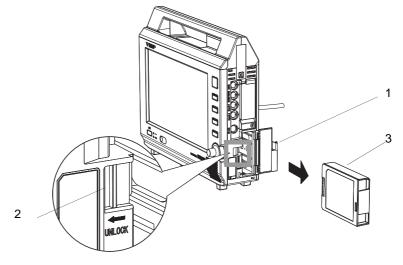
Place the DS-8100 main unit upright on a table. Connect the power cable when replacing the battery while monitoring.

#### NOTE

- Secure sufficient workspace for installation.
- 2 Open the battery cover on the DS-8100 main unit. If the battery is already in the main unit, slide and hold the battery lever and slide it away.

#### NOTE

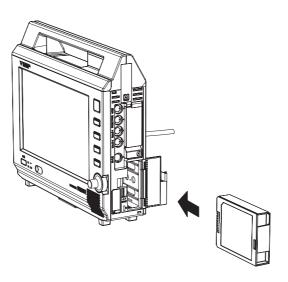
- · Hold the battery lever when removing the battery.
- Do not apply excessive force when removing the battery.
- 1 Battery Cover
- 2 Battery Lever
- 3 Battery



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

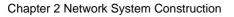
NOTE

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



# **Chapter 2 Network System Construction**

wired Network System	Z-1
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## **Chapter 2** Network System Construction

## **⚠** CAUTION

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

## Wired Network System

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

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

#### **DS-LAN Connection**

## **↑** WARNING

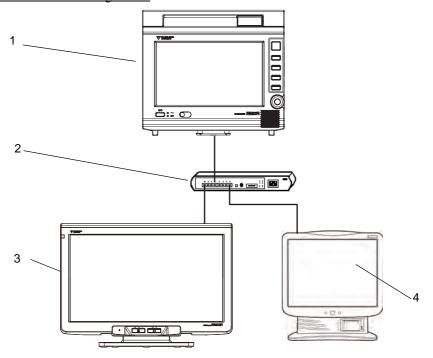
- · Do not connect unspecified equipment to the wired network.
- Do not mix devices with DS-LAN II and DS-LAN III setting in the same wired network. The network may cease and proper monitoring may not be possible.

## **!** CAUTION

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

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

#### **Example of Wired Network Configuration**



1 Bedside Monitor: DS-8100 System

2 HUB

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

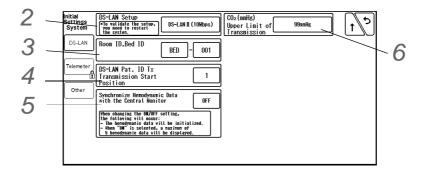
4 Central Monitor: DS-7700 System

#### **DS-LAN Setup**

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

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

▶ The DS-LAN setup screen will be displayed.



2 Set the DS-LAN.



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

LANII.

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

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

#### REFERENCE

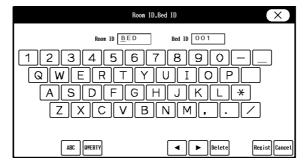
- · Select the DS-LAN network type.
- 1 Press the key for "DS-LAN Setup".
  - ▶ The dropdown list will be displayed.
- 2 Select from [DS-LANII (10Mbps)]/[DS-LANIII (100Mbps)].
- 3 Set the Room ID/Bed ID.

#### **!** CAUTION

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

#### NOTE

- Make sure to set the Room ID/Bed ID when connecting to the wired network. The set Room ID/Bed ID will be stored even after the power is turned OFF.
- 1 Press the key for "Room ID, Bed ID".
  - ▶ The "Room ID, Bed ID" window will be displayed.



- 2 Enter the Room ID using the alphanumeric keypad, and press the [Regist] key.
  - ▶ The entered ID will be displayed on the upper left of the screen.
- **3** Press the input area for the Bed ID.
  - ▶ The keypad will change to allow entering the Bed ID.
- 4 Enter the Bed ID using the numeric keypad.

#### REFERENCE

- To display the keypad for Room ID again, press the input area for the Room ID.
- **5** Press the [Regist] key.
  - ▶ The entered ID will be displayed on the upper left of the screen.
- 4 Set the "DS-LAN Pat. ID Transmission Start Position".

#### REFERENCE

- On the DS-8100 System, patient ID of up to 20 digits can be set, but only 10 digits can
  be transmitted on a DS-LANII network. This setup will set the starting digit from the 20
  digits to be transmitted on the DS-LANII network.
  - On the DS-LANIII network, if [Central] is selected for the printer and printing is started on the bedside monitor, the central monitor printer can print only up to 10 digits. This setup allows to set the starting digit of the 10 digits to be printed. 20 digits can be transmitted on the DS-LAN III network.
- 1 Press the key for "DS-LAN Pat. ID Transmission Start Position".
  - ▶ The "DS-LAN Pat. ID Transmission Start Position" window will be displayed.
- 2 Enter the starting position in the range from 1 to 20.
- 5 Set the "Synchronize Hemodynamic Data with the Central Monitor".
  - 1 Press the key for "Synchronize Hemodynamic Data with the Central Monitor".
    - ▶ The dropdown list will be displayed.
  - 2 Select from [ON] or [OFF].
    - ▶ [ON]: 5 latest hemodynamic data will be synchronized between this monitor and the central monitor. Other hemodynamic data will be deleted.
      - When the hemodynamic data is edited on this monitor, the result will be also reflected on the central monitor, and vice versa.
    - ▶ [OFF]: 5 latest data will be transmitted to the central monitor, but the data will not be synchronized between this monitor and the central monitor. The hemodynamic data edited on the central monitor will be deleted. The hemodynamic data edited on this monitor will be transmitted to the central monitor.
- **6** Set the "CO<sub>2</sub>(mmHg) Upper Limit of Transmission".

## REFERENCE

- If the CO<sub>2</sub> measurement unit is "mmHg", and the CO<sub>2</sub> value is 100mmHg or above, whether or not to limit the value for transmission to the central monitor can be set.
- 1 Press the key for "CO<sub>2</sub> (mmHg) Upper Limit of Transmission".
  - ▶ The dropdown list will be displayed.
- 2 Select from [No limit]/[99mmHg].
  - ▶ [No limit]: Actual CO<sub>2</sub> value will be transmitted to the central monitor even if the value is 100mmHg or
  - ▶ [99mmHg]: 99mmHg will be transmitted as the CO<sub>2</sub> value if the value is 100mmHg or above.

#### Precautions about the DS-LAN

## **!** CAUTION

- When using the wired network (DS-LANII), the BP measurement unit should be set to "mmHg".
- There are following restrictions when connecting this system to the wired network.
  - The data cannot be output to the AU-5500N.
  - When the BP measurement unit is "kPa", BP waveform, BP numeric data, NIBP numeric data, NIBP list will not be transmitted. It will be treated as not measured data, and will not be displayed on the central monitor. Also, the alarm limit setup from the central monitor cannot be performed.
  - Arrhythmia alarm of TACHY, BRADY, COUPLET, PAUSE, TRIGEMINY will not be transmitted.
  - · Arrhythmia alarm of "SLOW VT" will be transmitted as "VT" .
  - For the wired network, waveform, numeric data, and alarm of TEMP3 to 4 will not be transmitted. Also, the displayable waveform, numeric data, and alarm will differ depending on the central monitor model type. Refer also to the operation manual for the respective central monitor.
  - The numeric data and alarm of PR\_IBP will not be transmitted to the central monitor.
     Even if the PR\_IBP alarm is generated on the DS-8100, this alarm will not be generated on the central monitor.
  - If the "RR/APNEA alarm source" setting is other than [Impedance] (or, if [Auto] selects a setting other than [Impedance]), the RESP waveform will not be transmitted on a wired network.
  - If the "RR/APNEA Alarm Source" setting is other than [CO<sub>2</sub>] (Or, if [Auto] selects a setting other than [CO<sub>2</sub>]), the CO<sub>2</sub> waveform will not be transmitted on a wired network.
  - For the numeric data displayed as "xxx", maximum or minimum value of measurable range will be transmitted.
  - The numeric data displayed as "--- " will be treated as not measured data.
  - If the measurement unit of CO<sub>2</sub> concentration is mmHg and [99mmHg] is selected for "Upper Limit of CO<sub>2</sub> (mmHg) Transmission" ([Initial Settings]>[System]>[DS-LAN] or [Telemeter]), the CO<sub>2</sub> value of 100mmHg or above will be transmitted as 99mmHg.
- When the DS-5800N/NX/NX<sup>MB</sup> is used as a central monitor, recall, graphic trend, and tabular trend will not be displayed, and Σ recording cannot be performed. For the ST display, overlap waveform will not be displayed on the DS-5800N/NX/NX<sup>MB</sup> until 15 minutes have passed since the reference waveform is set on this monitor.
- As this monitor do not have the arrhythmia template display and 12-lead ST display function, these display on the central monitor will not be corresponded.
- When connected to the wired network, time/date will by synchronized with the central monitor. In this case, the time/date cannot be changed on this monitor.
- The ST display on the central monitor will be distorted when the ECG lead (ECG1 or ECG
   2) is changed on this monitor. Redrawing the ST display will return the display to normal.
- On the central monitor, the respiration waveform and RR value based on the RR/APNEA alarm source selected on this monitor will be displayed. The RR and APNEA monitored on the central monitor and this monitor will be the same.

NOTE

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

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

	Value Outside the Measurement Range	Central Monitor Display
HR	301 bpm and above	300 bpm
Respiration Rate	151 Bpm and above	150 Bpm
ВР	−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 45.1°C/113.2°F
Pulse Rate (Masimo Unit)	240 bpm and above 25 bpm and below	239 bpm 26 bpm
Pulse Rate (Nellcor Unit)	301 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/HLX-801(G)), the data on this bedside monitor can be transmitted to the central monitor.



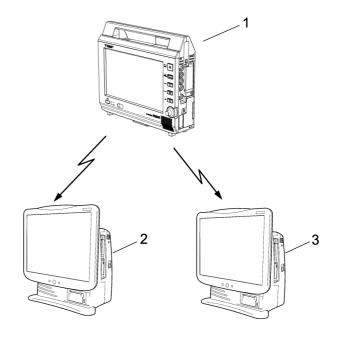
- Some wireless combinations of telemetry transmitters may generate interference with other devices.
- · Before selecting the channel, verify it will not interfere with other channels.
- Make sure the telemetry manager of your system is aware of any changes to the telemetry channels.
- If transmitters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



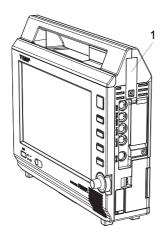
 The setup of channel ID and group ID should be performed only by our service representative. Users should not perform this procedure as malfunction may occur.

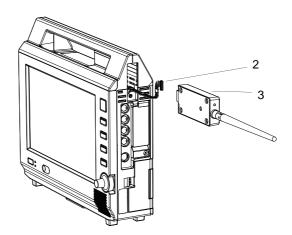
- 1 Bedside Monitor DS-8100 System
- 2 Central Monitor DS-7600 Series
- 3 Central Monitor DS-7700 Series



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

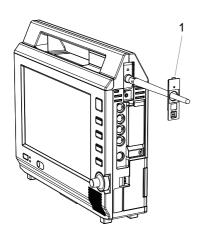
- 1 Loosen the screw, and remove the telemeter cover. Peel off the sheet on the telemeter cover.
- 2 Pull out the connection cable, and connect the telemetry transmitter module (HLX-801/HLX-801(G)).

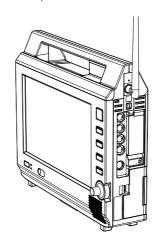




- 1 Telemeter Cover
- 2 Connection Cable
- 3 Telemetry Transmitter Module (HLX-801/HLX-801(G))

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





## Channel ID and Telemetry Wave Setup

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

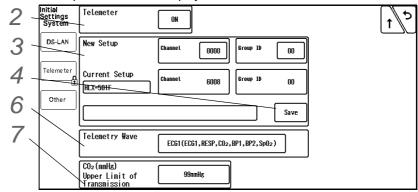


- A password can be set to access the channel ID setup menu to allow only the telemetry channel administrator to change the channel ID.
- Some combinations of channels may generate interference with other telemetry transmitters.
- Before selecting a channel, verify it will not interfere with other channels.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

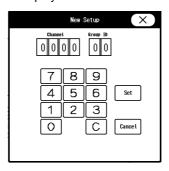
#### NOTE

- To change the setting, enter the password. ( \*\* "Administrator Setup" P5-2)
- Press the [Menu], [Initial Settings], [System], [Telemeter] keys.

▶ The Telemeter Setup window will be displayed.



- $oldsymbol{2}$  Perform setup for the telemetry transmission .
  - 1 Press the key for "Telemeter".
    - ▶ The dropdown list will be displayed.
  - 2 Select from [ON]/[OFF].
    - ▶ [ON]: Telemetry transmission will be performed.
    - ▶ [OFF]: Telemetry transmission will not be performed. In this case, channel ID will not be displayed on the home display.
- 3 Set the channel ID and group ID.
  - 1 Press the key for "Channel" or "Group ID".
    - ▶ The "New Setup" window will be displayed.



- 2 Use the numeric keypad to enter the 4-digit medical telemetry channel ID.
- **3** Press the input area for the Group ID.
- 4 Use the numeric keypad to enter the group ID in the range of 00 to 63.
- **5** Press the [Set] key.
- 4 Save the channel ID and group ID.
  - 1 Press the [Save] key.
    - ▶ The channel ID and group ID will be saved.
    - ▶ The <Complete> message will be displayed.
    - ▶ The set channel ID will be displayed on the upper left of the home display.

#### REFERENCE

• If an error is found on the password, channel ID, or group ID, <Invalid Data> message will be displayed. (Ex. The entered channel ID or group ID is outside the allowable range.)

Enter the ID within the range and press the [Save] key.

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

Current Setup	Channel	0000	Group ID	00
HLX-501F		6008		00

#### NOTE

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

	Value Outside the Measurement Range	Central Monitor Display
HR	301 bpm and above	Calculated on the central monitor based on ECG waveform.
Respiration Rate	151 Bpm and above	150 Bpm In case of impedance respiration, calculated on the central monitor.
BP	-51 mmHg and below	-50 mmHg
	301 mmhg and above	300 mmHg
Temperature	-0.1°C/31.8°F and below	0°C/32.0°F
	45.1°C/113.2°F and above	45.0°C/113.0°F
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 telemetry wave.

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

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

(© "DS-LAN Setup" P2-2)

## **!** CAUTION

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

 When using the Nellcor<sup>TM</sup> unit, the PR value of 255bpm or above will be transmitted to the central monitor as 254bpm.

#### REFERENCE

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

#### **TCON Network**

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

There are following features for the TCON network.

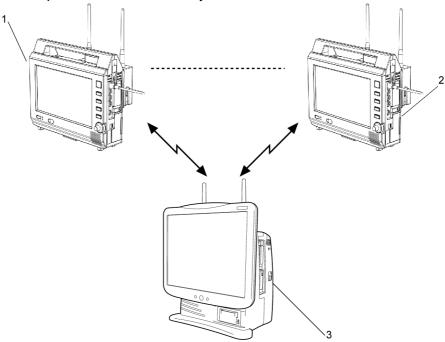
- The measured data on this equipment can be sent to the central monitor.
- Alarm settings can be synchronized.
- The NIBP measurement can be started from the central monitor.
- The night mode, time/date setting, patient information can be synchronized.

#### **Example of TCON Network Configuration**

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

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





1 Bedside Monitor: DS-8100 System

ID: 1 Channel: 9 2 Bedside Monitor: DS-8100 System

ID: 16 Channel: 9

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

ID: 1 Channel: 9

## **!** CAUTION

- Check that three antenna bar marks ( ) are displayed.
- Make sure that the TCON group number of the bedside monitor and the central monitor is the same
- If the equipment is moved during TCON operation, the radio waves signal may become interrupted.
- There are following restrictions when connecting this system to the TCON network.
  - When the NIBP measurement interval is set to [5] (Min) or less, or during the 1-minute or continuous measurement, NIBP measurement cannot be started from the central monitor. However, the measurement can be stopped from central monitor.
  - If the measurement unit of CO<sub>2</sub> concentration is mmHg, the CO<sub>2</sub> value of 100mmHg or above will be transmitted as 99mmHg.

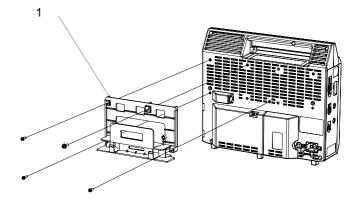
## Connecting the TCON Network

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

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

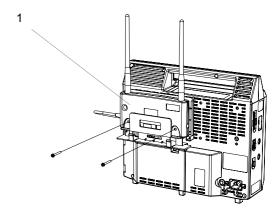


- Do not connect unspecified equipment to the serial connector (COM2) on the DS-8100.
- Attach the HTC Attachment Case to the DS-8100 using the screws.
  - 1 HTC Attachment Case (OAO-64A)

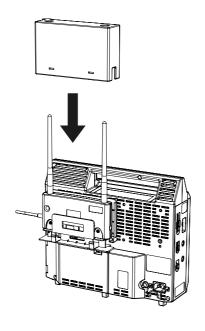


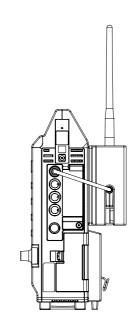
 $oldsymbol{2}$  Securely attach the HTC-702 using the screws.

1 HTC-702



- 3 Attach the HTC Case R.
  - 1 HTC Case R

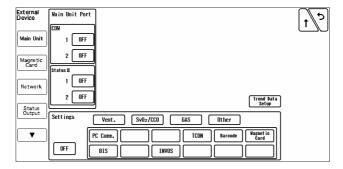




## Serial Communication Setup

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

- Press the [Menu], [Initial Settings], [External Device], [Main Unit] keys.
  - ▶ The "Main Unit Port" screen will be displayed.



**2** Press the key for "COM2".

▶ The setup mode will change to COM2 settings.

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

#### TCON ID/Channel Number Setup

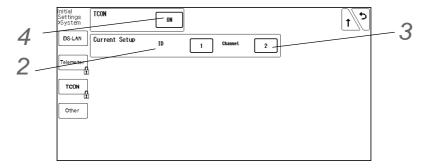
To connect to the TCON network, it is necessary to set the TCON ID and TCON channel. The set TCON ID and TCON channel will be saved even after the main power is turned OFF.

## **!** CAUTION

• The TCON setting will be performed by our service representative. Users should not perform this procedure as malfunction may occur.

#### NOTE

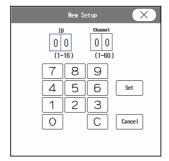
- To change the setting, enter the password.
   "Administrator Setup" P5-2)
- 1 Press the [Menu], [Initial Settings], [System], [TCON] keys.
  - ▶ The TCON setup menu will be displayed.



2 Set the TCON group ID and channel.

#### NOTE

- TCON ID is set to distinguish the bedside monitors in the same TCON group.
   Make sure not to set the same TCON ID to the bedside monitors in the same TCON group. ( "Example of TCON Network Configuration" P2-11)
- Make sure to set the same TCON channel number in the same TCON group. Otherwise, communication failure or interference with other TCON group may occur.
   The same TCON channel number should be set in the same TCON group. ( "Example of TCON Network Configuration" P2-11)
- 1 Press the key for "ID" or "Channel".
  - ▶ The "New Setup" window will be displayed.



- 2 Use the numeric keypad to enter the ID in the range from 01 to 16. The ID should not be duplicated with other bedside monitors.
- 3 Press the input area for the channel number.
- 4 Use the numeric keypad to enter the TCON channel in the range from 01 to 60. The same channel should be set for the monitors within the same TCON group.
- **5** Press the [Set] key.
- 3 Select ON/OFF of TCON communication.
  - 1 Press the key for "TCON".
    - ▶ The dropdown list will be displayed.
  - 2 Select from [ON] or [OFF].
    - ▶ [ON]: The bidirectional wireless communication will start and the TCON mark will be displayed.
    - ▶ [OFF]: The bidirectional wireless communication will cease.

#### REFERENCE

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



#### 1 TCON Channel Number

The same channel number (group number) with the central monitor will be displayed. If the numbers are different, check the setting. The TCON channel number (group number) will not be displayed unless communication with the corresponding central monitor is established. In such case, check the TCON settings of the bedside monitor and the central monitor.

#### 2 TCON ID

The set TCON ID will be displayed.

#### 3 Antenna Mark

The TCON antenna marks show the strength of the signal reception (electric field strength) in the same way as on a cell phone.

(Green): The electrical field strength is sufficient and communication errors rarely

(Green): The electrical field strength is sufficient, but exogenous noise may cause

(Yellow): The reception is available, but communication errors may occur frequently.

(Red): The communication is not possible.

communication errors.

## 4 Press the [Home] key.

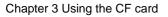
#### NOTE

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

• If a patient data server is connected to the system, patient information (name, age, etc.) can be searched from the patient ID and can be automatically entered. To use the patient ID search function, select [Enable] for "Search ID" under [Menu > Initial Settings > System > Other]. ( TCON Network Configuration P2-11)

# **Chapter 3 Using the CF card**

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



## **Chapter 3** Using the CF card

By using the optional CF card (FCF-128: 128MB, FCF-1000: 1GB) or SD card (SD-1G: 1GB, SD-8G: 8GB), backup/copy of the patient data and setup data can be performed. When the Recorder Unit (HR-810/HR-811) is not connected, pressing the [Print] key will store waveform and review data (Graphic Trend, Tabular Trend, Recall, Alarm History, etc.). The stored data can be verified and printed on a PC.

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

## Inserting the CF card



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

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

## Data Backup/Copy Using the CF Card

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

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

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

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

## **!** CAUTION

- Turn ON the power of the main unit before inserting the CF card into the CF card slot.
- · Use only the specified CF card.
- The CF card formatted for the central monitor full disclosure waveform data cannot be used on the DS-8100 System.

#### NOTE

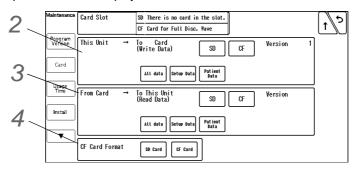
• When using the CF card with write-protect function, cancel the write-protect before usage.

#### REFERENCE

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

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

▶ The CF card setup screen will be displayed.



Format the CF card.



- If the card is unformatted, it is necessary to first format the CF card.
- 1 Verify the CF card is inserted in the CF card slot.
- 2 Press the [CF Card] key to display the "CF Card Format "screen.
- 3 Select the data type.
  - [Full Disc. Wave]: The CF card will be formatted for the full disclosure waveform data.
  - ▶ [Data Transfer]: The CF card will be formatted for data transfer.
- 4 Press the [Format] key and start the format process.
- **2** Write the data to the CF card.
  - 1 Verify the CF card is inserted in the CF card slot.
  - 2 Select the data type to write to the CF card.
    - ▶ [All Data]: Both setup data and patient data will be written to the CF card.
    - ▶ [Setup Data]: Setup data will be written to the CF card.
    - ▶ [Patient Data]: Patient data will be written to the CF card.
  - 3 Press the [Yes] key if OK to write the data to the CF card.
- Read the data from the CF card.
  - 1 Verify the CF card is inserted in the CF card slot.
  - 2 Select the data type to read from the CF card.
    - ▶ [All Data]: Both setup data and patient data will be read from the CF card.
    - ▶ [Setup Data]: Setup data will be read from the CF card.
    - ▶ [Patient Data]: Patient data will be read from the CF card.
  - 3 Press the [Yes] key if OK to read the data from the CF card.

## **⚠** CAUTION

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

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

#### NOTE

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

## ☐ Data that can be Backed Up/Copied

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

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

#### Setup Data

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

#### Patient Data

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

The following items will not be backed up/copied.

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

## Formatting the CF Card

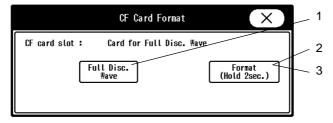
In this section, formatting of CF card to be used for storing the full disclosure waveform is explained. By inserting the formatted CF card, storing of the full disclosure waveform data will automatically start, and the full disclosure waveform review function will become available.

## • CAUTION

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

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

The "CF Card Format" screen will be displayed.



**2** Format the CF card.

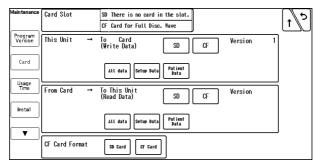
- 1 Make sure that the card is inserted, and that the card is unformatted or is for the full disclosure waveform data.
- 2 Select [Full Disc. Wave] and press [Format (Hold 2 sec.)] for 2 seconds.
- 3 Wait until the format completes.
  It will take about 5 minutes. During the format process, do not remove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

## Formatting the SD Card

In this section, formatting of SD card to be used for DS-8100 data transfer is explained. By using the specified SD card, recall data can be transferred.



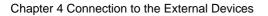
- It will take about 1 minute to format the SD card. Do not format the card during monitoring as all operation will not be possible during the format process.
- During the format process, do not turn OFF the power, or enter into standby condition, or remove the SD card. It may damage the SD card.
- The SD card formatted on other DS-8100 cannot be used.
- Make sure that the SD card is inserted to DS-8100, and that the card is unformatted and is the specified card for data transfer.
- Press the [Menu], [Maintenance], [Card] keys.



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

# Chapter 4 Connection to the External Devices

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# Chapter 4 Connection to the External Devices

## Ventilator Measurement and Alarm Input

Ventilator can be connected to the DS-8100 System using the Status II port on the DS-8100 main unit. By connecting a ventilator, ventilator measurement data and alarm can be monitored on the patient monitor. Also, ventilator alarm can be notified to the central monitor via wireless, wired, and TCON network.

This section describes the procedure to connect the DS-8100 System and ventilator, and to input the ventilator measurement and alarm.

Ventilator	Connection Cable	
vermator	For Connection to DS-8100 main unit Status II	
Servo Ventilator 900C/900D/900E*	CJ-400RI-70SV9 (x1)	
Servo Ventilator 300/300A	CJ-401RI-70SV3 (x1)	
Servo 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	

 $<sup>^{\</sup>star}$  For the SV-900 series, only the alarm can be input.

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

Ventilator	Corresponding Software Version
Servo Ventilator 900C/900D/900E	Not specified
Servo Ventilator 300/300A	Not specified
Servo Ventilator SERVO-i	v1.5 / v2.0 / v3.0
Servo Ventilator SERVO-s	v2.0 / v3.0
Servo Ventilator SERVO-U/SERVO-n/SERVO-air	v1.0
PB740	М
PB760	Н
PB840	К
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-8100 System does not generate an alarm even though the ventilator is generating an alarm, or if any other malfunction occurs, immediately check the ventilator, this equipment, cable, and replace the cable if necessary.
- The alarm generation on this system is not guaranteed if the alarm other than the following generates at the ventilator.

#### ◆SV-900:

gas supply alarm, power failure alarm, expiratory minute volume alarm, airway pressure upper limit alarm, apnea alarm, O<sub>2</sub> concentration alarm

#### **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

#### •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<sub>2</sub> monitoring disabled alarm, CO<sub>2</sub> alarm disabled alarm, Oximeter alarm disabled alarm, Neo. volume measurement inoperable alarm, Minute volume alarm disabled alarm, Minute volume alarm low off alarm, Tidal volume alarm high off alarm, Apnea alarm off alarm, Nebulizer active alarm
- When the Evita 2 dura/Evita 4/Evita XL is connected, there is a communication delay of 3 seconds between the DS-8100 System and the Evita ventilator. Therefore, if the alarm generated at the ventilator is resolved within 3 seconds, the ventilator alarm may not be generated at the DS-8100 System.
- 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-8100 System. If the connection cable is disconnected from the ventilator, <Vent. Alarm> will generate, but <VENT\_COMM> alarm will not generate on the DS-8100 System.

## ! CAUTION

- The ventilator operation should be performed by well-trained and authorized personnel.
- When connecting the DS-8100 System and the ventilator, use only the specified connection

cable.

- Make sure that the ventilator is connected to the specified connector on the DS-8100 System.
- When connecting the cable, make sure that the main power of this system and the ventilator is OFF.

#### **Ventilator Connection**

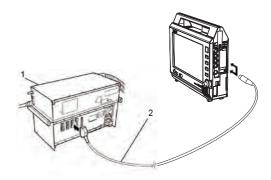
## **⚠** CAUTION

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

#### ☐In Case of SV-900

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

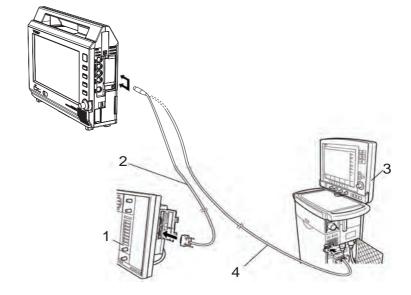
- 1 SV-900
- 2 CJ-400RI-70SV9



## ☐In Case of SV-300, SERVO-i/s

Connect the SV-300 or SERVO-i/s to Status II connector on the DS-8100 System.

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



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

Connect the SERVO-U, SERVO-n, SERVO-air to one of the Status II connectors on the DS-8100 System.

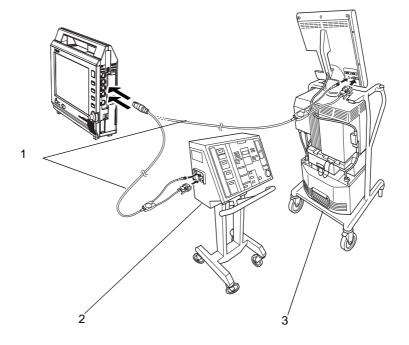
## ☐ In Case of VELIA, ASTRAL, VS ULTRA

Connect the VELIA, ASTRAL, or VS ULTRA to the Status II connector on the DS-8100 System.

#### ☐Connection of PB740/760/840

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

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



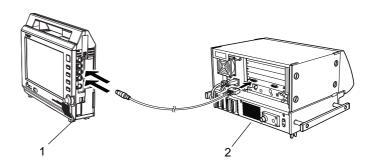
## ☐ In Case of Evita

## **!** 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: 19200bps
Data Bit: 8-bit
Parity Bit: Even
Stop Bit: 1bit

- Connect the Evita 2 dura/Evita 4/Evita XL to one of the Status II connectors on the DS-8100.
- 1 CJ-402RI-70SVi
- 2 Evita 2 dura



## **External Device Setup**

To monitor the ventilator alarm, it is necessary to perform setups for the connecting ventilator in advance.

REFERENCE

• Refer following for the procedure. ( "External Device Setup" P4-10)

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

This section describes the procedure on how to connect the DS-8100 System to the SvO<sub>2</sub>/CCO measurement device, Vigilance, VigilanceCEDV, VigilanceII, Vigileo (Edwards Lifescience) and hemodynamic monitoring device, Pulsio Flex (Pulsion Medical Systems).

By connecting the  $SvO_2/CCO$  Monitor to COM1 to 2 port or Status II port on the DS-8100 main unit,  $SvO_2/CCO$  Monitor data can be monitored on the DS-8100 System.

SvO <sub>2</sub> /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)
Vigilance II	CJ-402RI-70SVi (x1)	CJ-502 (x1)
Vigileo	CJ-402RI-70SVi (x1)	CJ-502 (x1)
Pulsio Flex	-	CJ-725

## **!** CAUTION

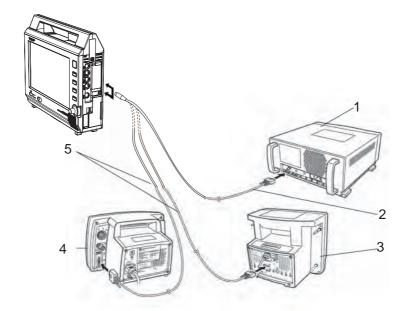
- When connecting this system and the SvO<sub>2</sub>/CCO monitor, use only the specified connection cable
- Make sure that the SvO<sub>2</sub>/CCO monitor is connected to the specified connector on this system. When connecting the cable, make sure that the power of this system and the SvO<sub>2</sub>/CCO monitor is turned OFF.

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

## ☐ In Case of Vigilance

Connect the Vigilance to the DS-8100 System.

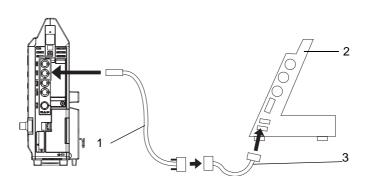
- 1 Vigilance
- 2 CJ-406RI-70VIGI
- 3 Vigilance II
- 4 Vigileo
- 5 CJ-402RI-70SVi



## ☐ In Case of Pulsio Flex

Connect the Pulsio Flex to the DS-8100 System.

- 1 CJ-725
- 2 Pulsio Flex
- 3 USB to RS232C Connector Cable



## **External Device Setup**

To display the measurement data, it is necessary to perform setups for the connecting external device.

## REFERENCE

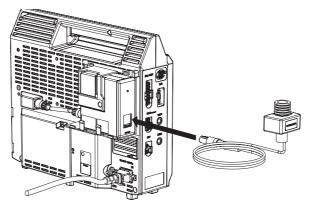
## CO<sub>2</sub> Concentration Data Input

By connecting the Gas Unit I/F (HPD-810), or  $CO_2$  Gas Unit (HCP-810), waveform and numeric data of  $CO_2$  concentration can be monitored on the DS-8100 System.

## Connecting the Capnostat 5

By connecting the Capnostat 5 via HPD-810 Gas Unit I/F,  $CO_2$  concentration measured by mainstream method can be monitored.

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

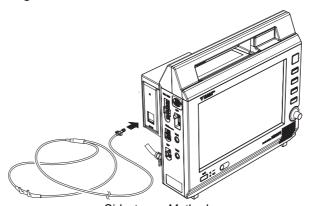


Mainstream Method Capnostat 5 (Philips)

## Connecting the Sampling Line (Covidien)

By connecting the FilterLine  $\mathrm{CO}_2$  sampling line series using the HCP-810  $\mathrm{CO}_2$  Gas Unit,  $\mathrm{CO}_2$  concentration measured by intubation or non-intubation can be monitored.

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



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

## **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	
DIS MONITO	For STATUS II Connector	For Serial Connector
A-2000	CJ-407RI-70BIS	CJO-03RS4
A-3000	00 407KI 70BIO	000 001(04

## **!** CAUTION

- Refer to the BIS monitor operation manual and set the SQI value above 15.
- ASCII should be set to communicate with this system. Make sure that ASCII is set on the BIS monitor communication setting. Refer to the BIS monitor operation manual for procedures.
- Securely connect the cable to the serial or status connector of the DS-8100 main unit and the connector of the BIS monitor.

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

## **!** CAUTION

- When connecting this system and the BIS monitor, use only the specified connection cable.
- Make sure that the BIS monitor is connected to the specified connector on this system.
   When connecting the cable, make sure that the main power of this system and the BIS monitor is OFF.
- Connect the serial connector or Status II connector on the DS-8100 System to the serial port on the BIS monitor using the BIS connection cable (CJ0-03RS4).

#### **External Device Setup**

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

#### REFERENCE

• Refer to the following procedure. (@"External Device Setup" P4-10)

## **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
11110001000	CJ-406RI-70Vigi	CJO-04RS4



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

## Connecting to the INVOS

Connect the INVOS 5100C to the serial connector or Status II connector on the DS-8100 using the connection cable.

## **External Device Setup**

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

#### REFERENCE

• Refer following for the procedure. (@"External Device Setup" P4-10)

## Setup for the External Device Connection

This section explains about the external device connection setup.

#### **External Device Setup**

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

- ▶ The "External Device" setup menu will be displayed.
- 1 Select the connecting port from the "Main Unit Port".
- 2 Select the connecting equipment from the displayed selection.

By selecting [Vent.], [SvO $_2$ /CCO], [Other] from the upper area, the corresponding selection will be displayed at the lower area.

[Ventilator]

SV-900, SV-300, SERVO-i/s, SERVO-U/n/air,

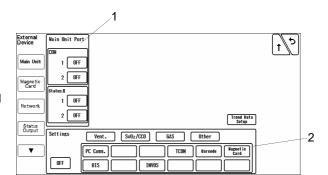
PB, Evita

[SvO2/CCO]

Vigilance, Pulsio Flex

[Other]

PC Comm., TCON, Barcode, Magnetic Card, BIS, INVOS



#### Selectable External Device for Each Port

Port	Selectable External Device	
COM1	Vigilance, PC Comm., Barcode, Magnetic Card, BIS, INVOS, Pulsio Flex	
Status II	SV-900, SV-300, SERVO-i/s, SERVO-U/n/air, PB, Evita, Vigilance, BIS, INVOS, Radical-7	
COM2	TCON, Barcode, Magnetic Card, Pulsio Flex	

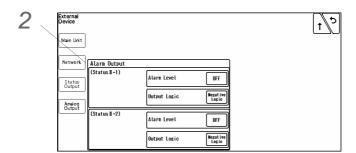
#### NOTE

- If communication with the external device is already established through the corresponding port, it is necessary to disconnect the communication in order to change the selection on this menu.
- When connecting the VELIA, ASTRAL, VS ULTRA, select [SV-900] under [Ventilator].
- The external devices other than Vigilance, BIS, INVOS cannot be set to multiple ports. If the setting is duplicated, the other port will be automatically set to [OFF].
- If the same external device is set to multiple ports, it may take time to identify the device.
- · Vigilance and Pulsio Flex cannot be set at the same time.
- When [TCON] is selected, perform TCON setup (TCON ID, etc.) on the TCON setup screen.
   "TCON Network" P2-11)
- When [Magnetic Card] is selected, perform further settings on the "Magnetic Card Reader" setup menu.
- The external device parameters to be displayed on the graphic trend/tabular trend needs to be selected in advance on the "Trend Data Setup" window ([Data Review>Graphic Trend or Tabular Trend] or [Initial Settings>External Device>Main Unit]).

## Alarm Output Setup

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

- Press the [Menu], [Initial Settings], [External Device], [Status Output] keys.
  - ▶ The status output setup screen will be displayed.



- 2 Select the alarm to output.
  - 1 Press the key for "Alarm Output".
    - ▶ The dropdown list will be displayed.
  - $2\,$  Select from [OFF], [APNEA], [Level H] / [Level H,M] / [Level H,M,L].
    - ▶ [OFF]: Alarm will not be output.
    - ▶ [APNEA]: Apnea alarm will be output.
    - ▶ [Level H]: Level H alarm will be output.
    - ▶ [Level H,M]: Level H, M alarm will be output.
    - ▶ [Level H,M,L]: Level H, M, L alarm will be output.
  - 3 Press the key for "Output Logic".
    - ▶ The dropdown list will be displayed.
  - 4 Select from [Positive Logic]/[Negative Logic]/[Pulse].
    - ▶ [Positive Logic]: Positive synchronized signal will be output.
    - ▶ [Negative Logic]: Negative synchronized signal will be output.
    - ▶ [Pulse]: A square wave of 440ms cycle will be output.

NOTE

- Refer to "Status I/O Signal (Status II Connector 1)" P6-16 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].

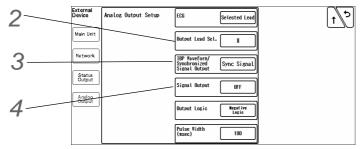
## **Analog Output Setup**

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

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

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

- 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 Press the key for "ECG".
    - ▶ The dropdown list will be displayed.
  - 2 Select from [Disp. Lead]/[Selected Lead].
  - ${f 3}$  When [Selected Lead] is selected, press the key for "Output Lead Sel.".
    - ▶ The subwindow will be displayed.
  - **4** Select from [I] / [II] / [III] / [aVR] / [aVL] / [aVF] / [V].
- 3 Select the IBP waveform to output from the DS-8100.
  - 1 Press the key for "IBP Analog/Synchronized Signal Output".
    - ▶ The dropdown list will be displayed.
  - 2 Select from [IBP1] / [IBP2] / [Sync Signal].
- 4 Set the synchronized signal output.
  - 1 Press the key for "Signal Output".
  - 2 Select from [HR]/[RR].
    - ▶ [HR]: HR synchronized signal will be output.
    - ▶ [RR]: Synchronized signal according to the selected RR source (impedance, CO<sub>2</sub>) will be output.
  - 3 Press the key for "Output Logic".
    - ▶ The dropdown list will be displayed.
  - 4 Select from [Positive Logic]/[Negative Logic].
    - ▶ [Positive Logic]: Positive synchronized signal will be output.
    - ▶ [Negative Logic]: Negative synchronized signal will be output.
  - 5 Select the "Pulse Width" from [100]/[60]/[20] msec.
    - ▶ The synchronized signal will be output with the selected pulse width.

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" P5-6)

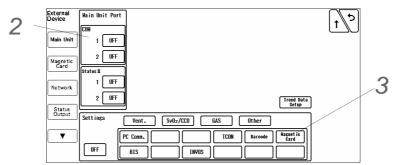
## Connecting the Magnetic Card Reader

- Connect the cable to the conversion cable (CJ-756).
- 2 Connect the other end of the conversion cable to the serial connector (COM1 to 2) on the right side of the main

## Magnetic Card Reader Setup

On the "Magnetic Card Reader" setup menu, 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, 2) for the magnetic card reader.
- 3 Select [Magnetic Card Reader] in the [Other] category.

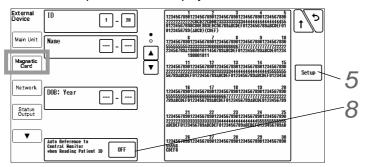


Since the data formats of magnetic card vary for each institution, it is necessary to set the digit location of each information.

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

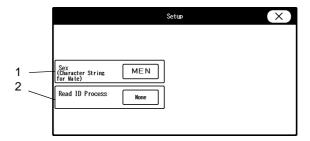
4 Press the [Magnetic Card Reader] key.

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



**5** Press the [Setup] key to preconfigure the magnetic card reader.

The character strings to indicate birth date, sex, etc., can be set.



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

#### 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

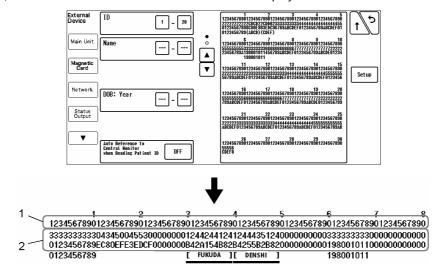
• The analyzing procedure is explained using the example of patient data below.

Patient ID:0123456789

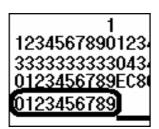
Patient Name: FUKUDA DENSHI Date of Birth: Jan. 1, 1980

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.



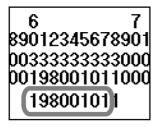
2 From the displayed result, specify the data position.



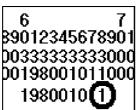
The patient ID, "0123456789" is displayed at 1st to 10th digit.

3 4 5 8901234567890123456789012 0012442441241244435124000 00B42A154B82B4255B2B82000 [ FUKUDA ][ DENSHI ] 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.



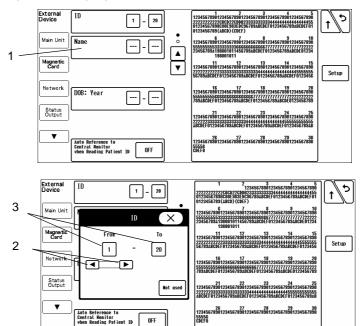
"1" which is displayed at the 68th digit can be estimated as the character string for male.

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.
- 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.
- 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 or TCON network is constructed.
  - ▶ [OFF]: Patient information cannot be received.

## 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.

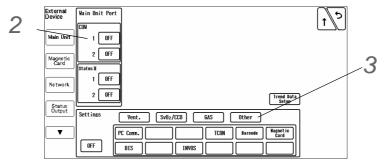
## Connection with the System

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

## **External Device Setup**

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

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



2 Select the port (COM1) to connect the PC.

NOTE

- **3** Press the [Other] key.
- 4 Press the [PC Comm.] key.

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

### Connection with the Laser Printer

This section explains the setup procedure for the laser printer.

There are two ways to print on the laser printer.

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

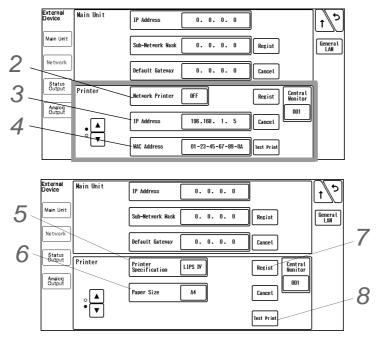
## Laser Printer Setup

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

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

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

▶ The laser printer setup screen will be displayed.



# 2 Select ON/OFF for "Network Printer".

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

## REFERENCE

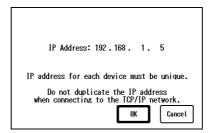
 Select [DS-LAN] to output on the laser printer of DS-7700 system central monitor connected to the DS-LANIII network.

3 Enter the IP address of the printer.

4 Enter the MAC address of the printer.



- MAC (Media Access Control) address is an address assigned for each network equipment. Refer to the operation manual of the printer or printer network board.
- **5** Select the printer specification.
  - ▶ [LIPS IV]: Select when LIPS IV laser printer is used.
  - ▶ [ESC/page]: Select when ESC/page laser printer is used.
  - ▶ [PCL5]: Select when PCL5 laser printer is used.
- **6** Select the paper size.
  - ▶ [A4]: Select when using A4 size paper.
  - ▶ [Letter]: Select when using letter size paper.
- When [Regist] is pressed, a confirmation message will be displayed.



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

Verify that the printing is properly performed.

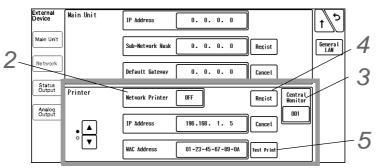
## **!** CAUTION

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

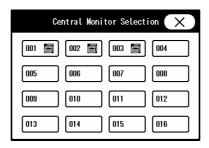
## ☐To Output on the DS-LAN Printer

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

- Press the [Menu], [Initial Settings], [External Device], [Network] keys.
  - ▶ The "Network" setup menu will be displayed.



- 2 Select [DS-LAN] for "Network Printer".
- 3 Specify the central ID of the central monitor to perform the printing.
  - 1 Press the key for "Central Monitor".
    - ▶ The "Central Monitor Selection" window will be displayed.
    - ▶ The central ID with the printer icon displayed can be selected.



- 2 Select the central ID.
- 4 Press the [Regist] key, then [OK] key.
  - ▶ It is necessary to press the [OK] key to validate the setting.
- **5** Perform test printing.

Verify that the printing is properly performed.



- 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.
- The bedside monitor printer output will be prioritized over the central monitor laser printer output. If the bedside monitor printer output is started during the laser printer output, the laser printer output will resume after the bedside 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**

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Chapter 5 Initial Settings Contents

# **Chapter 5** Initial Settings

## **Initial Settings**

This section explains about the "Initial Settings" menu.

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

Description for Each Category

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

Chapter 5 Initial Settings Administrator Setup

## **Administrator Setup**

This section explains about the "Administrator Setup" menu.

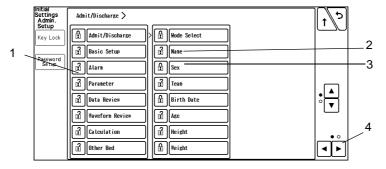
The "Administrator Setup" is composed of [Key Lock] and [Password Setup].



- 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 7 This indicates unlocked item. It is displayed in white.
- 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.

Chapter 5 Initial Settings Administrator Setup

## **Password Setup**

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

## **⚠** CAUTION

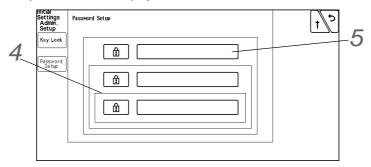
- · Do not forget the password.
- · The password should be strictly controlled.

#### NOTE

The default passwords are set as follows.

Red Key: 11111111 Yellow Key: 2222222 Green Key: 33333333

- · Before using the equipment, make sure to change the password.
- For details of the password, contact Fukuda Denshi service representative.
- Press the [Menu], [Initial Settings], [Admin. Setup] keys.
- **2** Enter the password.
- **3** Press the [Password Setup] key.
  - ▶ The password setup screen will be displayed.



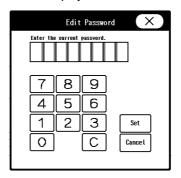
**4** Enter the password.

#### REFERENCE

- Depending on the password, the operation authorization will differ. With higher level password, the lower level settings can be changed.
- 1 Press the key for the level to change the password.

Chapter 5 Initial Settings Administrator Setup

▶ The "Edit Password " window will be displayed.



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

NOTE

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

REFERENCE

- Maximum of 8 digits can be set for the password.
- **5** For confirmation, enter the new password again.

REFERENCE

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

REFERENCE

- Depending on the password, the operation authorization will differ. With higher level password, the lower level settings can be changed.
- 1 Press the key for the level to change the administrator name.
  - ▶ The "Administrator" window will be displayed.



2 Enter the administrator name using the alphanumeric keys.

#### REFERENCE

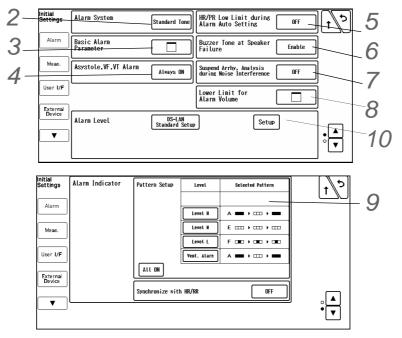
• Maximum of 8 characters can be set for the administrator name.

# Alarm Related Setup

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

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

▶ The alarm setup menu will be displayed.

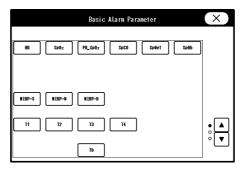


2 Set the "Alarm System".

# **↑** WARNING

- Changing the setting for "Alarm System" (Initial Settings > Alarm) will also change the alarm volume and tone setting. Make sure to check the volume and tone when the setting is changed.
- 1 Press the key for "Alarm System".
  - ▶ The dropdown list will be displayed.
- 2 Select from [Fukuda Tone] / [Melodic Tone] / [Standard Tone].
  - ▶ [Fukuda Tone]: The alarm tone common to DS-7000 series bedside monitor will be set.
  - ▶ [Melodic Tone]: The alarm tone which the rhythm is the same with [Standard Tone] with different melody will be set.
  - ▶ [Standard Tone]: The alarm tone complied to the IEC standard will be set.
- 3 Set the "Basic Alarm Parameter".
  - 1 Press the key for "Basic Alarm Parameter".

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



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

REFERENCE

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

- Set the "Suspend Arrhy. Analysis during Noise Interference".
  - 1 Press the key for "Suspend Arrhy. Analysis during Noise Interference".
    - ▶ The dropdown list will be displayed.
  - 2 Select from [ON] or [OFF].
    - ▶ [ON]: Arrhythmia analysis will be suspended for fixed duration (5 sec.) when a noise is continuously interfering.
    - ▶ [OFF]: Arrhythmia analysis will not be suspended even when a noise is continuously interfering.

## **⚠** CAUTION

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

8 Set the "Lower Limit for Alarm Volume".

## **↑** WARNING

- Changing the setting for "Alarm System" will also change the alarm volume and tone setting. As the "Lower Limit for Alarm Volume" may also change, make sure to check the volume and tone on the "Tone/Volume" setup menu.
- 1 Press the key for "Lower Limit for Alarm Volume".
  - ▶ The "Lower Limit for Alarm Volume" window will be displayed.
- 2 Set the lower limit of alarm volume for "Vital Alarm", "Ventilator Alarm", "Status Alarm".
  - ▶ The lower limit of adjustable alarm volume range on the "Tone/Volume" setup menu will be set. The lower limit level can be set according to the alarm level priority, Urgent > Caution > Status.
  - ▶ [Test]: The test sound will be generated with the set volume.
- 9 Set the operation for the alarm indicator located at the upper part of the main unit.

#### NOTE

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

#### REFERENCE

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

#### Alarm Indicator Flashing Pattern

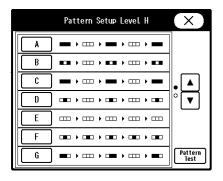
Pattern	Flashing Pattern
Pattern A	(Red, Red, Red), (xxx), (Red, Red, Red), (xxx), (Red, Red, Red)
Pattern B	(Red, Orange, Red), (xxx), (Red, Orange, Red), (xxx), (Red, Orange, Red)
Pattern C	(Red, Green, Red), (xxx), (Red, Green, Red), (xxx), (Red, Green, Red)
Pattern D	(x, Red, x), (xxx), (x, Red,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

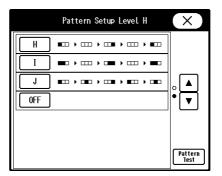
#### Alarm Indicator Flashing Pattern

Pattern	Flashing Pattern
Pattern I	(Red, Green, x), (xxx), (x, Green, Red), (xxx), (Red, Green, x)
Pattern J	(Red, x, x), (x, Red, x), (x, x, Red), (Red, x, x), (x, Red, x)

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

- 1 Press the key for the level to set the flash pattern.
  - ▶ The pattern setup window will be displayed.





Display Example for Level H

2 Select from [A] to [J].

NOTE

- When not using the alarm indicator function, select [OFF].
- 3 Press the [Pattern Test] key to test the flash pattern.
- 4 Press  $\overline{\times}$ .
- 5 Select from [All ON] or [All OFF].
  - ▶ [All OFF]: Alarm indicator function will be turned OFF for all levels.
  - ▶ [All ON]: Alarm indicator function will be turned ON for all levels with the current settings.
- 6 Press the key for "Synchronize with HR/RR".
  - ▶ The dropdown list will be displayed.
- 7 Select from [Sync. to HR]/[Sync. to RR]/[OFF].
  - $\blacktriangleright$  [Sync. to HR]: The alarm indicator will flash in green synchronizing to HR.
  - ▶ [Sync. to RR]: The green LED at the center of alarm indicator will flash synchronizing to RR.
  - ▶ [OFF]: The alarm indicator will not light.

NOTE

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

10 Set the "Alarm Level".

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

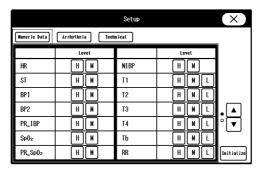
(@Operation Manual "Vital Alarm Message" P11-1)

(@Operation Manual "Vital Alarm Message (DS-LAN Standard Setup)" P11-3)

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

#### REFERENCE

- The alarm level for numeric data alarm, arrhythmia alarm, technical alarm can be set.
- The alarm level can be selected from S, H, M, L according to the priority. ("S" is the highest priority alarm.)
- 1 Press the [Set] key.
  - ▶ The "Setup" window will be displayed.



- 2 Press one of the [Numeric Data], [Arrhythmia], [Technical] key.
  - ▶ The window will change according to the selected alarm group.
- 3 Press the ▲/▼ keys.
  - ▶ The page will switch.
- 4 Select the alarm level from [S]/ [H]/ [M]/ [L]/ [N] for each parameter.

When the level is changed, a confirmation window will be displayed.

[Yes]: It will change to the selected level.

[No]: The level will not change.



## NOTE

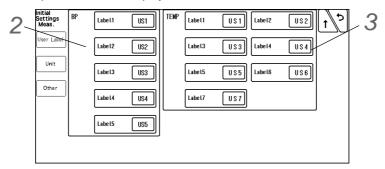
- · Only the displayed alarm level can be selected.
- Press the [Initialize] key to initialize the alarm level setting.

# Measurement Related Setup

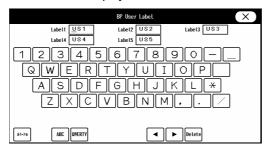
## **User Label Setup**

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

- Press the [Menu], [Initial Settings], [Meas.] keys.
  - ▶ The user label setup screen will be displayed.



- 2 Set the BP user label.
  - 1 For "BP", select from [US1] to [US5].
    - ▶ The "BP User Label" window will be displayed.



- 2 Use the alphanumeric keys to enter the user label up to 3 characters.
  - ▶ The cursor position will be indicated by a red underline.

#### REFERENCE

- Press the display area for the user label to perform the setting.
- The key arrangement can be selected from [ABC] or [QWERTY].
- The upper case/lower case can be changed using the [A <-> a] key.

# **!** CAUTION

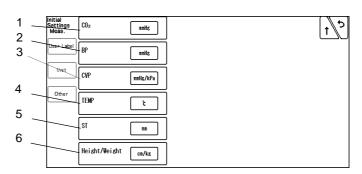
- When the system is connected to DS-LAN, BP label of US3 to US5, TEMP label of US3 to US7 cannot be selected.
- 3 Set the TEMP label using the same procedure with Step 2.

#### Measurement Unit

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

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

- ▶ The "Unit" setup screen will be displayed.
- 1 Select the CO<sub>2</sub> measurement unit from [mmHg]/[kPa]/[%].
- 2 BP Select the BP and NIBP measurement unit from [mmHg]/ [kPa].
- 3 CVP When the BP label is CVP (Central Venous Pressure), select the measurement unit from [mmHg/kPa]/[cmH<sub>2</sub>O].



4 TEMP

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

- 5 ST Select the ST measurement unit from [mV]/[mm].
- 6 Height/Weight Select the measurement unit from [cm/kg]/[in/lb].
- 2 Select the unit for each parameter.

#### NOTE

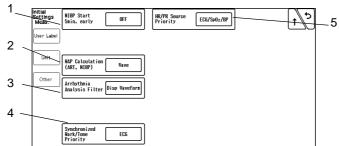
 When the BP, CVP unit is changed, the tabular/graphic trend data with the previous measurement unit will be deleted. Also, when the unit is changed, it is necessary to perform the alarm setup for the new measurement unit.

## Other Setup

Set the other measurement related settings.

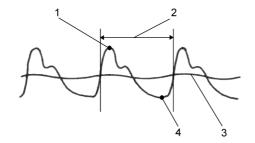
1 Press the [Menu], [Initial Settings], [Meas.], [Other] keys.

▶ The "Other" menu will be displayed.



- 1 If outputting the data to PC or other external device using the PC communication function of this system, an error may be generated to the NIBP measurement time depending on the input interval of the external device. As this system outputs the data at completion of NIBP measurement, if the external device inputs the data at 60 minutes interval, 60 minutes time lag will occur. By starting the measurement 5 minutes early, this time lag between the external device can be minimized.
  - [ON]: When [60min]/[120min] is selected for the measurement interval, the measurement will start 5 minutes before the set time.
- 2 The measurement source of BP/NIBP mean value can be selected from waveform or calculation.
  - [Calc.]: Calculates the mean BP from the following calculation. Mean BP (MAP) = (Systolic BP + Diastolic BP  $\times$  2) / 3

[Wave]: The following measurement will be performed.



- 1: Systolic BP
- 2: HR interval
- 3: Mean Value (MAP)
- 4: Diastolic BP
- 3 Set 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.



- When [Disp. Waveform] is selected, the filter will be set according to the selection on [Menu > Parameter > ECG]. If [Diag.] is selected, the filter will be 0.5 Hz to 40 Hz which is the same with [Fixed].
- 4 Set the "Synchronized Mark/Tone Priority".
  - When [Auto] is selected for "Synchronized Mark/Tone", the priority of the synchronizing parameter can be set.
  - [ECG]: The synchronizing priority will be set in the order of ECG>SpO<sub>2</sub>>BP. The synchronized tone will set to [ON].
  - $[SpO_2]$ : The synchronizing priority will be set in the order of  $SpO_2 > ECG > BP$ . The synchronized tone will be set to [ON].
- 5 Set the display priority of the parameter to be displayed inside the HR/PR numeric data box.
  - This priority setting will be applied when [Auto] is selected for "HR/PR", or when [HR/PR] user key is used to switch the HR/PR source.
  - Select the priority order from the dropdown list.
  - For example, if [ECG/SpO<sub>2</sub>/BP] is selected, HR/PR source will be set in the priority of ECG>SpO<sub>2</sub>>BP.

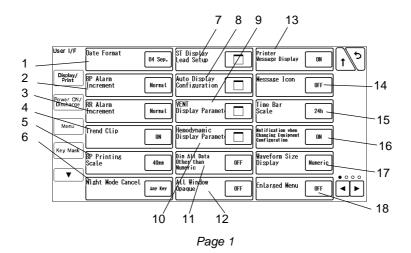
## User I/F

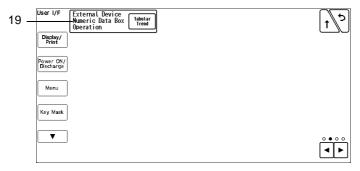
## Display/Print Setup

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

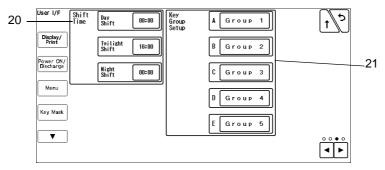
1 Press the [Menu], [Initial Settings], [User I/F] keys.

▶ The "Display/Print" setup menu will be displayed.

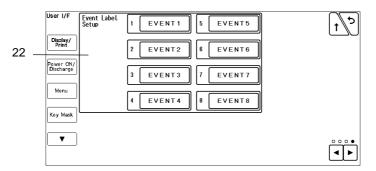




Page 2



Page 3



Page 4

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

	[Normal]	[Small]		
0 mmHg to 50 mmHg	2 mmHg increment	1 mmHg increment		
55 mmHg to 300 mmHg	5 mmHg increment	T mining 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	5.1 Ki a increment		

3 Select [Normal] or [Small] for "RR Alarm Increment".

[Normal]: 5 Bpm (Adult), 2 Bpm (Child, Neonate)

[Small]: 1 Bpm

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

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

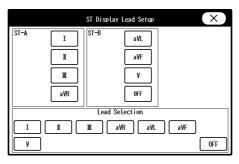
[OFF]: The exceeded portion of the vertical axis scale will not be displayed.

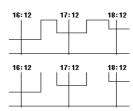
- 5 Select the printing scale height for the BP1 to 2 waveform.
- 6 Select the procedure to cancel the night mode when [No Change]/[Darker]/[Dark] is set.

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

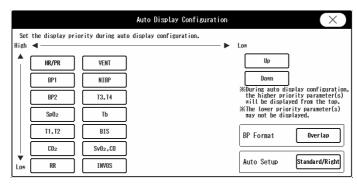
[Night Mode Key]: The night mode can be canceled by pressing the [Night Mode] key on the user key area or on the menu.

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

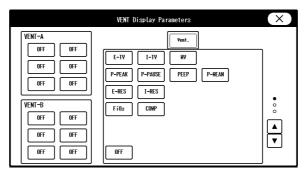




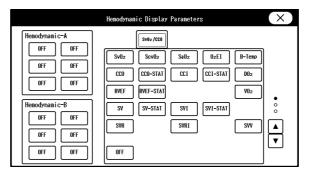
8 The BP display format ([Overlap]/[Separate]) and layout ([Standard/Right]/[Standard/Left]) for automatic display configuration can be set.



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



10 The parameters to be displayed for Hemodynamics-A, Hemodynamics-B numeric data box can be set.



- 11 [ON]: The display brightness of measurement unit, alarm limit, etc. displayed inside the numeric data box will be dimmed.
  - [OFF]: The display brightness will not be dimmed.
- 12 [OFF]: The window will become translucent allowing to view the waveform displayed behind the window. However, the key display will not become translucent.
  - [ON]: The window will not become translucent.
- 13 [ON]: The printer status will be displayed on the home display. [OFF]: The printer status will not be displayed.
- 14 Select [ON]/[OFF] for "Message Icon".
  - When there are many numeric data display, the parameter key size will be reduced which may disable the message to be displayed inside the parameter key.
  - A message icon will be displayed instead to notify that a message is present. ( Operation Manual "Numeric Data Box Display (for all parameters)" P3-9)
- 15 The time bar range can be selected from [24h]/ [48h].

16 Select [ON]/[OFF] for "Notification when Changing Equipment Configuration".

[ON]: A confirmation message will be displayed when equipment configuration is changed. (Connector ON/ OFF, etc.)

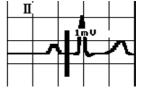
[OFF]: A confirmation message will not be displayed even when equipment configuration is changed.

17 Select the display type of the waveform size.

[Numeric]: The waveform size for the ECG, RESP,  ${\rm SpO_2}$  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)



18 Select [ON]/[OFF] for "Enlarged Menu".

[ON]: The enlarged menu will be displayed.

[ON]: The menu in list format will be displayed.

19 Set the "External Device Numeric Data Box Operation".

[Tabular Trend]: The tabular trend will be displayed.

[Parameters]: The parameter setup menu will be displayed.

20 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

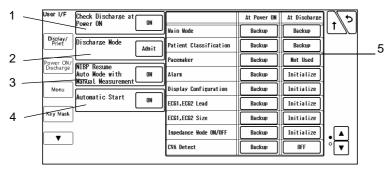
- 21 Key Group Setup: Eight (8) user keys can be registered for each group. The label for the key group can be also set.
- 22 8 event labels (Surgery, etc.) can be registered. By setting [Event] on the user key, the registered event label can be printed at any time.

## Power ON/Discharge

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

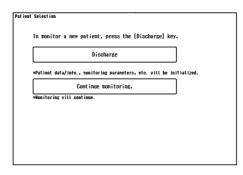
Press the [Menu], [Initial Settings], [User I/F], [Power ON/Discharge] keys.

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



1 The trend data will be stored even after the monitoring is ceased by pressing the standby switch. To start monitoring a new patient, it is necessary to perform discharge procedure on the "Admit/Discharge" menu, and clear the data of previous patient. If the power has been turned OFF for 30 seconds or more, whether or not to display the discharge confirmation window at power ON can be selected.

[OFF]: The discharge confirmation window will not be displayed and monitoring will be immediately started. [ON]: The discharge confirmation window will be displayed at power ON if the power has been turned OFF for 30 seconds or more.

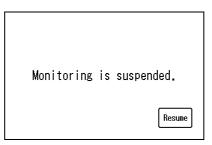


2 The monitoring condition after the patient has been discharged can be set.

[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.

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

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



Display during monitoring is suspended

3 [OFF]: At power ON 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.

4 Whether or not to automatically turn ON the patient monitor can be selected.

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

\* Connect the AC cable.

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

5 The backup status when the power is turned ON and when the patient is discharged can be set for each item. [Backup]: The setting will be backed up.

[Initialize]: 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.
Patient Classification	Adult, Child, Neonate	The setting will be initialized to the selected patient classification.
Pacemaker	OFF	"Not Used" will be set for "Pacemaker".

#### Selection other than Backup

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

## **!** CAUTION

 When the discharge process is performed, patient data such as recall and trend will be initialized. The parameter and alarm settings will be reset, backed up, or initialized 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

- To connect the DS-8100 system and DS-8500 system using the module connection cable, make sure to connect the power cable to the DS-8100 system.
- The operation after the power is turned ON will be according to the setting made on [Initial Settings] > [User I/F] > [Power ON/Discharge]. However, if the power was turned OFF for less than 30 seconds, the setting before the power was turned OFF will remain.
- If the "Main Mode" setting is other than [Backup], the following cannot be set.
   Patient Classification, Alarm, Display Configuration, ECG1, ECG2 Lead, ECG1, ECG2
   Size, Impedance Mode ON/OFF, CVA Detect, NIBP Auto Mode, BP Scale, SpO<sub>2</sub>
   Averaging, CO<sub>2</sub> Scale, EtCO<sub>2</sub> Peak Duration

## Menu Setup

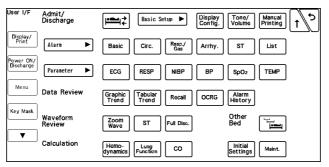
On the "Menu" setup, the keys displayed on the "Menu" screen can be customized.

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

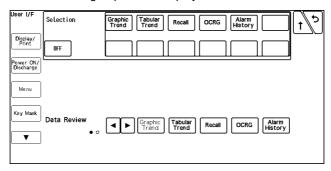
The keys displayed for each group except "Initial Settings" and "Maintenance" can be customized.

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

▶ The "Menu" setup screen will be displayed.



- 2 Press the group area to customize the keys.
  - ▶ The key selection for the selected group will be displayed.



- 3 Select the key position from the lower area.
  - ▶ The selected key position will be displayed in blue.
- 4 Select the key from the upper area to be assigned to the selected key position.

#### REFERENCE

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

## Key Mask

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

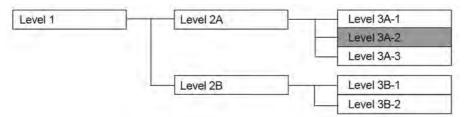


• The masked key function will be disabled on this system, but it will not affect the central monitor operation.

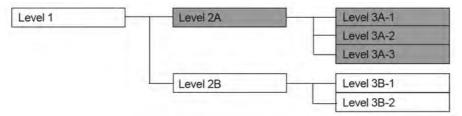
The setup items are in tree structure.

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

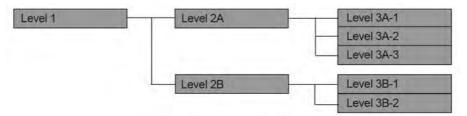
For the following tree structure, if "Level 3A-2" is masked, only this item will be masked.



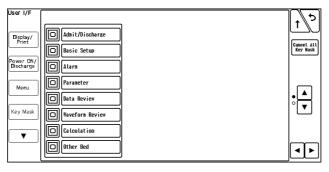
If "Level 2A" is masked, the masked items will be as follows.



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



- Press the [Menu], [Initial Settings], [User I/F], [Key Mask] keys.
  - ▶ The key mask setup screen will be displayed.

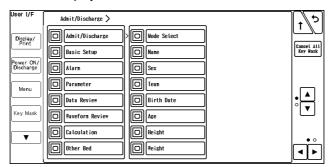


2 Select the item to perform the setting.

NOTE

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

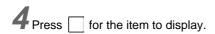
▶ The lower level items will be displayed.



3 Press of for the item to mask.



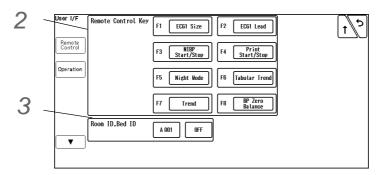
- Only the items with displayed with blue frame can be masked. For the items with white frame, display the lower items to perform the mask setting.
- Even if the key mask setting is performed for the "Initial Setting", the [Key Mask] key cannot be masked.



## Remote Control Setup

The initial settings for the remote control can be performed.

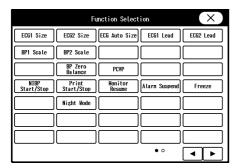
- 1 Press the [Menu], [Initial Settings], [User I/F], [Remote Control] keys.
  - ▶ The "Remote Control" menu will be displayed.

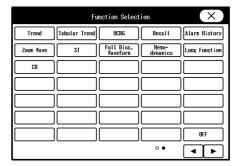


2 Set the remote control function.

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.
- $3 \text{ Press} \times$ .

Functions that can be assigned to the User Keys

Function	Key Operation
ECG1 Size ECG2 Size	Switches the ECG1 (ECG2) size each time the key is pressed. x1/4, x1/2, x1, x2, x4, x1/4
ECG1 Lead ECG2 Lead	Switches the ECG1 (ECG2) lead each time the key is pressed.  3-electrode: I, II, III, I  4-electrode: I, II, III, aVR, aVL, aVF, I  5-electrode: I, II, III, aVR, aVL, aVF, V, I
ECG Auto Size	Automatically adjusts the ECG amplitude to 10 mm. The automatic adjustment is effective only when the key is pressed.
BP1 (to BP2) Scale	Switches the BP1 (to 2) scale each time the key is pressed. The switching scale will differ depending on the BP label.  (© Operation Manual "BP Parameter Setup" P7-28)
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.
Night Mode	Turns ON/OFF the Night Mode.
Graphic Trend	The graphic trend will be displayed.
Tabular Trend	The tabular trend will be displayed.
OCRG	OCRG screen will be displayed.
Recall	Recall screen will be displayed.
Zoom Wave	The "Zoom Wave" window will be displayed.
ST	ST screen will be displayed.
Full Disclosure Waveform	The full disclosure waveform will be displayed.
Hemodynamics	Hemodynamics screen will be displayed.

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

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

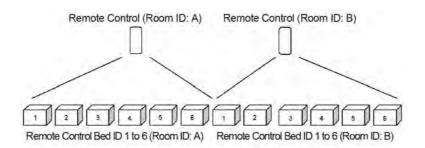
3 Set the Room ID/Bed ID.

## **!** CAUTION

- Do not set the same remote control bed ID to 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.

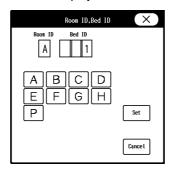
#### REFERENCE

- 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.

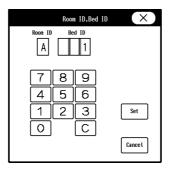


- 1 Press the key for "Room ID, Bed ID".
  - ▶ The dropdown list will be displayed.
- 2 Select from [ON] or [OFF].
  - ▶ [ON]: The Room ID/Bed ID setup will be enabled.
  - ▶ [OFF]: The Room ID/Bed ID setup will be disabled.
- **3** Press the [A 001] key.

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



- **4** Select from [A] to [H] / [P].
  - ▶ [A] to [H]: The keys to enter the Bed ID will be displayed.
  - ▶ [P]: DS-LAN setting will be applied for the Bed ID.



5 Use the numeric keys to enter the Bed ID.

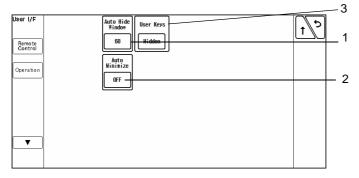


- Set the Bed ID in the range from 1 to 32.
- 6 Press the [Set] / [Cancel] key.
  - ▶ [Set]: The entered Room ID/Bed ID will be set.
  - ▶ [Cancel]: The entered Room ID/Bed ID will be canceled.

## Operation Related Setup

The initial settings for the operation can be performed.

- Press the [Menu], [Initial Settings], [User I/F], [Operation] keys.
  - ▶ The operation setup screen will be displayed.

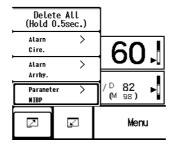


- 1 The window can be automatically closed after fixed duration.
  - [OFF]: The window will not automatically close.
  - [5] to [60]: If no operation was performed for the set duration, the window will automatically close. However, the windows for "Data Review", "Waveform Review", "Calculation", "Initial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

The minimized window will be stored at the left end of the user key area.

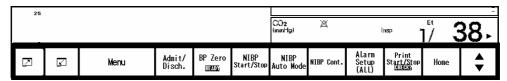


To restore the minimized window, press this key and select the window to restore.



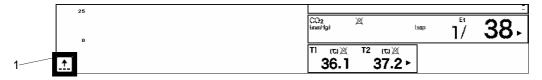
NOTE

- Maximum of 9 windows can be minimized. If exceeded, the minimized condition from the oldest window will be deleted respectively.
- 3 Whether or not to display the user key area can be selected. [Displayed]: The user key area will always be displayed.



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

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



1 User Key Area Display Icon

NOTE

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

Chapter 5 Initial Settings System Setup

## System Setup

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

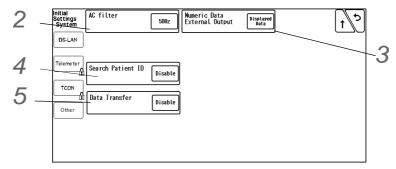
#### REFERENCE

• For setup of DS-LAN, Telemeter, TCON, Unit Module, refer to the corresponding chapter. ( "Network System Construction" P2-1)

(@"Connection to the External Devices" P4-1)

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

▶ The system setup screen will be displayed.



- 2 Set the AC filter frequency.
  - 1 Press the key for "AC filter".
    - ▶ The dropdown list will be displayed.
  - 2 Select from [50Hz]/[60Hz].
- 3 Set the "Numeric Data External Output".

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

- 1 Press the key for "Numeric Data External Output".
  - ▶ The dropdown list will be displayed.
- 2 Select from [Displayed Data]/[All Data].
  - ▶ [Displayed Data]: Only the displayed data on the home display will be output.
  - ▶ [All Data]: All data will be output.
- 4 Set the "Search Patient ID".
  - 1 Press the key for "Search Patient ID".
    - ▶ The dropdown list will be displayed.
  - 2 Select from [Enable] or [Disable].
    - ▶ [Enable]: Patient data can be searched on the patient data server using the patient ID. (☐ Operation Manual "Entering Patient Information from the Patient Data Server (When DS-LANIII, TCON is used)" P5-6)
    - [Disable]: Patient data will not be searched on the patient data server.
- 5 Set the "Data Transfer".

Chapter 5 Initial Settings User Mode Registration

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

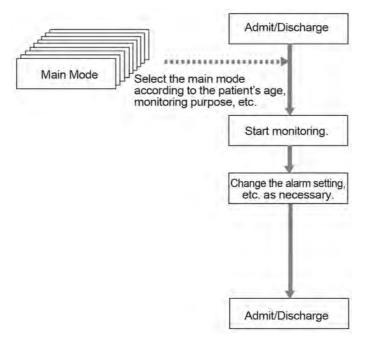
## User Mode Registration

This section explains about the user mode registration.

#### About the User Mode

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

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



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

The following items can be registered for the main mode.

- Mode Name
- Patient Classification
- Alarm
- Display Configuration
- Manual Printing
- Auto Printing
- Sound
- Color

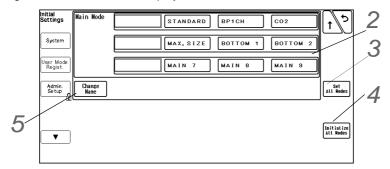
- Brightness
- Night Mode Setup
- Parameter Setup
- Graphic/Tabular Trend Display
- Synchronized Mark/Tone
- RR/APNEA Alarm Source

## To Program the User Mode

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

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

▶ User mode registration screen will be displayed.



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



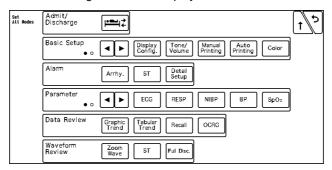
- [Regist]: The current monitoring settings will be registered to the selected key.
- ► [Change]: User mode settings can be changed.

  The user mode setting window background will be displayed in pink.
- ▶ [Initialize]: The settings for the selected key will be initialized.



- 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.
- 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.



- ${\bf 3}$  Press [OK] to apply the current setting to all modes.
- 4 All user modes will be initialized.
- **5** To change the name of user mode, press the [Change Mode Name] key and then select the key for the user mode to change the name.

Chapter 5 Initial Settings

# Chapter 6 Setup Item/Default Value

Setup Item	6-1
Initial Settings	
External Connection (Pin Assignments)	6-16
RS-232C Connector Output Signal	6-16
Status I/O Signal (Status II Connector 1)	6-16
Status I/O Signal (Status II Connector 2)	6-17



# **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	0
Basic Alarm Parameter		Each Parameter (S, D, M can be specified for BP)	HR, SpO <sub>2</sub> , NIBP-S, CO <sub>2</sub> Et	0
Asystole, VF, VT Alarm		Always ON, ON/OFF	Always ON	0
HR/PR Lower Limit durin	ng Alarm Auto Setting	OFF, 30 bpm, 40 bpm	None	0
Buzzer Tone at Speaker	Failure	Enable, Disable	Enable	0
Suspend Arrhythmia Ana Interference	alysis during Noise	ON, OFF	OFF	0
Lower Limit for Alarm	Vital Alarm: Urgent	11 levels	0	0
Volume	Vital Alarm: Caution		0	
	Vital Alarm: Status		0	
	Ventilator Alarm		0	
	Status Alarm: Urgent		0	
	Status Alarm: Caution		0	
	Status Alarm: Status		0	
	Other Bed Alarm		0	
Alarm Indicator Setup	Level S <sup>*1</sup>		Pattern A	0
	Level H		Pattern A	0
	Level M		Pattern E	0
	Level L		Pattern F	0
	Ventilator Alarm		Pattern A	0
	Synchronize with HR/RR	Sync. to HR, Sync. to RR, OFF	OFF	0
Alarm Level *2*3		DS-LAN Standard Setup, User Setup	DS-LAN Standard Setup	0
Numeric Data	HR	S, H, M	М	0
	ST	H, M	М	0
	BP1 to 2	H, M	М	0
	PR_IBP	H, M	М	0
	SpO <sub>2</sub>	H, M	М	0
	PR_SpO <sub>2</sub>	H, M	М	0
	NIBP	H, M	М	0
	TEMP1 to 4	H, M, L	L	0

Tb	ckup
Apnea H, M, L H  CO <sub>2</sub> In H, M M  CO <sub>2</sub> Et H, M M  SpCO H, M, L L  SpMet H, M, L  SpHb H, M, L  Arrhythmia  Asystole S, H H  VF S, H H  VT S, H H  Slow VT H H  Tachy S, H H  Run H, M M  Bigeminy H, M, L L  Trigeminy H, M, L L  Trigeminy H, M, L L  Ext Tachy S, H H  Couplet H, M, L L  Ext Tachy S, H H  Ext Brady S, H H  Couplet H, M, L L  Frequent H, M, L L  Ext Tachy S, H H  Ext Brady S, H H  Ext Tachy S, H H  Ext Brady S, H  Ext Br	0
CO2 In	0
CO2 Et	0
SpCO	0
SpMet	0
SpHb	0
Arrhythmia  Asystole VF S, H VF S, H H VF S, H H Slow VT H Tachy S, H Brady S, H H Run H, M Bigeminy H, M, L Trigeminy H, M, L Frequent H, M, L Ext Tachy S, H Ext Brady S, H H Ext Brady S, H H Ext Brady S, H Ext Brady S, H Ext Brady S, H Triplet H, M, L Ext Tachy S, H Ext Brady S, H Ext Brady S, H Triplet H, M, L Ext Tachy S, H Ext Brady S, H Ext Br	0
VF         S, H         H           VT         S, H         H           Slow VT         H         H           Tachy         S, H         H           Brady         S, H         H           Run         H, M         M           Bigeminy         H, M, L         L           Trigeminy         H, M, L         L           Pause         H, M         M           Couplet         H, M, L         L           Ext Tachy         S, H         H           Ext Tachy         S, H         H           Ext Brady         S, H         H           Triplet         H, M, L         L           R on T         H, M, L         L           Went Rhtm         H, M, L         L           SVT         H, M, L         L           Ireg RR         H, M, L         L           Prolong RR         H, M, L         L           S Frequent         H, M, L         L	0
VT         S, H         H           Slow VT         H         H           Tachy         S, H         H           Brady         S, H         H           Run         H, M         M           Bigeminy         H, M, L         L           Trigeminy         H, M, L         L           Pause         H, M         M           Couplet         H, M, L         L           Frequent         H, M, L         L           Ext Tachy         S, H         H           Ext Brady         S, H         H           Triplet         H, M, L         L           R on T         H, M, L         L           Wort Rhtm         H, M, L         L           SVT         H, M, L         L           Ireg RR         H, M, L         L           Prolong RR         H, M, L         L           S Frequent         H, M, L         L	0
Slow VT	0
Tachy         S, H         H           Brady         S, H         H           Run         H, M         M           Bigeminy         H, M, L         L           Trigeminy         H, M, L         L           Pause         H, M         M           Couplet         H, M, L         L           Frequent         H, M, L         L           Ext Tachy         S, H         H           Ext Brady         S, H         H           Triplet         H, M, L         L           R on T         H, M, L         L           Wultiform         H, M, L         L           Vent Rhtm         H, M, L         L           SVT         H, M, L         L           Ireg RR         H, M, L         L           Prolong RR         H, M, L         L           S Frequent         H, M, L         L	0
Brady         S, H         H           Run         H, M         M           Bigeminy         H, M, L         L           Trigeminy         H, M, L         L           Pause         H, M         M           Couplet         H, M, L         L           Frequent         H, M, L         L           Ext Tachy         S, H         H           Ext Brady         S, H         H           Triplet         H, M, L         L           R on T         H, M, L         L           Multiform         H, M, L         L           Vent Rhtm         H, M, L         L           SVT         H, M, L         L           Ireg RR         H, M, L         L           Prolong RR         H, M, L         L           S Frequent         H, M, L         L	0
Run       H, M       M         Bigeminy       H, M, L       L         Trigeminy       H, M, L       L         Pause       H, M       M         Couplet       H, M, L       L         Frequent       H, M, L       L         Ext Tachy       S, H       H         Ext Brady       S, H       H         Triplet       H, M, L       L         R on T       H, M, L       L         Multiform       H, M, L       L         Vent Rhtm       H, M, L       L         Ireg RR       H, M, L       L         Prolong RR       H, M, L       L         S Frequent       H, M, L       L	0
Bigeminy         H, M, L         L           Trigeminy         H, M, L         L           Pause         H, M         M           Couplet         H, M, L         L           Frequent         H, M, L         L           Ext Tachy         S, H         H           Ext Brady         S, H         H           Triplet         H, M, L         L           R on T         H, M, L         L           Multiform         H, M, L         L           Vent Rhtm         H, M, L         L           SVT         H, M, L         L           Ireg RR         H, M, L         L           Prolong RR         H, M, L         L           S Frequent         H, M, L         L	0
Trigeminy H, M, L L  Pause H, M M  Couplet H, M, L L  Frequent H, M, L L  Ext Tachy S, H H  Ext Brady S, H H  Triplet H, M, L L  R on T H, M, L L  Vent Rhtm H, M, L L  Ireg RR H, M, L L  Prolong RR H, M, L L  S Frequent H, M, L L	0
Pause         H, M         M           Couplet         H, M, L         L           Frequent         H, M, L         L           Ext Tachy         S, H         H           Ext Brady         S, H         H           Triplet         H, M, L         L           R on T         H, M, L         L           Multiform         H, M, L         L           Vent Rhtm         H, M, L         L           SVT         H, M, L         L           Ireg RR         H, M, L         L           Prolong RR         H, M, L         L           S Frequent         H, M, L         L	0
Couplet H, M, L L  Frequent H, M, L L  Ext Tachy S, H H  Ext Brady S, H H  Triplet H, M, L L  R on T H, M, L L  Multiform H, M, L L  Vent Rhtm H, M, L L  SVT H, M, L L  Ireg RR H, M, L L  Prolong RR H, M, L L  S Frequent H, M, L L	0
Frequent         H, M, L         L           Ext Tachy         S, H         H           Ext Brady         S, H         H           Triplet         H, M, L         L           R on T         H, M, L         L           Multiform         H, M, L         L           Vent Rhtm         H, M, L         L           SVT         H, M, L         L           Ireg RR         H, M, L         L           Prolong RR         H, M, L         L           S Frequent         H, M, L         L	0
Ext Tachy S, H H  Ext Brady S, H H  Triplet H, M, L L  R on T H, M, L L  Multiform H, M, L L  Vent Rhtm H, M, L L  Ireg RR H, M, L L  Prolong RR H, M, L L  S Frequent H, M, L L	0
Ext Brady S, H H  Triplet H, M, L  R on T H, M, L  Went Rhtm H, M, L  L  SVT H, M, L  Ireg RR H, M, L  Prolong RR H, M, L  S Frequent H, M, L  L	0
Triplet         H, M, L         L           R on T         H, M, L         L           Multiform         H, M, L         L           Vent Rhtm         H, M, L         L           SVT         H, M, L         L           Ireg RR         H, M, L         L           Prolong RR         H, M, L         L           S Frequent         H, M, L         L	0
R on T H, M, L L  Multiform H, M, L L  Vent Rhtm H, M, L L  SVT H, M, L L  Ireg RR H, M, L L  Prolong RR H, M, L L  S Frequent H, M, L L	0
Multiform         H, M, L         L           Vent Rhtm         H, M, L         L           SVT         H, M, L         L           Ireg RR         H, M, L         L           Prolong RR         H, M, L         L           S Frequent         H, M, L         L	0
Vent Rhtm         H, M, L         L           SVT         H, M, L         L           Ireg RR         H, M, L         L           Prolong RR         H, M, L         L           S Frequent         H, M, L         L	0
SVT         H, M, L         L           Ireg RR         H, M, L         L           Prolong RR         H, M, L         L           S Frequent         H, M, L         L	0
Ireg RR         H, M, L         L           Prolong RR         H, M, L         L           S Frequent         H, M, L         L	0
Prolong RR         H, M, L         L           S Frequent         H, M, L         L	0
S Frequent H, M, L L	0
	0
S Couplet H, M, L L	0
	0
VPC L L	0
SVPC L L	0
Not Capt H, M, L L	0
Not Pacing H, M, L L	0
Technical SpO <sub>2</sub> Low Perfusion L, N L	0
Check NIBP cuff, hose M, L, N L	0
NIBP meas. failed. (***- **)  M, L, N  M	0
BP Transducer OFF M, L L	0
Check System Conn. L, N N	0
Chk DS-LAN Comm L, N L	0

Ite	Item		Default	Backup
	Some parameters are not displayed due to the display layout setting.	L, N, OFF	N	0
	Check Electrodes	H, M, L	L	0
	SpO <sub>2</sub> Check Sensor Attach.	H, M, L	L	0
	Chk TCON Reception	L, N	L	0

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

## ☐ Initial Settings (Measurement)

Iten	า	Details	Default	Backup
NIBP Start 5 min. early		ON, OFF	OFF	0
MAP Calculation (ART, N	NIBP)	Waveform, Calculation	Waveform	0
Arrhythmia Analysis Filte	r	Disp Waveform, Fixed	Disp. Waveform	0
Synchronized Mark/Tone		ECG, SpO <sub>2</sub>	ECG	0
		ECG/SpO <sub>2</sub> /BP, ECG/BP/SpO <sub>2</sub> , SpO <sub>2</sub> /ECG/BP, SpO <sub>2</sub> /BP/ECG, BP/ECG/SpO <sub>2</sub> , BP/SpO <sub>2</sub> /ECG	ECG/SpO <sub>2</sub> /BP	0
BP User Label	Label 1	3 alphanumeric characters	US1	0
	Label 2		US2	0
	Label 3		US3	0
	Label 4		US4	0
	Label 5		US5	0
TEMP User Label	Label 1	3 alphanumeric characters	US1	0
	Label 2		US2	0
	Label 3		US3	0
	Label 4		US4	0
	Label 5		US5	0
	Label 6		US6	0
	Label 7		US7	0
Measurement Unit	CO <sub>2</sub>	mmHg, kPa, %	mmHg	0
	BP	mmHg, kPa	mmHg	0
	CVP	mmHg/kPa, cmH <sub>2</sub> O	mmHg/kPa	0
	TEMP	°C, °F	°F	0
	ST	mm, mV	mm	0
	Height/Weight	cm/kg, in/lb	in/lb	0
Catheter Manufacturer	Manufacturer 1	8 alphanumeric characters	BIOSENS	0
for CC Input	Manufacturer 2		ARGON	0
	Manufacturer 3	7	EDWARS	0

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

<sup>\*3:</sup> When [Fukuda Tone] is set for the "Alarm System", the alarm level of numeric data and arrhythmia can be selected from Level S, H, M, L. For technical alarm, the alarm level can be selected from Level S, H, M, L, N. OFF can be also selected for <Some parameters are not displayed due to the display layout setting.>.

# ☐Initial Settings (User I/F)

## Display/Print

Item		Description	Default	Backup
Date Format		07/19, Jul.19, 19 Jul	07/19	0
BP Alarm Increment		Normal, Small	Normal	0
RR Alarm Increment		Normal, Small	Normal	0
Trend Clip		ON, OFF	ON	0
BP Printing Scale		20 mm, 40 mm	40 mm	0
Night Mode Cancel		Any Key, Night Mode Key	Any Key	0
ST Display Lead Setup (A and B)		4 leads for each pattern of A and B I to V, OFF	ST-A: I, II, III, aVR ST-B: aVL, aVF, V, OFF	0
Auto Display Configuration	BP Format	Overlap, Separate	Overlap	0
	Automatic Setup	Standard/Right, Standard/ Left	Standard/Right	0
VENT Display Parameters		OFF [Ventilator] E-TV, I-TV, MV, P-PEAK, P- PAUSE, PEEP, P-MEAN, E- RES, I-RES, FiO <sub>2</sub> , COMP	VENT-A: All OFF VENT-B: All OFF	0
Hemodynamic Display Parameters Setup		OFF [SvO <sub>2</sub> /CCO] SvO <sub>2</sub> , ScvO <sub>2</sub> , SaO <sub>2</sub> , O <sub>2</sub> EI, B-Temp, CCO, CCO-STAT, CCI, CCI-STAT, DO <sub>2</sub> , RVEF, RVEF-STAT, VO <sub>2</sub> , SV, SV-STAT, SVI, SVI- STAT, SVR, SVRI, SVV, EDV, EDV-STAT, EDVI, EDVI-STAT, ESV, ESVI	Hemodynamics-A: All OFF Hemodynamics-B: All OFF	0
Dim All Data Other than Numeric		ON, OFF	OFF	0
All Window Opaque		ON, OFF	OFF	0
Printer Message		ON, OFF	ON	0
Message Icon		ON, OFF	OFF	0
Time Bar Scale		24h, 48h	24h	0
Notification when Changing Equipment Configuration		ON, OFF	ON	0
Waveform Size Display		Numeric, Bar, Bar (10 mm)	Numeric	0
Enlarged Menu		ON, OFF	OFF	0
External Device Numeric Data Box Operation		Tabular Trend, Parameter	Tabular Trend	0
Time Shift	Day Shift	Selectable Time	08:00	0
	Twilight Shift		16:00	0
	Night Shift		00:00	0

## Display/Print

Item		Description	Default	Backup
Key Group Setup	Label A to E	8 alphanumeric characters	Blank <sup>*</sup>	0
	A to E	Up to 8 user keys can be registered to each group (Home, Menu, Alarm Silence, Alarm Suspend, NIBP Start/Stop, NIBP Cont., Print Start/Stop, Monitor Suspend, Night Mode, Freeze, Key Lock, Mode Select, Admit/Disch., Rapid Discharge, HR/PR, HR/PR Source, BP Zero, ECG Size (All Leads), Scale/Baseline, SpO <sub>2</sub> Display ON/OFF, CO <sub>2</sub> Display ON/OFF, CHange Palette, Graphic Trend, Tabular Trend, NIBP List, Recall, Alarm History, OCRG, ST, Cardiac Output, PCWP, Hemodynamics, Lung Function, Full Disc. Wave, Tone/Volume, NIBP Auto Mode, Alarm Setup (All) (Basic), Manual Printing, Display Config., Time/Date, Other Bed, Stopwatch, Print (LBP) Cancel, Standard, BP1ch, CO <sub>2</sub> , Maximum, Bottom 1, Bottom 2, Main 7, Main 8, Main 9	None	0
Event Label Setup	Event 1	8 alphanumeric characters	Event 1	0
	Event 2		Event 2	0
	Event 3		Event 3	0
	Event 4		Event 4	0
	Event 5		Event 5	0
	Event 6		Event 6	0
	Event 7		Event 7	0
	Event 8		Event 8	0
		1		

 $<sup>\</sup>ast :$  When blank, "Group n" will be displayed.

## Power ON/ Discharge

Item	Description	Default	Backup
Check Discharge at Power ON	ON, OFF	ON	0
Discharge Mode	Admit, Monitor Suspend, Standby	Admit	0
NIBP Resume Auto Mode with Manual Measurement	ON, OFF	ON	0
Automatic Start by AC Connection	ON, OFF	ON	0
Automatic Start by M-LAN Connection	ON, OFF	ON	0

## Power ON/ Discharge

At Power ON Backup/Initialize	Patient Classification	Backup, Adult, Child,	Backup	_
		Neonate	,	0
	Main Mode	Backup, Current Mode, Standard, BP 1ch, CO <sub>2</sub> , Maximum, Bottom 1, Bottom 2, Main 7, Main 8, Main 9	Backup	0
	Pacemaker	Backup, Not Used	Backup	0
	Alarm Setup	Backup, Initialize	Backup	0
	Display Configuration	Backup, Initialize	Backup	0
	ECG1, ECG2 Lead	Backup, Initialize	Backup	0
	ECG1/ECG2 Size	Backup, Initialize	Backup	0
	Impedance Mode ON/OFF	Backup, Initialize	Backup	0
	CVA Detect	Backup, OFF	Backup	0
	NIBP Auto Mode	Backup, OFF OFF->2.5 min., OFF->5 min.	Backup	0
	BP Scale	Backup, Initialize	Backup	0
	SpO <sub>2</sub> Averaging	Backup, Initialize	Backup	0
	CO <sub>2</sub> Scale	Backup, Initialize	Backup	0
	EtCO <sub>2</sub> Peak Duration	Backup, 10 sec.	Backup	0
At Discharge Backup/Initialize	Patient Classification	Backup, Adult, Child, Neonate	Backup	0
	Main Mode	Backup, Current Mode, Standard, BP 1ch, CO <sub>2</sub> , Maximum, Bottom 1, Bottom 2, Main 7, Main 8, Main 9	Backup	0
	Pacemaker	Backup, Not Used	OFF	0
	Alarm Setup	Backup, Initialize	Initialize	0
	Display Configuration	Backup, Initialize	Initialize	0
	ECG1, ECG2 Lead	Backup, Initialize	Initialize	0
	ECG1/ECG2 Size	Backup, Initialize	Initialize	0
	Impedance Mode ON/OFF	Backup, Initialize	Initialize	0
	CVA Detect	Backup, OFF	OFF	0
	NIBP Auto Mode	Backup, OFF OFF->2.5 min., OFF->5 min.	OFF	0
	BP Scale	Backup, Initialize	Initialize	0
	SpO <sub>2</sub> Averaging	Backup, Initialize	Initialize	0
	CO <sub>2</sub> Scale	Backup, Initialize	Initialize	0
	EtCO <sub>2</sub> Peak Duration	Backup, 10 sec.	10 sec.	0

#### Menu

	tem	Description	Default	Backup
Menu Setup	Admit/Discharge	OFF, Admit/Discharge	Admit/Discharge	0
	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	0
	Alarm	OFF, Basic, Circ., Resp/Gas, Arrhy., ST, List, Detail Setup	Basic, Circ., Resp/Gas, Arrhy., ST, List, Detail Setup	0
	Parameter	OFF, ECG, RESP, NIBP, BP, SpO <sub>2</sub> , TEMP, CO <sub>2</sub> , Ext. Device, Sp*	ECG, RESP, NIBP, BP, SpO <sub>2</sub> , TEMP, CO <sub>2</sub> , Ext. Device Sp*	0
	Data Review	OFF, Trend, Tabular Trend, Recall, OCRG, Alarm History	Trend, Tabular Trend, Recall, OCRG, Alarm History	0
	Waveform Review	OFF, Zoom, ST, Full Disc. Wave	Zoom, ST, Full Disc. Wave	0
	Calculation	OFF, Hemodynamics, Lung Function, CO	Hemodynamics, Lung Function, CO	0
	Initial Settings	Initial Settings	Initial Settings	0
	Maintenance	Maintenance	Maintenance	0
	Other Bed	OFF, Other Bed	Other Bed	0

#### Key Mask

	Item	Description	Default	Backup
Key Mask	Admit/Discharge Items	ON/OFF	All ON	0
	Basic Setup	ON/OFF	All ON	0
	Alarm	ON/OFF	All ON	0
	Parameter	ON/OFF	All ON	0
	Data Review	ON/OFF	All ON	0
	Waveform Review	ON/OFF	All ON	0
	Calculation	ON/OFF	All ON	0
	Other Bed	ON/OFF	All ON	0

#### Remote Control

Item		Description	Default	Backup
Remote Control	Remote Control	ECG1/ECG2 Size	F1: ECG1 Size	0
	Key	ECG1 Lead, ECG2 Lead	F2: ECG1 Lead	
		ECG Auto Size	F3: NIBP Start/Stop	
		BP1 to 2 scale, PCWP, BP Zero Balance, NIBP Start/Stop, Print Start/Stop, Monitor Resume, Alarm Suspend, Freeze, Trend, Tabular Trend,	F4: Print Start/Stop	
			F5: Night Mode	
		OCRG, Recall, Zoom Wave, ST, CO, Hemodynamics, Lung Function, Night Mode, Full Disc. Wave, Alarm History, OFF	F6: Tabular Trend	
			F7: Graphic Trend	
			F8: BP Zero Balance	
	Room ID/Bed ID*	Room ID: A,B,C,D,E,F,G,H Bed ID: 1 to 32	A001, OFF	0

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

#### Operation (Touch Panel, etc.)

ı	tem	Description	Default	Backup
Window	Auto Hide Window	OFF, 5, 10, 20, 30, 60 sec.	60 sec.	0
	Auto Minimize	ON, OFF	OFF	0

## ☐ Initial Settings (External Device)

	Item		Description	Default	Backup
Main Unit P	ort ort	COM1	OFF, SV-900, SV-300, SERVO-i/s,	OFF *	0
		COM2	SERVO-U/n/air, PB, Evita, Vigilance, PulsioFlex, PC Communication,	OFF *	0
		Status II-1	TCON, Barcode Reader, Magnetic Card Reader, BIS, INVOS*	OFF *	0
		Status II-2	Card Reader, bis, invos	OFF *	0
Network	Main Unit	IP Address	Numeric (0 to 9)	0.0.0.0	0
		Sub-Network Mask		0.0.0.0	0
		Default Gateway		0.0.0.0	0
	Printer	Network Printer	ON, OFF, DS-LAN	OFF	0
		IP Address	Numeric (0 to 9)	0.0.0.0	0
		MAC Address	Alphanumeric (0 to 9, A to F)	00.00.00.00.00	0
		Printer Specification	LIPS IV, ESC/page, PCL 5	LIPS IV	0
		Paper Size	A4, Letter	A4	0
		Central Monitor	001 to 016	001	0
Status Output	Alarm Output Setup	Alarm to Output	OFF, APNEA, Level H, Level H,M, Level H,M,L	Level H*	0
	(Status II-1, Status II-2)	Output Logic	Positive Logic, Negative Logic, Pulse	Positive Logic*	0
Analog Out	put Setup	ECG	Disp. Lead, Selected Lead	Disp. Lead	0
		IBP Waveform/ Synchronized Signal Output	IBP1/IBP2/Sync Signal	IBP1	0
		Output Signal	HR, RR	HR*	0
		Output Logic	Positive Logic, Negative Logic	Positive Logic*	0
		Pulse Width (msec)	100, 60, 20	100*	0
Magnetic	Starting Digit	Patient ID	Entering using numeric keys	1-20	0
Card Reader	/ Ending Digit	Patient Name		OFF-OFF	0
Setup		Birth Year		OFF-OFF	0
		Birth Month		OFF-OFF	0
		Birth Day		OFF-OFF	0
		Age		OFF-OFF	0
		Sex		OFF-OFF	0
	Auto Reference when Reading	e to Central Monitor Patient ID	ON, OFF	OFF	0

 $<sup>\</sup>ast :$  The external device that can be connected differs depending on the port.

NOTE

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

# ☐Initial Settings (System)

	Item	Details	Default	Backup
DS-LAN	DS-LAN Setup	DS-LANII (10Mbps), DS-LANIII (100Mbps)	DS-LANII (10Mbps)*	0
	Room ID	3 alphanumeric characters	BED	0
Bed ID		3 numerics	000	0
	DS-LAN Pat. ID Transmission Start Position	1st to 20th character	1st character	0
	Synchronize Hemodynamic Data with the Central Monitor	ON, OFF	OFF	0
	CO <sub>2</sub> (mmHg) Upper Limit of Transmission	No limit, 99mmHg	99mmHg	0
Telemeter	Function	ON, OFF	ON	0
	Channel	1001 to 1080, 2001 to 2120 3001 to 3040, 4001 to 4080 5001 to 5080, 6001 to 6080	Depends on the telemeter	0
	Group	00 to 63	00 *	0
	Transmitting Waveform	ECG1(ECG1, RESP, CO <sub>2</sub> , BP1, BP2, SpO <sub>2</sub> ), ECG2 (ECG1. ECG2. RESP/CO <sub>2</sub> , BP1, SpO <sub>2</sub> )	ECG1(ECG1, RESP, CO <sub>2</sub> , BP1, BP2, SpO <sub>2</sub> )	0
	CO <sub>2</sub> (mmHg) Upper Limit of Transmission	No limit, 99mmHg	99mmHg	0
TCON Setup	TCON	ON, OFF	OFF *	0
	TCON ID	1 to 16	No selection*	0
	TCON Channel	2 to 19	No selection*	0
Other	AC Frequency	50Hz, 60Hz	60 Hz	0
	Search Patient ID	Enable, Disable	Disable	0
	Numeric Data External Output	Displayed Data All Data	Displayed Data	0
	Data Transfer Function	Enable, Disable	Disable	0

NOTE

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

# ☐ Initial Settings (User Mode Registration)

	Item	Details	Default	Backup
Main Mode*1	Mode Name	8 characters	Normal	0
			BP 1ch	
			CO <sub>2</sub>	
			Zoom	
			Bottom 1	
			Bottom 2	
			Main Mode 7	
			Main Mode 8	
			Main Mode 9	

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

Patient Classification

Display Configuration

**Manual Printing** 

**Auto Printing** 

Time/Date

Brightness

Tone/Volume

Color Setup

Night Mode Setup

Alarm

Settings for Each Parameter

Settings for Review Data (Trend, Tabular Trend, Recall, OCRG, ST, Zoom Wave, Full Disc. Wave)

#### Main Mode (Mode 1)

	Item	Default	Backup
Item		Standard	0
Layout		Standard/Right(Large)	0
Numeric Data		HR, SpO <sub>2</sub> , NIBP, RR_IMP	0
Waveform		ECG1, SpO <sub>2</sub> , RESP	0
User Key Down 1/2 User Key Down 2/2		Menu, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home	0
		Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/ Stop, Home	0
Short Trend		OFF	0
		15 min.	0
Detail Setup	Alarm Limit Display	Graph	0
(Numeric Data)	At Alarm Occurrence	Reversed	0

#### Main Mode (Mode 1)

Item		Default	Backup
Detail Setup	Grid	ON	0
(Waveform)	Scale	ON	0
	Thickness	Regular	0
	Clip	ON	0
	Fill CO <sub>2</sub> Waveform	ON	0
	ST/VPC/Arrhy. Alarm Display	ON	0
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	0

#### Main Mode (Mode 2)

	Item	Default	Backup
Item		BP1CH	0
Layout		Standard/Right(Large)	0
Numeric Data		HR, SpO <sub>2</sub> , NIBP, BP1, RR_IMP	0
Waveform		ECG1, SpO <sub>2</sub> , RESP	0
User Key	User Key Down 1/2	Menu, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home	0
	User Key Down 2/2	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/ Stop, Home	0
Short Trend		OFF	0
		15 min.	0
Detail Setup	Alarm Limit Display	Graph	0
(Numeric Data)	At Alarm Occurrence	Reversed	0
Detail Setup	Grid	ON	0
(Waveform)	Scale	ON	0
	Thickness	Regular	0
	Clip	ON	0
	Fill CO <sub>2</sub> Waveform	ON	0
	ST/VPC/Arrhy. Alarm Display	ON	0
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	0

#### Main Mode (Mode 3)

Item		Default	Backup	
Item		CO <sub>2</sub>	0	
Layout		Standard/Right(Large)	0	
Numeric Data		HR, SpO <sub>2</sub> , NIBP, BP1, CO <sub>2</sub> , RR_IMP	0	
Waveform		ECG1, SpO <sub>2</sub> , BP1, CO <sub>2</sub>	0	
User Key	User Key Down 1/2	Menu, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home	0	
	User Key Down 2/2	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/ Stop, Home	0	

#### Main Mode (Mode 3)

	Item	Default	Backup
Short Trend		OFF	0
		15 min.	0
Detail Setup	Alarm Limit Display	Graph	0
(Numeric Data)	At Alarm Occurrence	Reversed	0
Detail Setup	Grid	ON	0
(Waveform)	Scale	ON	0
	Thickness	Regular	0
	Clip	ON	0
	Fill CO <sub>2</sub> Waveform	ON	0
	ST/VPC/Arrhy. Alarm Display	ON	0
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	0

#### Main Mode (Mode 4)

Item		Default	Backup
Item		Zoom	0
Layout		Numeric/Max. Size	0
Numeric Data		HR, SpO <sub>2</sub> , NIBP, NIBP List	0
Waveform		ECG1	0
User Key Down 1/2		Menu, Alarm Silence, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home	0
User Key Down 2/2		Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/ Stop, Home	0
Short Trend		OFF	0
		15 min.	0
Detail Setup	Alarm Limit Display	Graph	0
(Numeric Data)	At Alarm Occurrence	3D	0
Detail Setup	Grid	ON	0
(Waveform)	Scale	ON	0
	Thickness	Regular	0
	Clip	ON	0
	Fill CO <sub>2</sub> Waveform	ON	0
	ST/VPC/Arrhy. Alarm Display	ON	0
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	0

#### Main Mode (Mode 5)

Item	Default	Backup
Item	Standard/Bottom	0
Layout	Standard (Box Layout: Bottom 3 row)	0
Numeric Data	HR, SpO <sub>2</sub> /PR, NIBP, RR_IMP	0
Waveform	ECG1, SpO <sub>2</sub> , RESP	0

#### Main Mode (Mode 5)

Item		Default	Backup
User Key	User Key Down 1/2	Menu, Alarm Silence, BP Zero, Scale, Alarm Setup (All), Trend, Tabular Trend, Recall, Print Start/Stop, Home	0
	User Key Down 2/2	Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/ Stop, Home	0
Short Trend		OFF	0
		15 min.	0
Detail Setup	Alarm Limit Display	Graph	0
(Numeric Data)	At Alarm Occurrence	3D	0
Detail Setup	Grid	ON	0
(Waveform)	Scale	ON	0
	Thickness	Regular	0
	Clip	ON	0
	Fill CO <sub>2</sub> Waveform	ON	0
	ST/VPC/Arrhy. Alarm Display	ON	0
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	0

#### Main Mode (Mode 6)

Item		Default	Backup
Item		Standard/Bottom CO <sub>2</sub>	0
Layout		Standard (Box Layout: Bottom 3 row)	0
Numeric Data		HR, SpO <sub>2</sub> /PR, NIBP, BP1,RR(GAS), CO <sub>2</sub>	0
Waveform		ECG1, SpO <sub>2</sub> , BP1, CO <sub>2</sub>	0
User Key Down 1/2		Menu, Alarm Silence, Scale, Trend, Tabular Trend, Recall, BP Zero, Alarm Setup (All), Print Start/Stop, Home	0
User Key Down 2/2		Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/ Stop, Home	0
Short Trend		OFF	0
		15 min.	0
Detail Setup	Alarm Limit Display	Graph	0
(Numeric Data)	At Alarm Occurrence	3D	0
Detail Setup	Grid	ON	0
(Waveform)	Scale	ON	0
	Thickness	Regular	0
	Clip	ON	0
	Fill CO <sub>2</sub> Waveform	ON	0
	ST/VPC/Arrhy. Alarm Display	ON	0
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	0

#### Main Mode (Mode 7)

Item		Default	Backup
Item		Main Mode 7	0
Layout		Standard/Right(Large)	0
Numeric Data		HR, SpO <sub>2</sub> , NIBP, RR_IMP	0
Waveform		ECG1, SpO <sub>2</sub> , RESP	0
User Key Down 1/2		Menu, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home	0
User Key Down 2/2		Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/ Stop, Home	0
Short Trend		OFF	0
		15 min.	0
Detail Setup	Alarm Limit Display	Graph	0
(Numeric Data)	At Alarm Occurrence	Reversed	0
Detail Setup	Grid	ON	0
(Waveform)	Scale	ON	0
	Thickness	Regular	0
	Clip	ON	0
	Fill CO <sub>2</sub> Waveform	ON	0
	ST/VPC/Arrhy. Alarm Display	ON	0
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	0

#### Main Mode (Mode 8)

Item		Default	Backup
Item		Main Mode 8	0
Layout		Standard/Right(Large)	0
Numeric Data		HR, SpO <sub>2</sub> , NIBP, RR_IMP	0
Waveform		ECG1, SpO <sub>2</sub> , RESP	0
User Key Down 1/2		Menu, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home	0
User Key Down 2/2		Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/ Stop, Home	0
Short Trend		OFF	0
		15 min.	0
Detail Setup (Numeric Data)	Alarm Limit Display	Graph	0
	At Alarm Occurrence	Reversed	0

#### Main Mode (Mode 8)

Item		Default	Backup
Detail Setup	Grid	ON	0
(Waveform)	Scale	ON	0
	Thickness	Regular	0
	Clip	ON	0
	Fill CO <sub>2</sub> Waveform	ON	0
	ST/VPC/Arrhy. Alarm Display	ON	0
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	0

#### Main Mode (Mode 9)

Item		Default	Backup
Item		Main Mode 9	0
Layout		Standard/Right(Large)	0
Numeric Data		HR, SpO <sub>2</sub> , NIBP, RR_IMP	0
Waveform		ECG1, SpO <sub>2</sub> , RESP	0
User Key Down 1/2		Menu, Admit/Disch., BP Zero, NIBP Start/Stop, NIBP Auto Mode, NIBP Cont., Alarm Setup (All), Print Start/Stop, Home	0
User Key Down 2/2		Menu, Alarm Silence, Trend (Group), Tabular Trend (Group), Night Mode, Key Lock, Print Start/ Stop, Home	0
Short Trend		OFF	0
		15 min.	0
Detail Setup	Alarm Limit Display	Graph	0
(Numeric Data)	At Alarm Occurrence	Reversed	0
Detail Setup	Grid	ON	0
(Waveform)	Scale	ON	0
	Thickness	Regular	0
	Clip	ON	0
	Fill CO <sub>2</sub> Waveform	ON	0
	ST/VPC/Arrhy. Alarm Display	ON	0
	Block Cascade	Waveform Quantity: 2 Waveform: ECG1, ECG2	0

# External Connection (Pin Assignments)

This section lists the connector pin assignments.

# RS-232C Connector Output Signal

## □COM1 Connector

No.	Signal Type	Note	Signal Level
1	RESET	Reset	Open Collector Output (internal pull-up register)
2	NC	Not connected	
3	TxD	Serial Transmission Data Output	RS232C
4	SG	GND	
5	RxD	Serial Reception Data Input	RS232C
6	+5V	+5V Power supply output	+5V Power Supply (150mA)
7	NC	Not connected	
8	NC	Not connected	

#### □COM2 Connector

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

# Status I/O Signal (Status II Connector 1)

No.	Signal Type	Note	Signal Level
1	ALARM_QRS_OUT1	Alarm Output 1	Logic TTL
2	ALARM_OUT2+	Alarm Output 2+ (Isolation)	Photo MOS Relay Contact
3	TxD	Serial Transmission Data Output	RS232C*
4	RxD/ALARM1	Serial Reception Data Input/ ALARM1 Input	RS232C* / Logic
5	ALARM2_IN+	Alarm Input 2 (Isolation)	Logic Input
6	ALARM2_IN-	Alarm Input 2 Return (Isolation)	
7	+5V	+5V Power supply output	+5V Power Supply (150mA)
8	ALARM_OUT2-	Alarm Output2-(Isolation)	Photo MOS Relay Contact
9	GND_ISO	Isolation Ground	

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

# Status I/O Signal (Status II Connector 2)

No.	Signal Type	Note	Signal Level
1	ALARM_QRS_OUT1	Alarm Output1	Logic TTL
2	ALARM_OUT2+	Alarm Output2+ (Isolation)	Photo MOS Relay Contact
3	TxD	Serial Transmission Data Output	RS232C*
4	RxD/ALARM1	Serial Reception Data Input/ ALARM1 Input	RS232C* / Logic
5	ALARM2_IN+	Alarm Input 2 (Isolation)	Logic Input
6	ALARM2_IN-	Alarm Input 2 Return (Isolation)	
7	+5V	+5V Power supply output	+5V Power Supply (150mA)
8	ALARM_OUT2-	Alarm Output2-(Isolation)	Photo MOS Relay Contact
9	GND_ISO	Isolation Ground	

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

# **Chapter 7 Replacement Parts**

Periodic Replacement	7-1
To Check the Periodic Replacement Period	7-1
Disposing the Equipment	7-2



# **Chapter 7** Replacement Parts

# Periodic Replacement

To ensure reliability of safety, function, and performance of this equipment, the following parts must be replaced periodically.

When replacing, contact your nearest service representative.

#### **!** CAUTION

- · Replace the periodic replacement parts periodically as specified.
- This equipment 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.

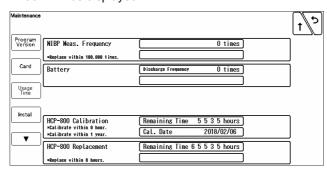
Periodic Replacement Parts	Periodic Replacement Period
DS-8100 Series Main Unit	
NIBP Unit	100,000 times of measurement or 6 years, whichever earlier
Lithium-Ion Battery Pack BTO-008	300 times of charge/discharge or 1 year of usage whichever earlier
HCP-810	
CO <sub>2</sub> Unit	30,000 hours

#### To Check the Periodic Replacement Period

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

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

▶ The "Usage Time" window will be displayed.



#### REFERENCE

- The usage period or NIBP measurement frequency for each part will be displayed.
- 2 After the part is replaced, press the [Reset] key.
  - ▶ The displayed value will reset.

#### **A** CAUTION

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

# Disposing the Equipment

#### **!** CAUTION

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

# **Chapter 8 Cleaning/Disinfecting/Storing**

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# Chapter 8 Cleaning/Disinfecting/Storing

## After Usage/Handling the Equipment

This section explains about how to handle the equipment.

#### After Using the Equipment

- When unplugging the cables, make sure to pull from the connector part of the cable and avoid applying excessive force.
- Clean the equipment, accessories, and cables, and keep them together in one place for next use.
- Always check for adequate supply of ECG electrodes, and other disposable accessories. If any shortage is found, contact your nearest service representative.

#### Display

- Due to its material characteristic, the touch panel expands/contracts depending on the temperature/humidity. When the touch panel is left unused for a while, or when the ambient temperature is low, the surface film of the touch panel may expand, but this is not an abnormal condition.
  - This expansion will be reduced in few hours or half a day after the power is turned ON.
- The surface of the touch panel is susceptible to scratches, therefore do not scratch or rub it using a hard item.

## Storing the Equipment and Recording Paper

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

#### Equipment

- Store in a place where the equipment will not be exposed to splashing water.
- Store in an area where the environmental conditions, such as atmospheric pressure, temperature, sunlight, dust, sodium, sulfur, will not adversely affect the system.
- Store in a level area where the equipment is not exposed to vibration and shock (including during transportation).
- Store in an area which meets the following environmental conditions.
  - Storage Temperature: -10°C to 60°C/14°F to 140°F
  - Storage Humidity: 10% to 95% (at 40°C/104°F, non-condensing)
  - Atmospheric Pressure: 80 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.



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

#### **Touch Panel**

Since the display panel of the DS-8100 System incorporates a touch panel, finger prints and other stains are likely to appear on the touch panel. Follow the procedure below to clean the touch panel while monitoring. For disinfecting procedure, refer to the next section, "Housing"...



- 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.).
- 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.
   (POperation 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.

- 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<sub>2</sub> 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.

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# **Chapter 9 Maintenance Check**

# Daily and Periodic Check

#### Maintenance Check

Periodic check must be performed. When reusing the equipment which was left unused for a while, always check that the equipment operates properly and safely before use.

In this section, the maintenance check items that must be performed for this equipment are explained. Make sure to perform "Daily Inspection" and "Periodic Inspection" 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.



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

#### ☐ Daily Check

Perform the daily check using the "Daily Check List". (Poperation Manual "Daily Check" P4-1)

#### 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.

# Handling and Storage of Lithium-Ion Battery Pack (BTO-008)

This section describes the handling and storage of the BTO-008 battery pack. Refer also to the BTO-008 Operation Manual.

#### ☐ Handling the Battery

- For uninterrupted monitoring, charge the battery when the battery level is low.
- When the battery operation time becomes short even after it is fully charged, the battery needs to be replaced.
- The battery should be charged at room temperature (10°C to 30°C/50°F to 86°F).
- The lithium-ion battery can only be charged in the specified operating temperatures of the equipment. Refer to the operation manual of the lithium-ion battery (BTO-008) for details.
- When using the battery for the first time, or using after leaving it for a while, make sure to charge the battery before use.

#### ☐ Storing

To take advantage of the characteristic of the battery pack, pay attention to the following when storing. Storage Temperature and Humidity for the Battery

• Store in an environment specified below without corrosive gas.

Storage Period	Storage Temperature	Storage Humidity
Within 30 days	-20°C to 60°C/-4°F to 140°F	
Within 90 days	-20°C to 45°C/-4°F to 113°F	20% to 85% (non-condensing)
Within 1 year	-20°C to 20°C/-4°F to 68°F	

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

#### ☐ Long-Term Storage

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

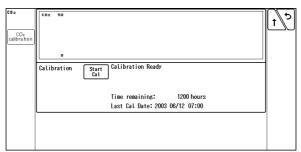
When storing the monitor for a long period, remove the battery from the monitor.

## CO<sub>2</sub> Calibration (HCP-810)

This section describes about the procedure of CO<sub>2</sub> gas calibration.

Perform calibration when 1 year has elapsed from the last calibration, or accumulated EtCO<sub>2</sub> measurement time exceeds 4,000 hours, or any measurement error is found.

Press the [Menu], [CO<sub>2</sub>] ("Parameter"), [CO<sub>2</sub> Calibration] to display the CO<sub>2</sub> calibration screen.



- 2 Press the [Start Cal] key and conduct calibration according to the displayed messages.
- 3 The message, <Feed CAL. GAS> will be displayed. Press the injection button and inject the calibration gas.
- 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**

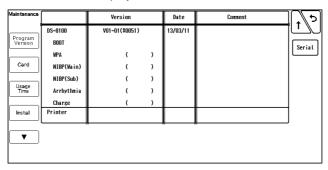
- Perform the calibration 5 minutes after turning ON the power on the HCP-810.
- Do not disconnect the sampling tube during calibration. If disconnected, calibration will cease.
- Conduct CO<sub>2</sub> calibration for the following case.
  - When the accumulated measurement time exceeds 1,200 hours from the first use.
     However, if the first calibration was performed before the accumulated measurement time reaches 720 hours, another calibration is required when the accumulated measurement time exceeds 1,200 hours from the first calibration.
  - When 12 months has elapsed or the accumulated measurement time has exceeded 4,000 hours from the previous calibration.
  - When EtCO<sub>2</sub> measurement is not stable or accuracy is degraded compared with other measuring device.
  - When the patient monitor was not used for a while, or when EtCO<sub>2</sub> was not measured for a while
  - When a message, "Calibrate the CO<sub>2</sub> unit (HCP-810)" or "The periodic calibration of the CO<sub>2</sub> unit (HCP-810) is approaching" is displayed at power ON.
- Dispose of calibration gas according to the regulation of each medical institution.

## **Program Version**

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

Press the [Menu], [Maintenance] keys.

▶ The software version screen will be displayed.



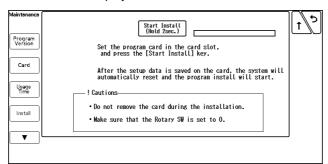
- ▶ The software version, boot version, date, comment required for the DS-8100 System system will be displayed.
- DS-8100 Main Unit Software
- HR-810 Recorder Unit Software
- Recorder/Expansion Port Unit HR-811
- ▶ [Serial]: The information of the equipment connected to the serial connector of the main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

#### Software Install

The software can be updated on the install screen.

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

▶ The software install screen will be displayed.



#### NOTE

Users cannot perform the software update process.
 Contact our service representative.

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