DYNASCOPE 1000 Series

Central Monitor

DS-1800 System

Ver. 03

Maintenance Manual

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

FUKUDA DENSHI

This manual is for the DS-1800 System Version 03.

⚠ 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 device.
- The information contained in this document is subject to change without notice due to improvement in the device.

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

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Preface

Introduction

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

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

Important Notice

For Safe Operation of the Device

(1) Before using this device, 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 device, 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 device, follow the respective regulation to minimize the probability of accidents.

Intended Use of this Device

This device is designed for the following intended use.

Intended Use

This device is a central monitor to monitor the conditions of the patients. It deals with the following vital sign parameters, which are measured and transmitted by the specified bedside monitors and /or the telemeters for use in combination.
The vital signs are electrocardiogram, heart rate, respiration rate, body temperature, arterial oxygen saturation (SpO_2), pulse rate, invasive blood pressure, non-invasive blood pressure, CO_2 concentration, O_2 concentration and anesthetic gas concentration (including N_2O, halothane, isoflurane, enflurane, sevoflurane and desflurane).

REFERENCE

- For the specifications and limit range details of this device, refer to "Chapter 17 Specification" of this Operation Manual.

WARNING

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

of possible hazards and measures to avoid those hazards. Any local regulations that are applicable to operation and care of this device must also be followed. The following hazards may occur if this device is used for any purpose other than what is intended, or if the user does not follow proper safety protocols.
*Hazard to the Life and Health of the Patient or the User
*A Problem Related to Medical Practice
*Damage to the Device

Copyright

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(2) This manual includes the description for the optional devices that can be connected.

(3) The illustration in this manual may differ with the actual device.

(4) If you lose or damage this manual, contact your nearest sales representative. Using the device without this manual may cause accidents.

(5) When handing over this device, 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 device 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-1800 System is available from your local Fukuda Denshi sales representative.

Contact

If you need more detailed information or information about security risk, please contact following.

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- If a serious incident has occurred in relation to this device, please report it to the manufacturer and to the competent authority of the country where the user and/or the patient is established.
- In case you need the contact information for your national competent authority, please ask the manufacturer or the distributor from whom you purchased the device.

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 device.
NOTE	"Note" is used to emphasize important information.
REFERENCE	"Reference" is used to provide useful information.
☞	Indicates the reference page for the procedure and precaution.
*	Used in a table which indicates that there is detailed explanation outside the table.

❑Indications for the Screens and Keys

The keys displayed on the monitor screen are indicated by [ ].
(Ex.: [Menu], [Home] etc.)

Other indications on the monitor screen are indicated by " ".
(Ex: "Patient Name", "Filter Mode", etc.)

The titles displayed on the monitor screen are indicated by " ".
(Ex: "Admit/Discharge" screen, "Parameter Setup" screen, etc.)

The messages displayed on the screen are indicated by < >.
(Ex: <Searching>, <Alarm Suspend>, etc.)

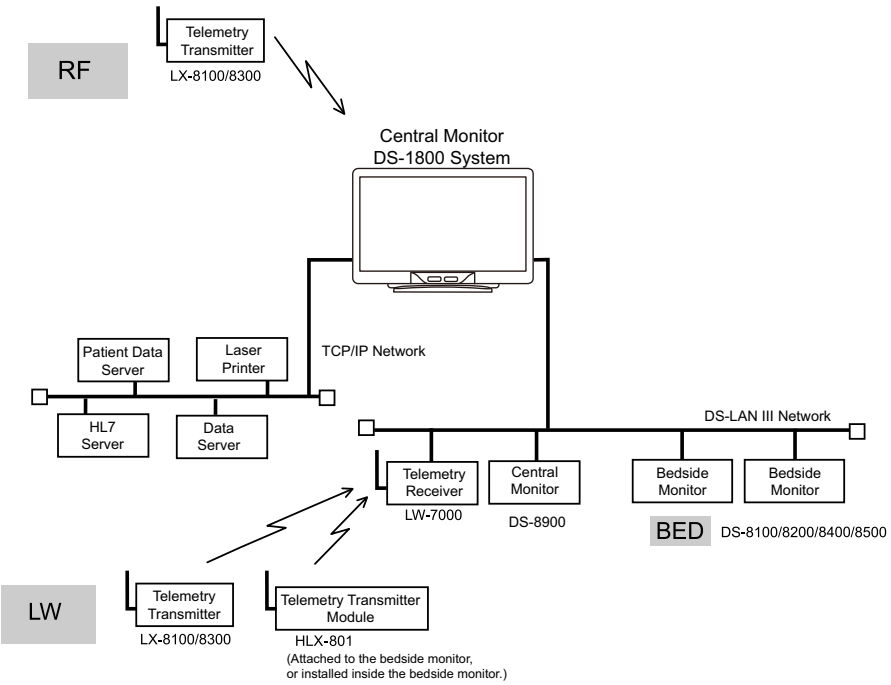
❑Restriction of the Function

Various network system such as wired and wireless network can be constructed with this device.

Some display and setups on this system are restricted depending on the system construction.

To explain these restrictions in a easy way to understand, the following expressions are used in this operation manual.

General Term	Expression		Description
Wireless Network Bed	RF Bed		The data is received by the built-in telemetry module in this device. Waveforms and numeric data can be displayed. Monitoring control from this device is not possible,
		LX+RF Bed	RF bed received from the LX series transmitter
		HLX+RF Bed	RF bed received from the HLX series transmitter
Wired Network Bed	DS-LAN Bed		Bedside monitor connected to the wired network The monitoring data is received through the wired network (DS-LAN III). Monitoring control is not possible on this device.
	LW Bed		Network Telemetry Bed The monitoring data is received by the telemetry receiver which is then received by this device through the wired network (DS-LANIII). Monitoring control from this device is not possible.
		LX+LW Bed	LW bed receiving data from the LX series transmitter
		HLX+LW Bed	LW bed receiving data from the HLX series transmitter



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, EMC
1. General Description	Composition, features, operation flow
2. Name of Parts and Their Functions	Name and function of each part
3. Description of the Display	Information shown in the home display and individual bed display
4. Basic Operation	Basic operation procedure of home display and menu window, descriptions of menu functions
5. Preparation	Installing the paper, turning ON/OFF the power, time/date setting, maintenance check items
6. Admit/Discharge	Entering patient information (name, age, etc.) at admittance, discharging the patient, suspend monitoring, etc.
7. Alarm Function	General description of alarm function, alarm-related setups
8. Parameter Setup	Measurement condition setup of the monitoring parameters, size/scale setup, etc.
9. Data Review	Graphic trend, tabular trend, recall
10. Waveform Review	Full disclosure waveform
11.Calculation	Procedure of hemodynamics calculation
12. Printing	Printing functions on the printers
13. Menu Items	Settings of the display configuration, tone/volume, color, etc.
14. Troubleshooting	Maintenance and troubleshooting
15. Setup Item/Default Value	Setup item and default value
16. System Components	List of system components
17. Specification	Specification and performance of the device

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, EMC
1. Installation of the Unit	Starting up the system, keyboard/mouse setup, extended display unit connection
2. System Construction	Network restrictions, network connection and setup
3. Using the Storage Media	Procedure to use the storage media
4. Connection to the External Devices	Procedure to use the EMR, nurse call system, magnetic card reader, barcode reader
5. Initial Settings	Settings necessary before monitoring
6. Setup Item/Default Value	Default and backup of setup items
7. Replacing/Disposing the Parts	Precautions about the periodic replacement parts
8. Cleaning/Disinfecting/Storing	Procedure to handle, clean, store this device
9. Maintenance Check	Daily and periodic checks, maintenance, LAN information, software version, etc.

System Construction and Installation

WARNING

- The installation of this device should be performed by our service representative. The users should not attempt it.
- The system construction and network setup of this device should be performed by our service representative or system administrator of your institution.
  (☞Maintenance Manual "Installation of the Unit" P1-1)
  (☞Maintenance Manual "System Construction" P2-1)
- Verify that the initial settings are properly set before monitoring.
  (☞Maintenance Manual "Initial Settings" P5-1)

Safety

About the Safety Precautions

The Meaning of Each Safety Precaution

Read this manual thoroughly before use to ensure correct and safe use of the product.
Be sure to follow the precautions indicated below, as these are important messages related to safety.

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

Graphic Symbols

The following symbols are used for this device.

Graphic Symbols	Description
	Protective Earth Indicates the protective earth inside the device.
	Alternating Current (Power Supply LED)
	In Operation Indicates that the device is in normal operation status.
	Standby Mode Indicates that the device is in standby mode.
	Follow operating instructions (Warning). Indicated in blue. Failure to follow operating instructions could place the patient or operator at risk.
	Follow operating instructions (Information). Indicates the need to refer to the related accompanying documents before operation.
	TCP/IP Network Connector Connects to TCP/IP network.
	Video Output Connector Connects to external monitor.
	Battery Part Indicates the part to install the battery pack. LED Part Indicates the battery status LED.
	Antenna Terminal Indicates the terminal to connect the antenna.
	Signal Input/Output Indicates the connector which inputs/outputs the signals.
	USB Connector Indicates the USB connector.

Precautions for Safe Operation

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

Precautions for Safe Operation of Medical Device

⚠ CAUTION

- User should have a thorough knowledge of the operation before using the device.

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

- Set the monitor to the user's intended position where the user can easily recognize the visual and audible monitoring conditions. Normally it is recommended to set at a distance of one (1) m from the user.
- Install or store in a place where the device will not be exposed to splashing water.
- Install or store in an area where environmental conditions such as atmospheric pressure, temperature, humidity, ventilation, sunlight, dust, sodium, and sulfur will not adversely affect the system.
- Place the device 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.

❑Precautions Before Using the Device

- Verify the power voltage. When operating the system with the battery pack, make sure that the battery pack is fully charged.
- Check the cable connection and polarity to ensure proper operation of the device.
- Make sure the power system has adequate earth ground.
- Ensure that all cables are firmly and safely connected.
- Pay special attention when the device is used in conjunction with other devices as it may cause erroneous judgment and dangerous situation.

❑Precautions during Operation of the Device

- Always observe the device and patient to ensure safe operation.
- If any abnormality is found on the device or with the patient, take appropriate measures under the safe conditions, such as ceasing operation of the device.
- Do not allow the patient to come in contact with the device.
- Do not assess the patient's condition only by the information from this device. A clinical judgment based on the information from this device should be made by a physician who fully understands functions of the device, in a comprehensive manner combined with clinical findings and other test results.

❑Precautions After Using the Device

- 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 device clean to ensure proper operation for the next use.

❑Precaution when Device Failure Occurs

- If the device is damaged and in need of repair, the user should not attempt service. Label the unit "OUT OF ORDER" and contact your nearest service representative.

❑Precaution about Disassembling/Remodeling the Device

- Do not disassemble or remodel the device.

❑Precautions about Maintenance Check

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

Maintenance

⚠ WARNING

- Never open the housing while the device 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 device, 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 device was subjected to extreme mechanical stress, e.g. after a heavy fall.
  - When the device was subjected to liquid spill.
  - When the monitoring function is interrupted or disturbed.
  - When parts of the device 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 device.
- When laying receiver antenna for each transmitter, the Institution has to examine the installation so that electronic interference does not occur.
- Based on the above examination result, the Institution should place each receiver antenna as required.

⚠ CAUTION Precautions about the Management

- The institution appoints a person to manage the wireless channels for the whole medical institution. And when using telemetry which requires zone location, the Institution should nominate a person to manage the wireless channels in each zone (a "Coordinator"). However, when using such telemetry in a local medical institution, one person can perform both functions.
- Select a telemetry coordinator who understands the characteristics and functionality of telemetry systems, and is skilled in operating telemetry.
- When installing telemetry, the Coordinators have to understand the precautions for use of the telemetry in advance.
- The Coordinator takes responsibility of wireless channel management and transmitter storage for the whole Institution by giving proper instruction.
- The Coordinator should create a management log (hereinafter referred to as the "log"), which contains a list of the management status of the wireless channels for the whole Institution. When changing a wireless channel, register it in the log and give proper instructions to the user.
- The Coordinator assumes responsibility for managing the wireless channels, storing, and managing telemetry.
- The Coordinator assigns the transmitter to the user, and provides enough education for use inside the zone.
- The telemetry user verifies operation of the transmitter/receiver before use.
- The telemetry user, if using the telemetry in a zone location, follows the instructions of the Coordinator for the zone and gives instructions to the patient if required.
- When interference or breakdown occurs in telemetry communication, the user is required to inform the Coordinators of the problems. The Coordinators are to deal with the problem properly and/or contact their nearest Fukuda Denshi representative for service.

Precautions when Using with Other Device

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 device in the presence of flammable anesthetics, high concentration of oxygen, or inside hyperbaric chamber. Also, do not operate the device 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.

MRI (Magnetic Resonance Imaging)

⚠ WARNING

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

- Do not use this device in magnetic resonance imaging (MRI) environments.
- When conducting MRI test, remove the electrodes and sensors connected to the patient (test subject).
  This device 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 device.
  For details, refer to the operation manual for the MRI testing device.

Precautions for Using the Device

This System

⚠ WARNING

- Do not connect any device or cable not authorized by Fukuda Denshi to any I/O connector. Also, do not connect any damaged device or cable. If done so by mistake, not only that the device cannot deliver its maximum performance, the device may be damaged and safety cannot be ensured.
- For the connector with mark, only the peripheral devices specified by Fukuda Denshi should be connected with the given procedure on the operation manual. Use of an unspecified device may cause electric shock to the patient and/or operator due to excessive leakage current.
- If the device is used under an environment not fulfilling the specified condition, not only that the device cannot

deliver its maximum performance, the device may be damaged and safety cannot be ensured.

- When using multiple medical devices simultaneously, pay attention not to touch multiple devices at the same time. Even a small potential difference between the devices may result in electric shock to the patient and the operator.
  Even a small potential difference may result in electric shock to the patient and the operator.
- 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 of 115 V AC. When connecting, do not use a multiple portable socket-outlet.
- The PHS nurse call system should be used as supplementary function of alarm notification. Make sure to monitor the alarm on this device as it may not be notified to the PHS depending on the nurse call system condition.
- When using the PHS nurse call system, make sure to set the "Bed Name" as it will be used for alarm notification to the PHS. If the "Bed Name" is not set, the patient cannot be specified on the nurse call system.
- The pacemaker usage setting influences the precision of the QRS detection and arrhythmia analysis. When a pacemaker is used, make sure to select [Used] for "Pacemaker" under "Admit/Discharge" menu.
- The patient classification selection influences the precision of the QRS detection and NIBP measurement range. Make sure that correct selection is made.
- The SpO_2 respiration measurement is not intended for use as an APNEA monitor.
- When [Suspend] is selected for "Setup at Discharge" (Initial Settings > User I/F), the suspend condition on this device will continue until the [Resume] key is pressed, even if the monitoring is performed on the bedside monitor.
- If a low battery condition occurs for the battery operating bedside monitor or telemetry transmitter, the waveforms and numeric data for the corresponding bed will not be displayed.
  For the telemetry transmitter and wireless bedside monitor, "Check Battery" mark and a square waveform will be displayed to warn the low battery condition. But for the wired network bedside monitor, <Chk DS-LAN Comm> message will be displayed without prior warning. Therefore, the wired network bedside monitor should be operated by AC power source and not by battery. For the telemetry transmitter and wireless bedside monitor, make sure that "Check Battery" mark is not displayed.
- Objective and constant arrhythmia detection is possible through the fixed algorithm. 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.
- If the QRS pace mask function is set to [OFF], the pace pulse may be erroneously detected as a QRS complex, and even when the patient’s HR is decreasing, HR or asystole alarms may not generate. Turn this function [OFF] only if you are sure that pacing failure will not occur, or when the patient can be constantly monitored.
- The operation cannot be guaranteed if connected to improper network. To change the network settings, refer to your nearest service representative. When connecting to an existing network, follow the instruction of the network administrator.
- Make sure not to duplicate the IP address for DS-1800 System, laser printer, and the server.
- As this system does not support DHCP (Dynamic Host Configuration Protocol) IP address, set the IP address excluded at DHCP if DHCP server is present.
- When a network setting is changed and [Regist] key is pressed, a warning message will be displayed. All the operation controls will not be possible until the system is restarted.

⚠ WARNING Warnings about the Alarm

- The ventilator alarm on this monitor should be used as supplementary function. Check the patient's condition, ventilator alarm sound and message occasionally.
- Depending on the bedside monitor type and software version, the ventilator alarm factor may not be transmitted

to the central monitor.
For details of the bedside monitor type and software version, refer to your nearest service representative.

- If the upper/lower alarm limit of the individual parameter is set to OFF, alarm will not generate even if the individual parameter alarm is set to ON. Pay attention when setting them OFF.
- During monitor suspend condition or alarm suspend condition, all the alarms will not generate even if the parameter alarm is set to ON. Also, the alarms will not be stored as recall events. Check the patient's condition frequently.
- If [Displayed Data] is selected for "Numeric Data External Output" on the bedside monitor, the alarm for the parameter which is not displayed on the bedside monitor will not generate on the central monitor.
  Make sure to display the parameter on the bedside monitor if alarm monitoring on the central monitor is required for that parameter.
- When a parameter monitored on a bedside monitor or telemetry transmitter is in a connector-off condition, the numeric data and waveform for that parameter will not be displayed on the central monitor. Also, alarms other than <SpO_2 Disconnected> will not be displayed. Make sure that all the connectors are firmly plugged in.
- If the parameter is not selected for the "HR/PR Alarm Source" (ECG/SpO_2/BP) on wired bedside monitor, the alarm for that parameter will be set to OFF on this device.
- When <Chk TLM Receive> or <Chk DS-LAN Comm> is displayed, alarm will not function.
- If "Alarm Judgment" under [Initial Settings > Alarm > During Lead OFF] is set to [OFF], HR alarm and arrhythmia alarm will not generate at lead-off condition. 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.
- Some delay may occur until the alarm generated on the bedside monitor is displayed on the central monitor.
- The alarm generation will differ depending on the communication specification (wired, wireless, etc.) between the bedside monitors, telemetry transmitters and the central monitors. Read the operation manual thoroughly before setting the alarm.
- Do not assess the patient's condition only by the alarm generated on this device. If the alarm is set to OFF or if low priority is set for the alarm, the alarm condition of the patient may not be noticed.
- If an alarm generates, check the patient's condition first and ensure the safety. Depending on the alarm, take appropriate measures to remove the problem. If the problem lies with the alarm setting, set the alarm properly.
- During monitoring, set the alarm volume according to the surrounding environment so that the alarm sound can be always recognized.

⚠ CAUTION

- Use only the products specified for this device. If unspecified products are used, proper function cannot be executed.
- For quality improvement, specifications are subject to change without prior notice.
- The maintenance and internal switch setting will be performed by our service representative. Users should not perform this procedure as malfunction of the device may occur.
- Do not attach film or adhesive tape to the touch panel. This may result in malfunction or failure.
- As the touch panel is made of glass, a strong impact may cause damage. Pay attention not to hit or drop the touch panel.
- Always operate the touch panel with fingers. Do not touch with a pen-point or other hard-edged instruments. It may cause malfunction or damage the touch panel. Do not apply pressure for a prolonged time to any part of the panel.
- Do not press the touch panel with strength or twist your finger on the panel. This may result in malfunction or failure.
- The LCD of this device utilizes LED for the backlight. Since this LED deteriorates by the life cycle, the display may become dark, scintillate, or may not light by the long term use. In such case, contact your nearest service representative.
- Although the LCD utilizes highly accurate picture elements, occasionally, there may be few pixels which does

not light or constantly lights. This is not an device failure and will not affect monitoring operation.

- If a still image is displayed for a long time, a minor afterimage may occur. This is a normal operation of the LCD of this device. If the afterimage affects the visibility, contact your nearest service representative.
- The installation of this device should be performed by our service representative or a person who is well acquainted with this device.
- If not using the device for a long period, disconnect the power cable and battery.
- The battery can be charged only in the specified operational temperatures of the device. For details, refer to the operation manual of the battery (BTO-005).

⚠ CAUTION Precautions about the System

- The time will be synchronized with the following priority.
  1 Administrating monitor, if wired network is constructed.
  2 SNTP server, if used.
  3 Patient data server, if used, and if [Time Synchronization] is selected on Patient Data Server setup or "Time Synchronization" is set to [ON] for [Link with EMR] or [Search ID].
- Verify that the correct date and time is set before monitoring. If not correct, set the correct date and time under [Initial Settings>System>Other]. If the date/time is changed during monitoring, inconsistency of time may appear on the trend data or other patient data.
- Many of the initial settings items can be set only on the network-administrating monitor (Central ID: 001). Such initial settings items will not be displayed on other monitors.
- Canceling the bed registration will clear all data for that bed.
- The drift filter setting should be the same for all central monitors. Proper operation will not be performed if the setting is different among the central monitors.
- Unless the correct power frequency is set for "AC Filter" under [Initial Settings > System], the AC filter will not properly function.
- Do not use any slave monitors which does not satisfy the required display resolution. Do not use any monitors which has the function to display higher resolution than the actual resolution.

⚠ CAUTION Precautions about the Storage Media (SD Card, USB Memory), Data Transfer

- Use only the storage media specified by Fukuda Denshi.
- Use only the storage media formatted on this device.
- To avoid losing the data saved in the storage media, set to standby mode before turning OFF the power.
- The data transfer using the storage media is possible only between the DS-1800 System central monitors. The data cannot be transferred to other central monitors or to bedside monitors.
- If the software version of the DS-1800 System central monitors are different, the data transfer may not be possible, or part of the data may not be transferred. (The data transfer from the newer version monitor to the older version monitor is not possible.)

⚠ CAUTION Precautions about the Patient Admit/Discharge

- Make sure to discharge the previous patient before admitting a new patient. Otherwise, monitoring data of new patient will be added to that of the previous patient which will result in inaccurate monitoring.
  When a patient is discharged, make sure to perform the discharge procedure.
- Depending on the model type and software version of the bedside monitor, the monitor suspend operation will synchronize between the bedside monitor and the central monitor. If the bedside monitor is not compatible to synchronizing the monitor suspend operation, the data of the monitoring suspended patient on the central monitor will not be displayed. If the monitoring is resumed, the data on the central monitor will be displayed again.
- To display the pacemaker pulse, select [Used] under "Admit/Discharge" menu, and select [ON] or [Distinct

Color] under "ECG Setup" menu. It is also necessary to select [Used] for pacemaker on the bedside monitor in order to display pacemaker pulse on the DS-1800 System central monitor.

- When a patient ID is searched from the patient data server, admit operation should be performed with the patient information acquired from the patient data server. Also, Bed ID of the bedside monitor should not be changed during monitoring.
- When the monitoring is suspended, the trend data and full disclosure waveform data will not be acquired.
- Resuming monitoring will also resume the suspended alarm.
- When a bed transfer procedure is performed, all setup data for the new bed will be updated.
  The data for the wired network bed and the same data monitored on other central monitors will be initialized.
- Bed transfer/exchange of monitoring data is not possible among different central monitors.
- When the discharge process is performed on the bedside monitor or other central monitors, the monitoring on this device will not be suspended even if [Suspend] is selected for "Setup at Discharge" under [Initial Settings > User I/F > Display/Print].
- When EMR link function is used, the patient admitted on EMR will be also admitted on the central monitor. But it is also necessary to perform admit process for this patient on the central monitor as some items may not be transmitted.
  Make sure that the pacemaker usage and patient classification are properly set as these will affect the monitoring accuracy.
- The discharge process on EMR will initialize only the patient information and monitoring data on the central monitor. It will not initialize the alarm settings. To initialize these data, it is necessary to perform discharge process on the central monitor.

⚠ CAUTION Precautions about the Parameter Monitoring

- The parameters that can be monitored on this device differs depending on the bedside monitor type and software version.

⚠ CAUTION Precautions about the Alarm Setup

- The adjustable alarm limit increments are different for the DS-7000 series, DS-8000 series, and DS-1000 series monitors. Therefore, the set alarm limit may change to the adjustable value depending on the monitor type constructing the network system.
- The alarm messages will be displayed in descending order of priority.
- For the same alarm level, the alarm message for the newer alarm will be displayed. However, arrhythmia alarm will be displayed according to their priority.
- The alarm message for the arrhythmia alarm (except Tachy, Brady, Ext Tachy, Ext Brady) will continue to be displayed for 30 seconds even after the alarm condition dissolves.
- Even during arrhythmia learning, alarms for HR, Asystole, VF, Tachy, Brady, Ext Tachy, Ext Brady, Pause will generate.
- Even when the <Cannot analyze> alarm is generated, alarms for HR, Asystole, VF, Tachy, Brady, Ext Tachy, Ext Brady will generate.
- If "Suspend Arrhy. Analysis during Noise Interference" is set to [ON] under [Initial Settings > Alarm Setup], the <Cannot analyze> alarm will generate when analysis is suspended for 30 seconds and longer.
- Depending on the bedside monitor type and software version, BP7, BP8, TEMP3–8, SpMet, SpCO, SpHb alarm will not be generated on the central monitor.
- If the same or similar devices with different alarm settings are used in the same facility or same department, pay attention not to misjudge the alarms.

⚠ CAUTION Precautions about the PHS Nurse Call System

- When connecting multiple central monitors to one nurse call system, LAN adapter is required. When using the LAN adapter, contact your nearest service representative.
- Perform nurse call daily check and make sure that alarm is properly notified to the nurse call system.

⚠ CAUTION Precautions about the TCP/IP Network

- Make sure to power cycle the printer after setting the IP address, etc. for the laser printer.

⚠ 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 device frequently so stains can be removed easily.
- To prevent injury, it is recommended to wear gloves when cleaning the device.
- Pay attention not to allow chemical solution to enter the device or connectors.
- Do not use organic solvents, thinner, toluene or benzene to avoid damaging the resin case.
- Do not polish the device with abrasive or chemical cleaner.
- When disinfecting the entire room using a spray solution, pay close attention not to get any solution into the device or connectors.
- Use only neutral detergent to clean the device. The surface resin coating may damage, resulting in discoloration, scratches, and malfunction.
  Example:
  chemical cloth, scrub brush, abrasive, polishing powder, hot water, volatile solvent and chemicals (cleanser, thinner, benzine, benzol, and synthetic detergent for house and furniture), or sharp-edged tools
- Do not open the housing.
- Do not allow alcohol or other liquids to enter the device.
- Replace the periodic replacement parts periodically as specified.

Wired Network System

⚠ WARNING

- Do not connect unspecified device to the wired network.
- This device cannot connect to the DS-LANII network.
- For the DS-LANIII network, use the specified HUB. If unspecified HUB is used, a communication error may occur.

⚠ CAUTION

- The DS-5000 series bedside monitors, LW-5500N Telemetry Receiver, and AU-5500N 8ch Recorder are not compatible with the DS-LANIII network.
- The central monitor with the Central ID, "001" will function as a network-administrating monitor, and controls the whole LAN system. One of the central monitors must have the Central ID, "001" in a network system. Also, make sure not to duplicate the Central ID with other monitors.
- The alarm generated on the bedside monitor will be transmitted to the central monitor with maximum of 5 seconds delay for the NIBP alarm and maximum of 2 seconds delay for other alarms.
- If the measurement unit for BP (mmHg/kPa) and temperature (°C/°F) is different between the bedside monitor and the central monitor, the corresponding waveform and numeric data will not be displayed on the central monitor.
- If the numeric data is displayed as "xxx" (out of measurement range) on the bedside monitor, maximum or minimum value of measurable range will be transmitted to the central monitor.

Wireless Network System

⚠ DANGER

- When monitoring a patient with wireless telemetry, make sure the patient data is properly received at the central monitor. Pay special attention when channel ID at the bedside monitor is changed.

⚠ WARNING

- Make sure to set the correct 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.
- 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.
- If the channel ID of the transmitter is changed, make sure to replace the channel label attached to the transmitter with a new one.
- If the channel ID is changed without notifying, it will result in monitoring an incorrect patient. To avoid incorrect diagnosis, make sure that the channel ID corresponds to the patient.

RTC and Data Backup

⚠ CAUTION

- This device is equipped with a built-in clock. When the power of this device is turned OFF, this clock is backed up by a lithium 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.
- During voltage dip, short interruptions and voltage variations on power supply input lines or during short duration of power turned OFF, the data will not be protected. The data that may not be protected are NIBP list data and alarm history. Maximum of 15 minutes of data before power-off may be lost for the trend data, recall data, full disclosure waveform data, ST data, hemodynamics data. To prepare for the possibility of voltage dip, short interruptions and voltage variations, it is recommended to equip battery pack (optional) on this device.
- The set alarm limits on this device will be retained even after the power is turned OFF.

Cables

⚠ CAUTION

- When disconnecting the cables, pull on the connector and not on the cable itself. For cable with a lock tab, push the tab when disconnecting. Pull the connector straight so the connector pins do not bend. When attaching the cables to each other, both connectors should be directly facing each other.

Precautions regarding Peripheral Devices and Accessories

Connection to Peripheral Device

To use the device safely and to ensure maximum performance of the device, connection of other manufacturer's device to this device 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 device.

When connecting peripheral devices to this device, it is the user's responsibility to verify that the overall system complies with "ES60601-1 Clause 16 "ME SYSTEMS"".

⚠ WARNING

- For the connector with mark, only the peripheral devices specified by Fukuda Denshi should be connected with the given procedure on the operation manual. Use of an unspecified device may cause electric shock to the patient and/or operator due to excessive leakage current.

⚠ CAUTION

- Adjust, clean, disinfect the connected devices according to the instructions in their respective manuals.
- Do not sterilize the connected devices.
- Do not touch the connected devices and the patients at the same time.
- For environmental conditions for using and storing the connected device and ME system, refer to the respective manuals of the device.

Fuse

⚠ DANGER

- If the fuse blows, contact Fukuda Denshi service representative. Do not continue using it as internal damage to the device may be considered.

Accessories

⚠ WARNING

- Use only the cables specified by Fukuda Denshi.
  Use of other cables may result in increase in emission or decrease in immunity.

Recording Paper

⚠ CAUTION Precautions about the Recording Paper

- Use only the specified recording paper. The surface treatment and thickness of the recording paper affects the printing quality.

⚠ CAUTION Storing the 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 superpose the papers until the diazo copy is completely dried.
- Do not expose the paper to alcohol, hydrochloric acid, or ester ketone.
- Avoid using adhesive agents other than water based glue.

Precautions about Disposing of the Device, Accessories, or Components

⚠ CAUTION

- When disposing of this device, 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 the DS-1800 System, pack it with specified packing materials. Also, transport it under appropriate environment condition. (☞"Specification" P17-1)

To Prepare for Emergency Use

Battery Pack

- Even if the battery pack is not in use, the remaining capacity decreases due to self-discharge. Make sure to verify periodically that the battery pack is fully charged
- To fully charge the empty battery pack, it will take approximately 5 hours during operation, and approximately 2.5 hours during standby mode with AC cable 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

This equipment complies with IEC 60601-1-2: 2014, safety standard regarding the electromagnetic disturbances of medical electrical equipment. To ensure maximum performance against the electromagnetic disturbances, make sure to follow the precautions for installation and usage described in this manual.

- This equipment is intended for use in the medical facility (except in the vicinity of MRI device), and satisfies the immunity level for professional healthcare facility environment stipulated in IEC 60601-1-2: 2014.
- When using this equipment, interference with other medical electrical equipments or non-medical electrical equipments may occur. Make sure that no interference is present before usage.
- This equipment is a ME equipment which intentionally receives RF energy of specific reception frequency. RF electromagnetic radiation from other equipment for the intended specific reception frequency band may cause radio interference. Make sure that the reception is properly made in the used environment.
- To ensure basic safety and essential performance related to electromagnetic disturbances during the expected service life of this equipment, "Daily Check" and "Periodic Check" must be performed.
  (Refer to "Chapter 9 Maintenance Check" of the Maintenance Manual.)

Precautions for Safe Operation under Electromagnetic Influence

If any sorts of electromagnetic wave, magnetic field, or static electricity exist around the device, noise interference or malfunction of the device may occur. If any unintended malfunction or noise occurs during monitoring, check the magnetic influence and take appropriate countermeasures.

The following are examples of the common cause and countermeasures.

⚠ DANGER Static Electricity

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

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

⚠ WARNING Cellular Phone

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

⚠ WARNING Lightning

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

- Use the uninterruptible power supply system.

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

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

⚠ WARNING

- 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.
- Use of accessories, probes, or cables other than specified may cause increase in electromagnetic emission or decrease in electromagnetic immunity resulting in malfunction of the equipment.
- The portable RF communications equipment (including antenna cable and peripheral equipment such as external antenna) with the specified cable should be used in a location at least 30 cm apart from any part of this equipment. Otherwise, it may result in performance degradation of this equipment.

EMC Guidance

This equipment complies with IEC 60601-1-2: 2014. 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-1800 System is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-1800 System should assure that it is used in such an environment.

Emission Test	Compliance
Mains Terminal Disturbance Voltage CISPR 11	Group 1 Class A
Electromagnetic Radiation Disturbance CISPR 11	Group 1 Class A

⚠ CAUTION

- The emission performance of this equipment is suitable for use in industrial environment and hospital environment (CISPR 11 Group 1 Class A). Do not use in home environment (generally, CISPR 11 Group 1 Class B is required).

❑Compliance to the Electromagnetic Immunity

The DS-1800 System is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-1800 System should assure that it is used in such an environment.

Basic EMC Standard or Test Method	Immunity Test Levels
Electrostatic Discharge (ESD) IEC 61000-4-2	±8 kV contact ±2 kV, ±4 kV, ±8 kV, ±15 kV air
Radiated RF EM Fields IEC 61000-4-3	3 V/m 80 MHz to 2.7 GHz 1 kHz 80%AM
Proximity fields from RF wireless communications equipment IEC 61000-4-3	Refer to the following table.
Electrical fast transient/burst IEC 61000-4-4	±2 kV AC Mains ±1 kV Signal and Interconnecting Cables Repetition rate: 100 kHz
Surge IEC 61000-4-5	±0.5 kV, ±1 kV Normal mode (Phase 0°, 90°, 180°, 270°) ±0.5 kV, ±1 kV, ±2 kV Common mode (Phase 0°, 90°, 180°, 270°)
Conducted disturbances induced by RF fields IEC 61000-4-6	3 V 0.15 MHz to 80 MHz 1 kHz 80%AM 6 V 0.15 MHz to 80 MHz (ISM bands) 1 kHz 80%AM
Rated power frequency magnetic fields IEC 61000-4-8	30 A/m 50 Hz and 60 Hz
Voltage dips, short interruptions and voltage variations on power IEC 61000-4-11	0% UT; 0.5 cycles (Phase 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°) 0% UT; 1 cycle, 70% UT; 25 cycles (60 Hz) (Phase 0°) 0% UT; 250 cycles (60 Hz) with battery

Immunity test specifications for RF wireless communications equipment

Test Frequency (MHz)	Modulation	Immunity Test Level (V/m)
710, 745, 780	PM, 217 Hz	9
810, 870, 930	PM, 18 Hz	28
1720, 1845, 1970	PM, 217 Hz	28
2450	PM, 217 Hz	28
5240, 5500, 5785	PM, 217 Hz	9

- The assumed service TETRA 400 of the test frequency of 385 MHz is a service in Europe, and this product, which is intended for use in the United States, has not been tested as it will not be radiated in close proximity.
- The assumed service GMRS 460, FRS 4600 of the test frequency of 450 MHz is a wireless device for general and leisure use, and this product, which is intended for use in a professional healthcare facility environment, has not been tested as it will not be radiated in close proximity.

Telemetry Precautions

For proper management of the telemetry installation, consult your Fukuda Denshi representative concerning the following.

- Plan the installation of your telemetry system, taking into account your entire medical facility needs and plant requirements.
- Be sure the antenna system installed meets the facility and plant requirements.

⚠ WARNING

- The Radio Frequency device is susceptible to interference from other outside sources. Interference may prevent the monitoring of patients connected to this device. If problems exist, contact your local service representative.
  - Note: This device operates in the 600MHz UHF band. The exact frequency of operation depends on the destination, and has been preset for your facility, and may be identified by cross-referencing the channel designator on the device with the Telemetry Channel-Frequency Table in the transmitter operating manual.

⚠ CAUTION

- The manufacturers, installers and users of WMTS equipment are cautioned that operation of this equipment could result in harmful interference to other nearby medical devices.
- Users are advised to periodically contact the FCC or specified frequency coordinator and determine if your transmitter frequencies may cause interference.
- To assure safe and reliable operation, observe the following precautions:
  - Be sure that no other devices are using the frequency assigned to this transmitter.
  - This device is susceptible to interference from electrosurgical knives and other computerized equipment. If problems occur, contact your local Fukuda Denshi service representative.
  - Any obstruction such as reinforced concrete or large metallic surfaces between the receiver and the transmitter can affect reception. If problems occur, contact your local Fukuda Denshi service representative.
  - When a low battery alarm occurs, replace the battery in the transmitter.

Declaration of Conformity

Device: Central Monitor
Model Name: DS-1800

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
1) This device may not cause harmful interference.
2) This device must accept any interference received, including interference that may cause undesired operation.

The responsible party for this device is:

Fukuda Denshi USA, Inc.
17725-C NE 65th Street
Redmond, WA 98052
Phone: (425) 881-7737, US Agent

WARNING

- Changes or modification not approved by the responsible party for compliance of this device could void the user's authority to operate the equipment.

Chapter 1 Installation of the Unit

Precautions for Installing the Device

WARNING

- The installation of this unit will be performed by our service representative. Users should not attempt it.
- The system construction and network setup of this device should be performed by our service representative or system administrator of your institution.
- Install this device in a place where power supply cable can be easily disconnected.
- If any abnormality is found on the device, immediately turn OFF the power, and disconnect the power supply cable from the outlet.

Operating Environment

- The following environmental conditions should be observed when using the device.
  - Surrounding Temperature: 10°C to 40°C
  - Relative Humidity: 30% to 85% (non-condensing)
  - Atmospheric Pressure: 80 kPa to 106 kPa
- This device is intended for patient monitoring in ICU or nurse station in the medical facility.
  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.
- Pay attention to install or store the device in proper location. Do not install or store in the following locations.
  - where chemicals are stored or gas may generate
  - where the device will be subject to splashing water or humidity from a nebulizer or vaporizer
  - where the device will be subject to direct sunlight
  - Unstable place with inclination, vibration, or shock
- Ensure proper ventilation to cool the device.
  - A minimum space of 5 cm is required between vents on the rear side of the device and the wall. If the device is embedded in a wall or surrounded by a wall, a minimum space of 10 cm is required on the top side.

WARNING

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

Procedure to Start Monitoring

This section explains the operation flow from installation, preparation, and monitoring condition settings.

1 Start the DS-1800 System.
   1 Connect the power cable.
   2 Connect the extended display unit.
   3 Connect the keyboard and mouse (optional).
   4 To Turn ON the Power

2 Prepare for network construction. (DS-LANIII)
   1 Set the central ID.
   2 Set the date/time.

3 Construct the network system. (DS-LANIII)
   1 Connect the LAN cable.

4 Set the monitoring beds.
   1 Register the beds.
   2 Set the channel ID.
   3 Select the monitoring beds on the display configuration setup menu.

5 Set the monitoring condition on the initial settings menu.
   1 Set the printing function.
   2 Set the ST, BP, TEMP measurement unit and CO_2 atmospheric pressure.
   3 Set the user key.
   4 Set the alarm related setup.
   5 Set the initial settings at admittance.
   6 Register the bed name.

Starting the System

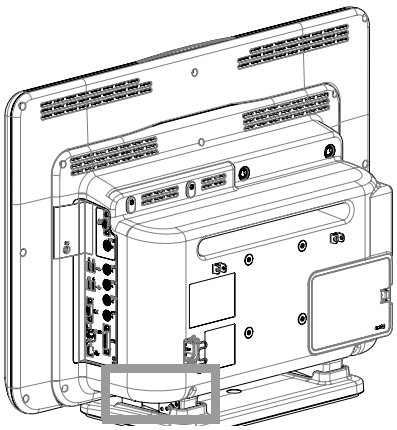
⚠ WARNING

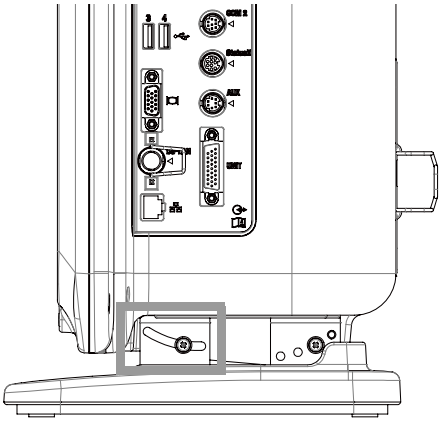
- When moving the display unit, do not apply excessive force.

Adjusting the Angle of this Device

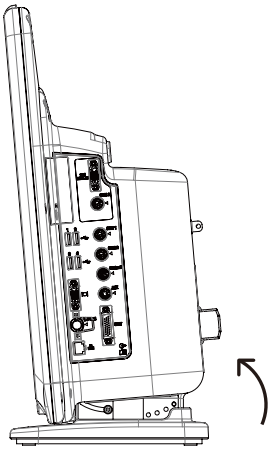
This device can adjust the angle 1 level downwards and 2 levels upwards.

1 On the side of this device, remove the two screws at the back, and loosen the two screws at the front.

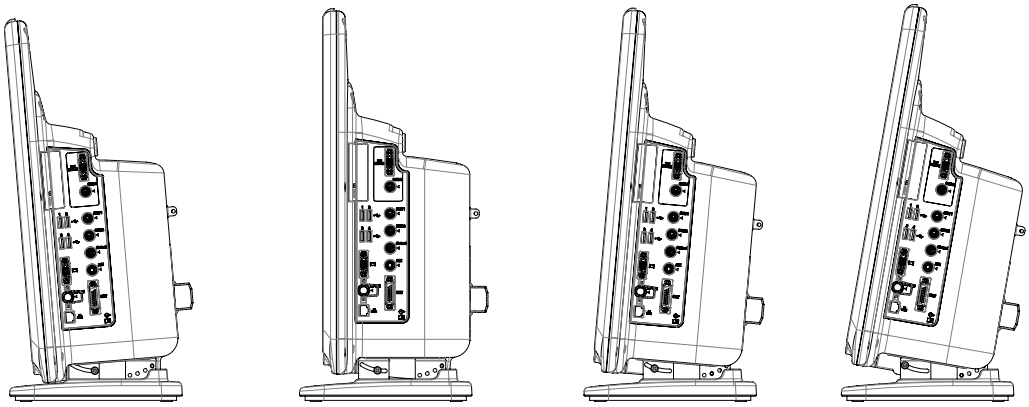




2 Raise the device slightly to adjust the angle, and tighten the two screws at the back.



The angle can be adjusted 1 level downwards and 2 levels upwards.



3 Tighten the two screws at the front.

NOTE

- Make sure that all the screws are tightened.

Connecting the Power Cable

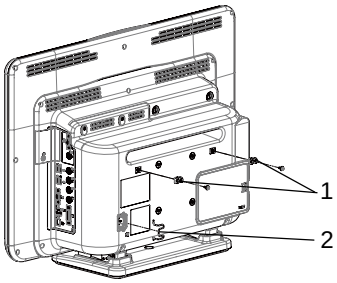
WARNING

- Use only the supplied 3-way AC power cable. Use of other cables may result in electric shock to the patient and the operator.
- The power cable must be connected to a hospital grade outlet of 115 V AC. When connecting, do not use a multiple portable socket-outlet.
- When using multiple medical devices simultaneously, pay attention not to touch multiple devices at the same time. Even a small potential difference between the devices may result in electric shock to the patient and the operator.

1 Attach the cable retainer and fall-prevention bracket to this device.

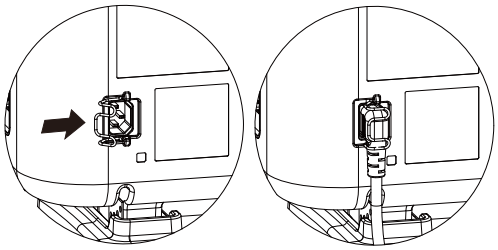
1 Fall-Prevention Brackets

2 Cable Retainer

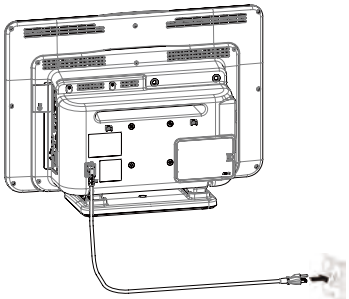


2 Connect the power cable (CS-34) to the rear side of this device.

3 Push the cable retainer to the arrow direction as shown in the illustration to lock the power cable.

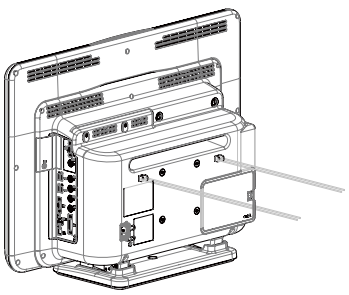


4 Connect the power cable to a hospital grade outlet (3-pin grounded outlet).



❑Usage of Fall-Prevention Brackets

Insert the wires through the fall-prevention brackets on the rear side of this device and fix the wires to the wall or poll.
When fixing the wires to the wall or pole, make sure that enough space is acquired to adjust the angle of this device.



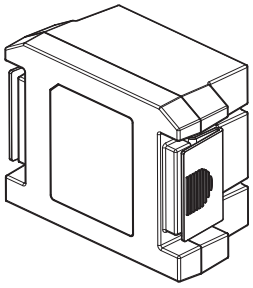
NOTE

- This bracket is intended to only reduce the risk of device from falling during earthquakes, etc., and no warranty is given.
- Check that all the screws are securely tightened after assembly and at periodic inspections.

Installing the Battery Pack (BTO-005)

⚠ WARNING

- When lifting this device with the Base Unit and HS Adapter attached, hold the bottom part of the Base Unit.
- When replacing the battery pack while monitoring, make sure to supply power by connecting the power cable.

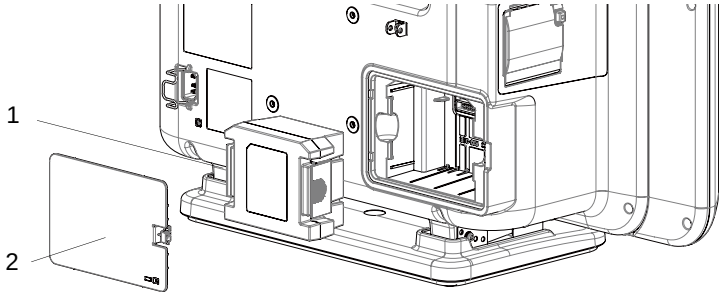


1 Remove the battery cover.

2 Insert the BTO-005 and close the battery cover.

1 Battery Pack

2 Battery Cover



NOTE

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

Turning the power ON

❑To Turn ON the Power

The procedure to turn ON the power of the DS-1800 System is explained below.

⚠ CAUTION

- The power cable must be connected to a hospital grade outlet.
- Do not connect a battery other than the lithium-ion battery (BTO-005).

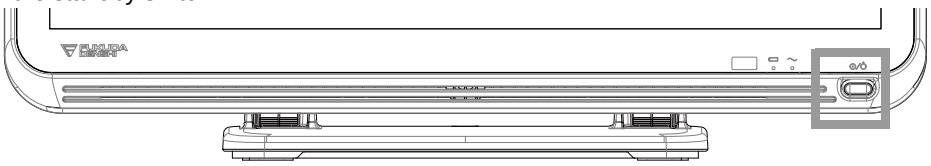
- If not using the device for a long period, disconnect the power cable and lithium-ion battery.
- To avoid losing the data saved in the storage media, set to standby mode before turning OFF the power.

1 Before turning ON the power, connect the cable, external device, etc. required for system construction.

Power Cable (CS-34) (If operating with AC power supply)
Lithium-Ion Battery Pack (BTO-005) (If operating with battery)
Recorder Unit (HR-800)
Extended Display Unit, Slave Monitor
Network System, etc. (☞Maintenance Manual "Installation of the Unit" P1-1, ☞Maintenance Manual "System Construction" P2-1)

▸ When connected to the AC power source with battery installed, charging will automatically start.
Rapid Charge (when the device is not in operation): 2.5 hours
Normal Charge (when the device is operating): 5 hours

2 Turn ON the standby switch.



▸ The power supply LED on the front side will light.

1 Power Supply LED

- Green: Power ON
- Orange: Standby Mode
- Light Off: During battery operation, or power OFF

2 Battery Status 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.)

3 Adjust the brightness and color of the display, and perform initial settings, etc.
(☞Maintenance Manual "Initial Settings" P5-1)

Connecting the Mouse and Keyboard

- An optional mouse can be connected allowing touch key control using the mouse.
By moving the pointer on the displayed keys, and left-clicking the mouse, the operation can be performed just the same as by directly touching the displayed keys.
- An optional keyboard can be used when entering patient information.

NOTE

- The keyboard can be used only when the touch panel keyboard is displayed (patient name, monitor suspend setup, etc.) The keyboard cannot be used for the display other than above (password input, etc.).

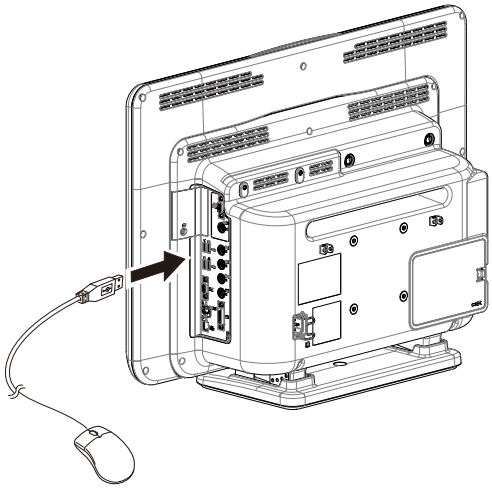
Connecting the Mouse and Keyboard

WARNING

- Use the mouse, keyboard specified by Fukuda Denshi. Use of other products may cause malfunction or damage.

❑Connecting the Mouse

1 Connect the mouse to the USB connector on the right side of the device.



❑Connecting the Keyboard

1 Connect the keyboard to the USB connector on the right side of the device.

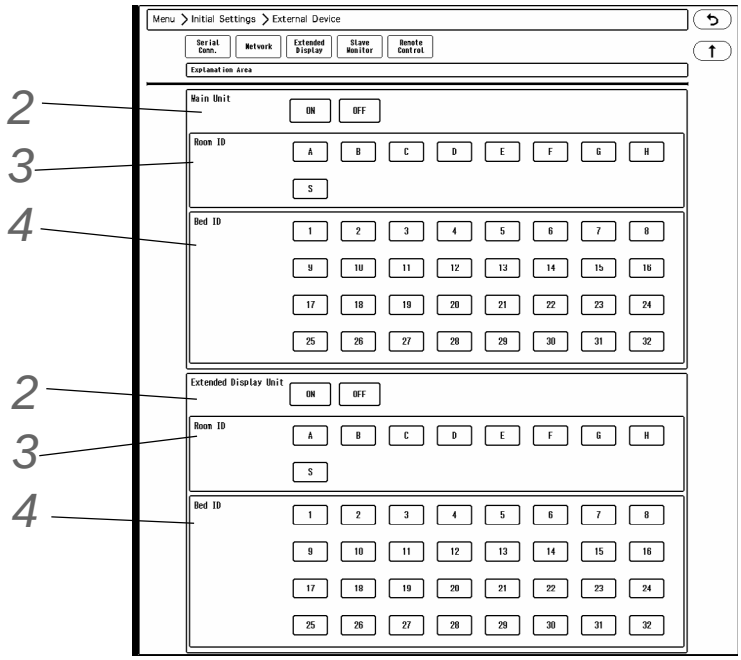
Remote Control Setup

Set the Room ID and Bed ID for remote control operation.

REFERENCE

- 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 [Menu], [Initial Settings], [Remote Control] ("External Device") keys.



2 Select [ON]/[OFF] of remote control function for "Main Unit" and "Extended Display Unit".

- Select [ON] if using the remote control, and [OFF] if not using the remote control.

3 For "Room ID", select from [A] to [H], or [S].

4 Select the "Bed ID".

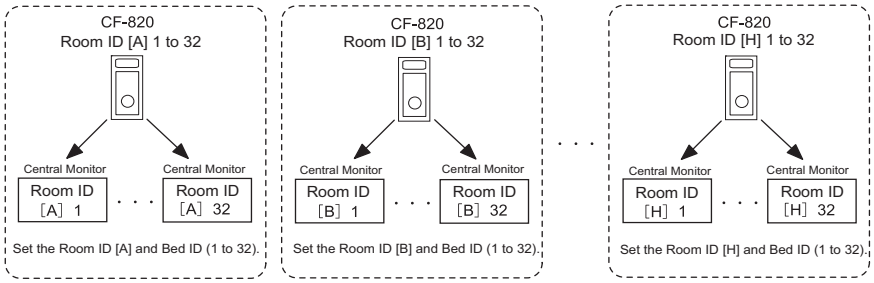
- If [S] is selected for "Room ID", central ID setting will be applied for the "Bed ID", and this setting is not necessary.

NOTE

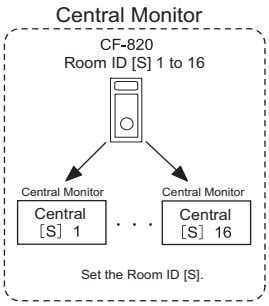
- For the CF-820 IR Remote Control Unit, if [S] is set for Room ID, central ID used on the DS-LAN (displayed on the lower right of the home display) will be set as the remote control ID. If [A] to [H] is set, a different ID for the remote control unit can be set.
- One remote control unit can control maximum of 16 monitors for the Room ID [S], and maximum of 32 monitors for Room ID [A] to [H].

▸ The example of system configuration is shown below.

CF-820: When Room ID [A] to [H] is used



CF-820: When Room ID [S] is used



5 Test the remote control operation, and verify it is properly operating.

⚠ CAUTION

- If the same remote control ID is set for the main display unit and the extended display unit, the alarm silence operation from the remote control will silence the alarm on both units.
- Do not set the same remote control ID to multiple monitors in the same floor. Otherwise, the remote control operation may control multiple monitors at the same time.

Connecting the Recorder Unit (HR-800)

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

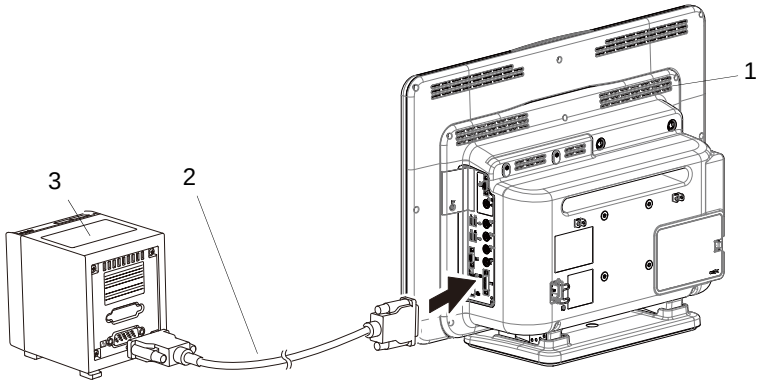
NOTE

- Select [External] under [Initial Settings > Printer > Printer Connection] in advance.

1 DS-1800 Central Monitor

2 Unit Connection Cable (CJO-09SSxx)

3 HR-800



⚠ CAUTION

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

Using the Extended Display Unit

Extended display unit can be connected to this device.
By using the extended display unit, maximum of 32 beds can be monitored with various display configurations.
For procedure to attach the extended display unit, refer to the assembly instruction of the extended display unit.

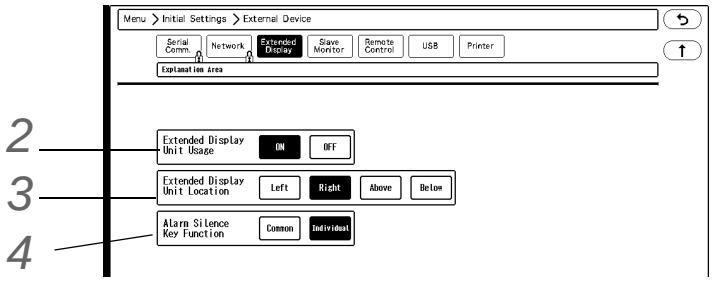
⚠ CAUTION

- Use only the specified extended display unit.

Setup

1 Press the [Menu], [Initial Settings], [Extended Display] ("External Device") keys.

- The setup window will be displayed.Extended Display Unit Setup



2 Extended Display Unit Usage

Select [ON] when using the extended display unit.

3 Extended Display Unit Location

By viewing the main unit from the front side, select which side of main unit to locate the extended display unit.

4 Alarm Silence Key Function

- [Common]: Pressing the [Alarm Silence] key on either of the main display unit or the extended display unit will silence the alarms for all the beds monitored on both display units.
- [Individual]: Pressing the [Alarm Silence] key will silence only the alarm for the beds monitored on the display unit which the key was pressed.

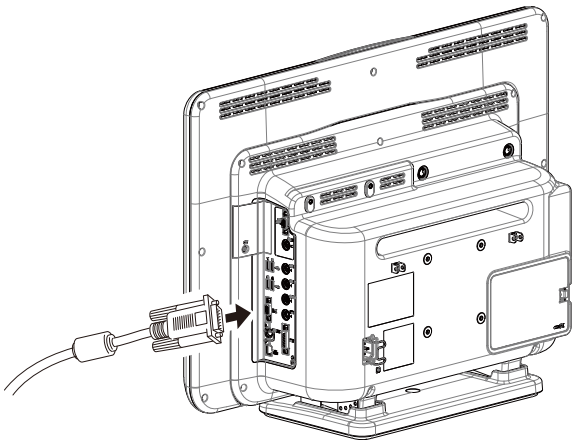
Using the Slave Monitor

On the slave monitor, the same display of the main unit can be displayed.

Connection Procedure

NOTE

- For details, contact your nearest service representative.



Slave Monitor Specification:
A monitor with analog RGB input which satisfies the following condition should be used.

- Resolution: Full HD (1920 dot x 1080 dot)
- Horizontal Frequency: 67.5 kHz
- Vertical Frequency: 60 Hz

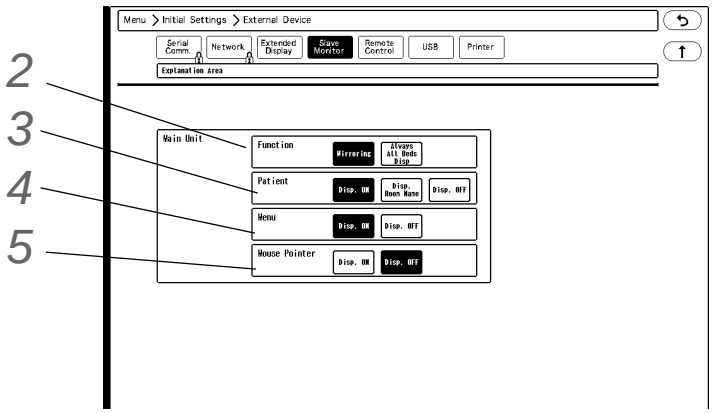
⚠ CAUTION

- Do not use any monitors which does not satisfy the required display resolution.
  Do not use any monitors which has the function to display higher resolution than the actual resolution.
- For the compatible slave monitor, refer to your nearest service representative.

Setup

1 Press the [Menu], [Initial Settings], [Slave Monitor] ("External Device") keys.

▸ The slave monitor setup window will be displayed.



2 Function

Select the slave monitor function from [Mirroring]/[All Beds Display].

▸ [Mirroring]: The same display with the main unit will be displayed.

- The patient name, menu, mouse pointer will be displayed according to the slave monitor setup.

▸ [All Beds Display]: All beds with the same display configuration with the main unit will be displayed.

- The display will be fixed to all beds even if individual bed or menu is displayed on the main unit.
- When the all beds display configuration is changed on the main unit, the slave monitor display will also change.
- The patient name will be displayed according to the slave monitor setup.
- The menu, mouse pointer will not be displayed.

3 Patient Name

Select from [Disp. ON]/[Disp. Room Name]/[Disp. OFF].

4 Menu

Select from [Disp. ON]/[Disp. OFF].

With this setting, the display on the slave monitor will be as follows.

Main Unit Display	Slave Monitor Display	
	Menu: [Disp. ON]	Menu: [Disp. OFF]
Home Display	Home Display	Home Display
Home Display Floating Window	Home Display Floating Window	Home Display
All Beds Menu	All Beds Menu	Individual Bed Display of Selected Bed
Individual Bed Display of Selected Bed	Individual Bed Display of Selected Bed	Individual Bed Display of Selected Bed
Individual Bed Menu	Individual Bed Menu	Individual Bed Display of Selected Bed
Individual Bed Floating Window	Individual Bed Floating Window	Individual Bed Display of Selected Bed

Main Unit Display	Slave Monitor Display	
	Menu: [Disp. ON]	Menu: [Disp. OFF]
Monitor Suspend Message	Disp. ON	Disp. ON
[Arrhythmia Relearn] key		Display OFF
Event Key		Disp. ON
EMR Icon		Disp. ON
Lead OFF Icon		Disp. ON
Shortcut Key		Display OFF
Waveform Size Key		Display OFF
Message Display		Disp. ON
Low Battery Icon		Disp. ON
Too Far Alarm Suspended Duration		Disp. ON

5 Mouse Pointer

Select from [Disp. ON]/[Disp. OFF].

Chapter 2 System Construction

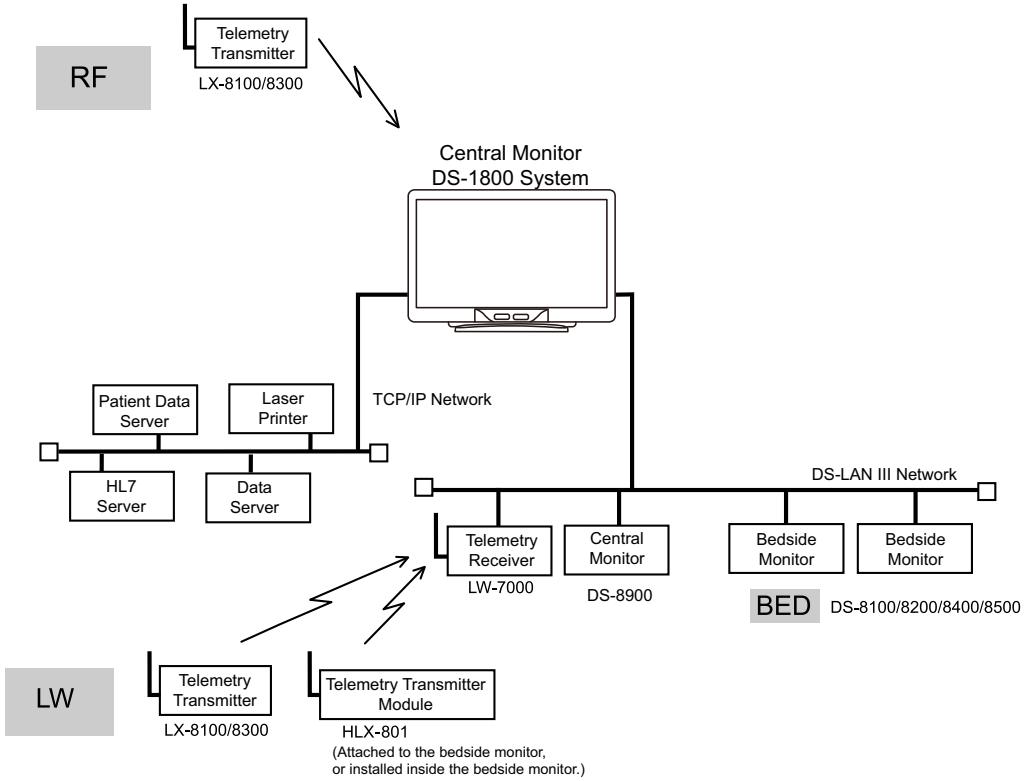
General Description

For the DS-1800 System Central Monitor, the following network system can be constructed.

1 Wired network (DS-LAN III) bedside monitors and central monitors are connected by LAN cable.
The telemetry beds (LW beds) with Telemetry Receiver (LW-7000) can be also connected to the central monitor by wired network. The LW beds receive the monitoring data from the bedside monitor with HLX-801 or LX-8100, LX-8300 Telemetry Transmitter.
Maximum of 100 beds can be connected within 1 network segment.
A network administrating monitor (Central ID: 001) is required.

2 Wireless Network System
The bedside monitor with HLX-801 or telemetry transmitter (LX-8100, LX-8300) transmits the monitoring data to the central monitor via wireless network.

Other than above, TCP/IP network connection is also possible for printing the review data such as graphic trend on the laser printer or storing the waveform data on the data server.
By performing central monitor communication setup, transfer/exchange of patient information and alarm settings among several central monitors can be performed through the TCP/IP network.
(☞"TCP/IP Network" P2-15)



Network Restrictions

There are some setups that can be performed only on the network administrator of the wired network system.
Also, when more than one monitor are used in a same network, there are some setups that should be the same for all monitors (both central monitors and bedside monitors).
The following lists show these restrictions for setup.

Setup Item Synchronizing within the Same Wired Network

Explanation of the List
Yes: Setup item will be synchronized. No: Setup item will not be synchronized.

❑Patient Admit/Discharge

Setup Item		Synchronize within the Wired Network
Patient Information	ID	Yes
	Patient Name	Yes
	Birth Date	Yes
	Age	Yes
	Height	Yes
	Weight	Yes
	BSA	Yes
	Bed Name	No
	Patient Classification	Yes
	Sex	Yes
	Nurse Team	No
	Pacemaker	Yes
	Comment	No
Monitor Suspend	Monitor Suspend Condition	*3

*1: For the DS-7100 system with software version before V04-02, synchronizing patient ID is maximum 10 digits.
*2: For the DS-7100 system with software version before V04-02, synchronizing patient name is maximum 8 characters.
*3: For the following model type and software version, monitoring suspended condition will be synchronized.
DS-8400/DS-8007: from V01-01, DS-8100: from V06-01, DS-8500: from V11-01

❑Alarm

Setup Item		Synchronize within the Wired Network
Alarm Suspend	Alarm Suspend Condition	Yes
Alarm Silence	Alarm Silence Condition	Yes

Setup Item		Synchronize within the Wired Network
Alarm Setup	Asystole, VF, VT, Slow VT, Run, Couplet, Pause, Bigeminy, Trigeminy, Frequent, Tachy, Brady, Ext Tachy, Ext Brady, Triplet, R on T, Multiform, Vent Rhythm, SVT, Irregular RR, Prolonged RR, S Frequent, S Couplet, VPC, SVPC, Pacer Not Capture, Pacer Not Pacing	Yes
	AFib	Yes
	HR	Yes
	ST1/ST2	Yes
	BP1 to BP8 (mmHg/kPa)	Yes
	CVP (cmH_2O)	Yes
	PR-IBP	Yes
	NIBP (mmHg/kPa)	Yes
	RR	Yes
	Apnea	Yes
	$EtCO_2$ (mmHg/kPa/%)	Yes
	$InspCO_2$ (mmHg/kPa/%)	Yes
	Exp O_2, Insp O_2	Yes
	Exp N_2O, Insp N_2O	Yes
	Exp Agent, Insp Agent	Yes
	MAC	Yes
	MVe	Yes
	PEAK	Yes
	PEEP	Yes
	SpO_2, SpO_2-2	Yes
	PR-SpO_2, PR-SpO_2-2	Yes
	SpMet, SpMet-2	Yes
	SpCO, SpCO-2	Yes
	SpHb, SpHb-2	Yes
	T1 to T8 (°C), T1 to T8 (°F)	Yes
	Tb (°C), Tb (°F)	Yes
	12-Lead ST	Yes
	12-Lead ΔST	Yes
	QTc	Yes
	SI	Yes
	ST: Display Numeric, Measurement Point [From R]/[From J], Reference Point, J Point [Auto]/[Manual], J Point Position	Yes
	QT: Alarm Target Lead, Reference Point, T Wave Peak Range, Formula, ΔQTc Upper Limit Display	Yes

❑Parameter

Setup Item		Synchronize within the Wired Network
ECG	Leads	Yes
	Waveform Size	Yes
	Filter Mode	*1
	Synchronized Mark/Tone	No
	Pacemaker	Yes
	Pacemaker Pulse	Yes
	Pace Pulse Mask Time	Yes
	QRS Detection	Yes
	Drift Filter	Yes
	AC Filter	Yes
	Auto Lead	*1
	ST/VPC/Arrhy. Alarm Display	No
	Arrhythmia Learn	Yes
	HR Delay	No
RESP	Waveform Size	Yes
	RR Synchronized Mark	No
	RR/APNEA Alarm Source	*1
	CVA Detect	Yes
SpO_2	Waveform Size	No
	Label	*1
	Synchronized Mark/Tone	No
	Perfusion Index	No
NIBP	NIBP Periodic Measurement	Yes
	Measurement Interval	*2
	Timer	No
	Patient Classification	Yes
	PR Display	No
	Mean	*1
	Time Display	No
BP1 to BP8	Label	*1
	Scale	No
	Synchronized Mark/Tone	No
	Display Type	*1
TEMP	Label	*1
CO_2	Unit	No
	Scale	No
Ventilator	AWP, AWF, AWV Scale	No
Multigas	GAS_CO_2, GAS_O_2, GAS_AGT Scale	No
	AWP, AWF, AWV Scale	No
	Wave Clip	No

Setup Item		Synchronize within the Wired Network
SI, RPP	HR/PR Source	*1
	BP_S Source	*1
Scoring	Source Select	*1
	SpO2 Scale	*1

*1: This setting is not possible on the DS-1800. The setting on the bedside monitor will be applied.

*2: The NIBP measurement interval synchronizes for the following case.
DS-7100: from V08-01
DS-7300: from V06-01

❑Each Bed

Setup Item		Synchronize within the Wired Network
Print Settings	All Setup	No
Color Setup	All Setup	No
Nurse Call Setup	All Setup	No
Full Disclosure Waveform	All Setup	No
Data Server Waveform	All Setup	No
Parameter ON/OFF	All Setup	No

❑Basic Setup

Setup Item		Synchronize within the Wired Network
Display Layout	All Setup	No
Detail Setup	All Setup	No
Block Cascade	All Setup	No

❑Common Setup > Display Config.

Setup Item	Synchronize within the Wired Network
All Beds	No

❑Common Setup

Setup Item	Synchronize within the Wired Network
All Setup	No

Setup Item Synchronizing to the Network Administrator

Explanation of the List

Yes: Setup item will be synchronized. No: Setup item will not be synchronized.

*1: The wired network will be prioritized if simultaneously used.

❑Parameter > Scoring

Setup Item	Synchronize to Wired Network Administrator
Score Mode	Yes
Score Mode Name	Yes
Score Mode General Setup	Yes
Parameter Selection	Yes
Parameter Score Range Setup	Yes

❑Initial Settings > Alarm

Setup Item		Synchronize to Wired Network Administrator
Alarm System		No
Basic Alarm Parameter		No
Asystole, VF, VT Alarm		Yes
Ventilator Alarm		No
Suspend Arrhythmia Analysis during Noise Interference		Yes
Lower Limit for Alarm Volume	Physiological Alarm	No
	Ventilator Alarm	No
	Device Status Alarm	No
Alarm Indicator	Level S	No
	Level H	No
	Level M	No
	Level L	No
	Enable/Disable	No
	Synchronize with HR/RR	No
Alarm Level	All Setup	No
Alarm Auto Setup	Enable/Disable	No
Alarm Threshold Limit	All Setup	No
Alarm Silence Time	1 min./2 min.	No
Alarm Suspend Time	1 min./2 min.	No
Too Far Alarm	Setup	No
	Time	No
During Lead OFF	Alarm Judgment	Yes
	Alarm Printing	Yes
	Lead OFF Message	No
	Lead OFF Alarm Interval	No
During "Check SpO_2 Sensor"	Alarm Judgment	Yes
Alarm Occurrence at NIBP Failure	ON/OFF	No
Alarm Wave Background	Lighting/Normal	No
Event Display	ON/OFF	No
Alarm Suspend/Alarm Silence from Central Monitor	OK/NG	No
Link with Alarm Sound Suspend	ON/OFF	No

Setup Item		Synchronize to Wired Network Administrator
Status Alarm Control	Link to alarm silence time/Link to each new occurrence	No

❑Initial Settings > Measurement

Setup Item		Synchronize to Wired Network Administrator
Unit	ST	No
	BP, TEMP	Yes
	CO_2 Atmospheric Pressure Value	No
	CO_2 Atmospheric Pressure Unit	No
Other	Disregard Artifact Ch. at QRS Detect	Yes
	Display measurement error on NIBP list	No
	Drift Filter	No
	Auto Resume Monitoring	No

❑Initial Settings > User I/F

Setup Item		Synchronize to Wired Network Administrator
Display/Print	Date Format	No
	BP Alarm Increment	No
	RR Alarm Increment	No
	Trend Clip	No
	Built-in Printer Message	No
	ST Display Lead Setup (A to C)	No
	QRS Classification	No
	Speed	No
	Print Calibration	No
	BP Printing Scale	Yes
	CO_2 Printing Scale	No
	Meas. Info. Printing	Yes
	LX Remote Printing	Yes
	Setup at Discharge	No
	Home Display	No
	Dim All Data Other than Numeric	No
	Message Icon	No
	Room/Bed ID Display	No
	LAN_ID Unique Name Setup	Yes
	Event Label Setup	No
	Optimize Displayed Beds Function	No
	Optimize Display after Monitor Resume	No
	Register Fixed Comment	No
Admit	All Setup	No

Setup Item		Synchronize to Wired Network Administrator
User Key	All Setup	No
Operation	All Setup	No
Shortcut Key	All Setup	No

❑Initial Settings > External Device

Setup Item	Synchronize to Wired Network Administrator
All Setup	No

❑Initial Settings > System

Setup Item		Synchronize to Wired Network Administrator
Central ID	Room ID	No
	Central ID	No
Bed Register		No
Channel	Stored Channel No.	No
Receiver Setup	Switch Antenna	No
	Diversity Threshold	No
	Garbled Circuit	No
Bed Name	Bed Name Registration	No
Other	AC Frequency	Yes
	Synchronized Tone	No
	Synchronized Mark	No
	Data Transfer	No
	Upload Waveform Selection	Yes
	DS-LAN Output of RF Bed	No
	Bed ID of RF Bed	No
Time/Date		Yes

❑Initial Settings > Administrator Setup

Setup Item	Synchronize to Wired Network Administrator
All Setup	No

Wired Network System

A wired network system of maximum 100 beds can be constructed using a LAN cable.

⚠ CAUTION

- The DS-LAN II network cannot be used.
- For the alarm generation on the wired network bedside monitor, maximum of 15 seconds delay will occur on this central monitor.

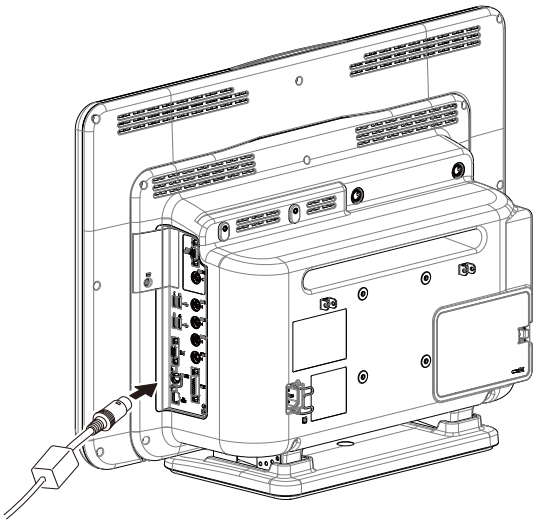
❑Model Types that can be connected to the Wired Network

	DS-LANIII
DS-5000 Series Bedside Monitor DS-5100, DS-5300/5300W, DS-5400	No
DS-5000 Series Central Monitor DS-5700, DS-5800N/NX/NX^{MB}	No
Central Telemetry Receiver LW-5500N	No
8ch Recorder AU-5500N	No
DS-7000 Series Bedside Monitor	
DS-7000, DS-7100*, DS-7300, DS-7200	Yes
DS-7000 Series Central Monitor DS-7600/7600W, DS-7700/7700W	Yes
DS-8000 Series Central Monitor DS-8900	Yes
Central Telemetry Receiver LW-7000	Yes
DS-8000 Series Bedside Monitor	
DS-8007, DS-8100, DS-8200, DS-8400, DS-8500	Yes
DS-1000 Series Bedside Monitor	
DS-1200	Yes
DS-1000 Series Central Monitor	
DS-1700, DS-1800	Yes

*Some DS-7100 cannot be connected to the DS-LAN III system depending on the embedded PCB.

Connection Procedure

1 Connect the cable (CJ-522 or CJ-530) to the DS-LAN connector on the right side of this device.



2 Connect the other side of the cable to the HUB.

WARNING

- Be careful not to confuse the HUB for the DS-LAN network and the TCP/IP network. The operation cannot be guaranteed if connected to improper network.
- For the DS-LANIII network, use the specified switching HUB.
  If a 10M HUB or a repeater HUB is used, a communication error may occur.

CAUTION

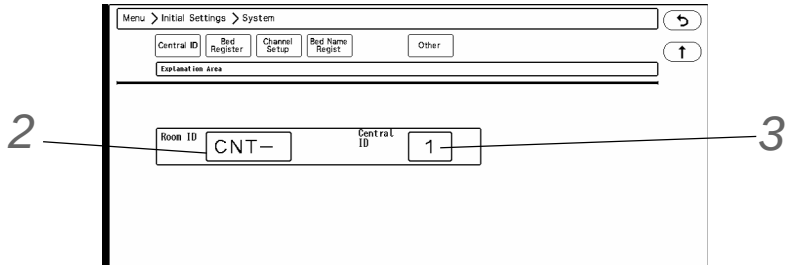
- Make sure that "DS-LANIII" is set for DS-LAN setup for all the monitors connected to the wired network.
- To construct a DS-LANIII network, the software version for all the monitors should be compatible with the DS-LANIII.

Room ID/Central ID Setup

A Room ID or Central ID must be set to connect to the DS-LANIII network system.

1 Press the [Menu], [Initial Settings], [Central ID] ("System") keys.

▸ The Room ID/Central ID setup screen will be displayed.



2 Enter the Room ID within 4 alphanumeric characters.

3 Select the Central ID from [1] to [16].

CAUTION

- The central monitor with the Central ID, "001" will function as a network-administrating monitor, and controls the whole LAN system. One of the central monitors must have the Central ID, "001" in a network system. Also, make sure not to duplicate the Central ID with other monitors.

Wireless Network System

The monitoring data of the patient can be monitored on the central monitor through the Central Telemetry Receiver (LW-7000) or built-in RF module, which receives the data from the telemetry transmitter, and then transmits them to the central monitor via wired network.

Channel ID and Antenna Setup for the Receiver

When using a wireless system, it is necessary to set the Channel ID and Band.
If diversity function is available, antenna can be switched.

WARNING

- Make sure to set the correct channel ID.
- Some wireless combinations of telemetry transmitters may generate interference with other devices.
- 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 neighboring facility must make agreements on the setting of telemetry channels to prevent telemetry interference.
- If the channel ID of the transmitter is changed, make sure to replace the channel label attached to the transmitter with a new one.
- If the channel ID is changed without notifying, it will result in monitoring an incorrect patient. To avoid incorrect diagnosis, make sure that the channel ID corresponds to the patient.

❑Registering the Channel ID

Maximum of 64 frequently used channel ID can be registered.

NOTE

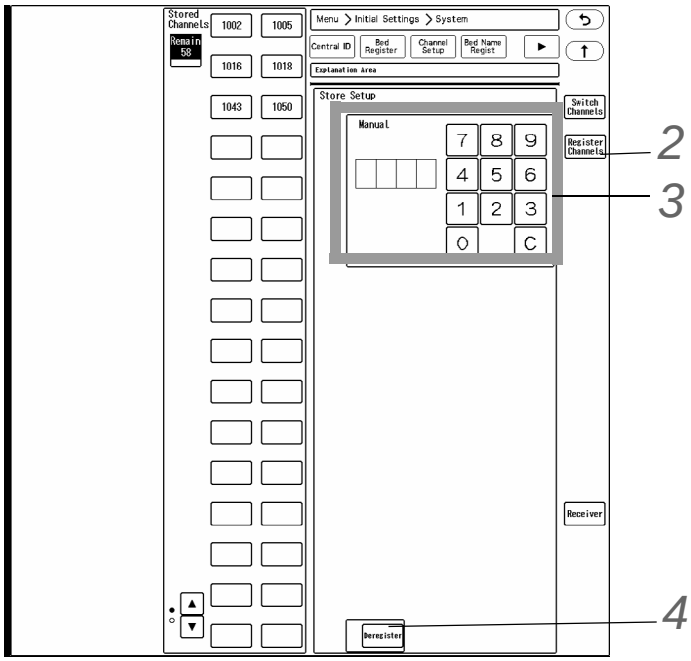
- Only the medical telemetry channel ID can be set.

1 Press the [Menu], [Initial Settings], [Channel Setup] ("System") keys.

▸ The channel setup menu will be displayed.

2 Press the [Register Channels] key.

▸ The "Store Setup" window will be displayed.



3 Enter the channel ID.

1 Enter a 4-digit number (medical telemetry channel ID) using the numeric keys.

2 Press the key displayed at the left.

▸ The entered ID will be registered for "Stored Channels" .

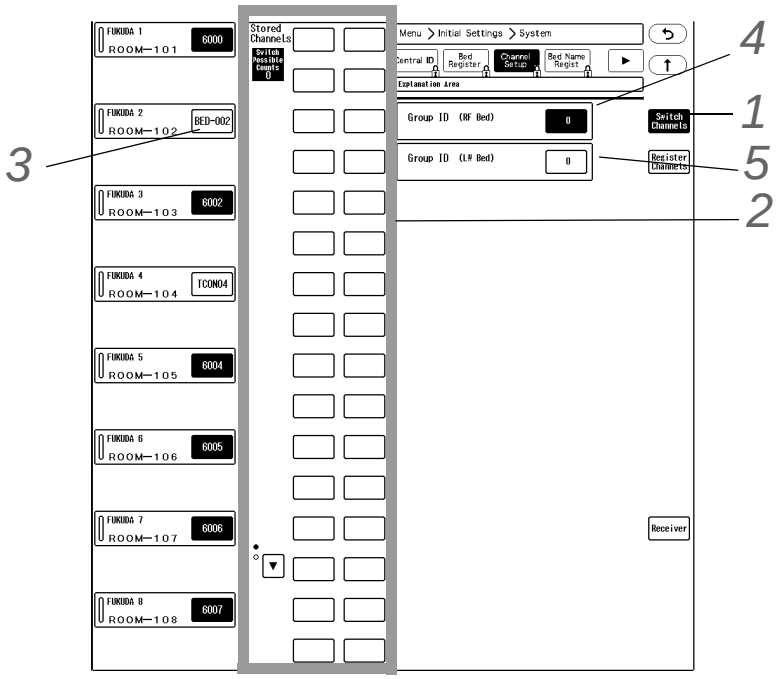
4 To cancel the registration, press the key for the channel ID to cancel registration, and press the [Deregister] key.

▸ The keys for the currently used channel ID are displayed in blue.

❑Setting the Channel ID

Set the channel ID.

1 Press [Switch Channels].



2 Select the channel ID from the "Stored Channels" on the center of the screen.

- The keys for the currently used channel ID are displayed in blue. The same channel ID cannot be set to more than one bed.

3 Press the key for the bed on the left to assign the channel ID.

- The channel ID will be assigned to that bed.

NOTE

- The channel ID can be set only for the beds displayed on the current display configuration.

4 Use the numeric keys to enter the group ID in the range from 0 to 63.

5 The group ID of the selected LW bed will be displayed. The setting cannot be changed on the central monitor.

NOTE

- The group ID is used to distinguish the patients of different facilities when the medical telemetry radio wave of the same channel used in other institution nearby is erroneously received. By setting a unique group ID for each institution, the patient data of other institution will not be displayed even when the radio wave of the other institution is erroneously received. When the radio wave of other institution with different group ID is received, interference waveform ( ) will be displayed.

⚠ CAUTION

- The group ID setting is not intended for increasing the telemetry channel selection within the same institution.
- If the medical telemetry radio wave of the same channel used in the nearby institution is

strong, telemetry reception error may occur. If multiple telemetry radio wave of the same channel exists, the radio wave will become unreceivable.

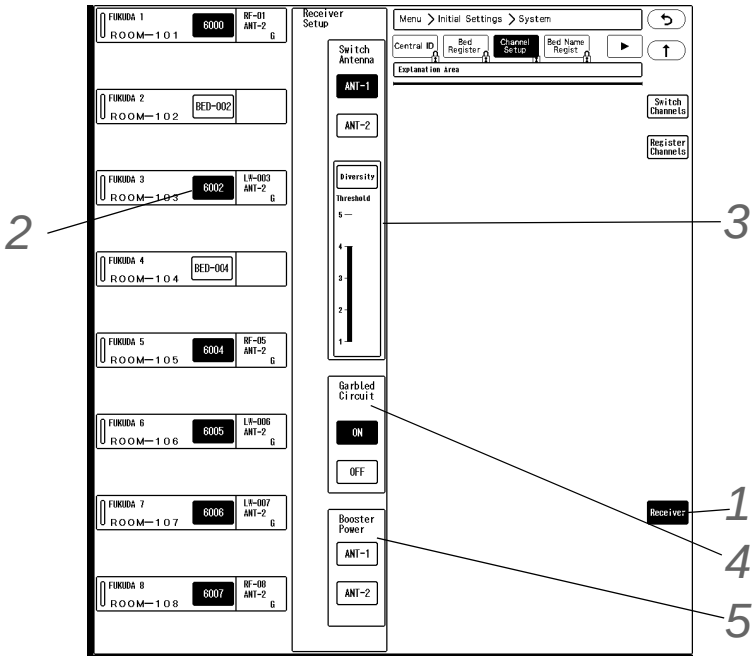
- Make sure to set the same group ID on the transmitting side (bedside monitor or telemetry transmitter) and the receiving side (central monitor).

❑Setting the Receiver

The settings for the receiver can be performed.

1 Press [Receiver].

- The setup screen for the receiver will be displayed.



2 Press the key for the bed on the left to perform the receiver setup.

3 Set the "Switch Antenna" .

- [ANT-1]: Receiving antenna will be fixed to antenna input 1.
- [ANT-2]: Receiving antenna will be fixed to antenna input 2.
- [Diversity]: ▱ will be displayed. Select the threshold from 1 to 5.

4 Select [ON] or [OFF] for "Garbled Circuit".

5 Select [ANT1] or [ANT2] for "Booster Power".

TCP/IP Network

By connecting the DS-1800 System to the TCP/IP network, the following function can be performed using the laser printer and server.

- Review data such as graphic trend can be output on the laser printer.
- By using the patient data server, patient data can be acquired from the server.
- By using the EMR link function, patient information can be input from the electronic medical record system.
- By using the data server, the waveform data for the patient can be stored in the server.
- By using the SNTP server, the time can be synchronized to the SNTP server.
- If the HL7 server is used in the hospital, patient information and current measurement data monitored on the DS-1800 System can be transmitted to the HL7 server when requested.
- By performing central monitor communication setup, transfer/exchange of patient information and alarm settings among several central monitors can be performed through the TCP/IP network.

WARNING

- The operation cannot be guaranteed if connected to improper network. To change the network settings, refer to your nearest service representative.
- When connecting to an existing network, follow the instruction of the network administrator.
- Make sure not to duplicate the IP address for DS-1800 System, laser printer, and the server.
- As this system does not support DHCP (Dynamic Host Configuration Protocol) IP address, set the IP address excluded at DHCP if DHCP server is present.

NOTE

- Before using the laser printer and server, perform network setup for this device, laser printer, and server.

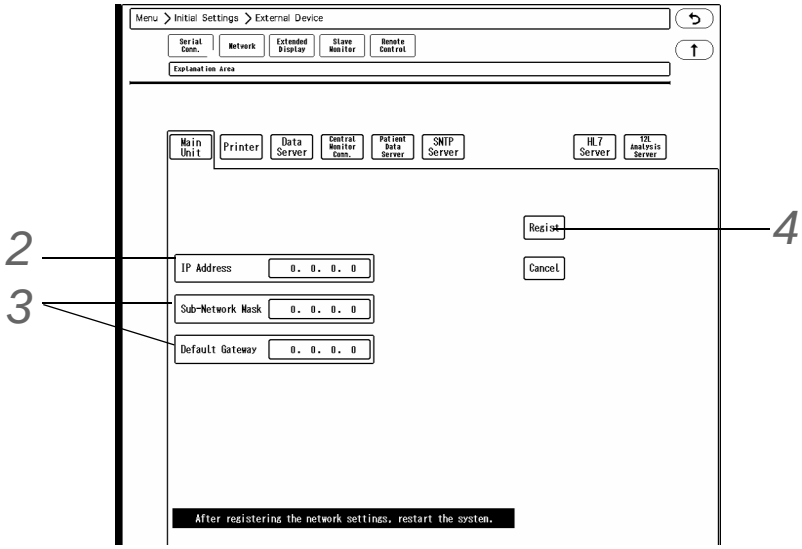
Setup for this Device

Set the IP address, sub-network mask, default gateway for this device.

NOTE

- To validate the setup, the system needs to be restarted.

1 Press the [Menu], [Initial Settings], [Network] ("External Device"), [Main Unit] keys.



2 Enter the IP address for this device.

- Use the numeric keys to enter the numbers. The entered numbers will be displayed inside the key.

NOTE

- Enter the IP address within the following range; Class A (0.0.0.0 to 127.255.255.255), Class B (128.0.0.0 to 191.255.255.255), Class C (192.0.0.0 to 223.255.255.255)

3 Using the same procedure above, enter the address for sub-network mask and default gateway.

4 Press the [Regist] key to finalize the setup.

- On the confirmation window, press the [Regist] key.
- A warning message will be displayed. (shown on right)

WARNING

- When a warning message is displayed, all operation controls will not be possible until the system is restarted.

5 Turn OFF the power.

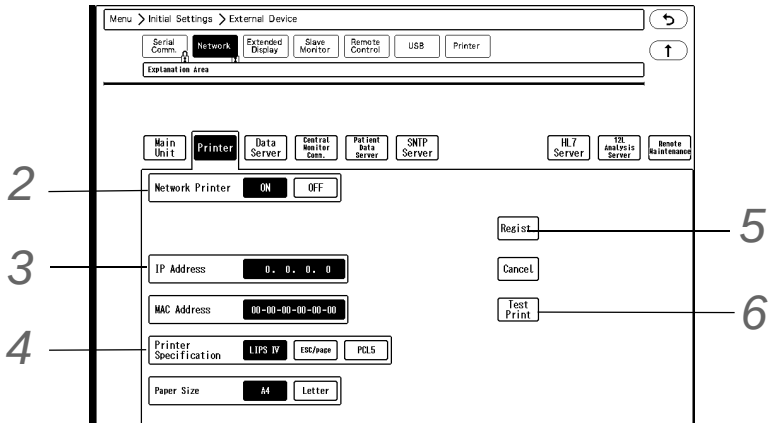
6 Connect the LAN cable to this device.

Laser Printer

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

1 Press [Menu > Initial Settings > External Device > Network > Printer].

▸ The printer setup window will be displayed.



2 Select [ON]/[OFF] for "Network Printer" .

3 Set the IP address of the printer.

4 Select the printer specification from [LIPS IV]/[ESC/page]/[PCL 5].

NOTE

- Refer to the operation manual of the printer. Depending on the printer, the display may differ.

5 Press [Regist] to finalize the setup.

▸ On the confirmation window, press [Regist].

⚠ CAUTION

- Make sure to power cycle the printer after the printer setup.

6 Press [Test Print].

▸ Check that the printing is properly performed.

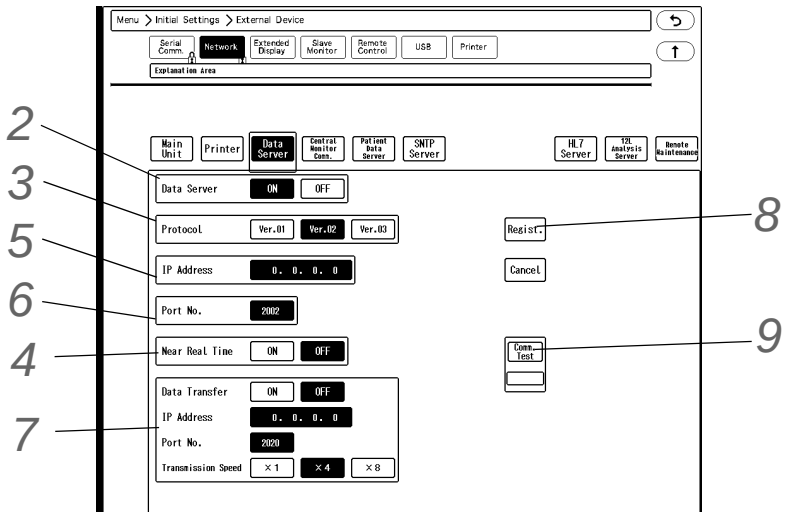
NOTE

- For printing the review data, set the output printer.
(☞"Output Printer Setup for Review Data Printing" P12-8)

Data Server

By using the data server, the waveform data for the monitored patient can be stored on the server.
Maximum of 16 beds 32 waveforms can be stored. When the protocol is Ver.03, maximum of 32 beds 64 waveforms can be stored.

1 Press [Menu > Initial Settings > External Device > Network > Data Server].



2 Select [ON]/[OFF] for "Data Server" .

3 Select [Ver.01]/[Ver.02]/[Ver.03] for "Protocol" .

NOTE

- Use the protocol recommended for the used data server.
  (☞Operation Manual "Data Server Output Waveform Setup" P13-21).

4 When [Ver.02]/[Ver.03] is selected for "Protocol", select [ON]/[OFF] for "Near Real Time".
If [ON] is selected, the data will be output with the protocol with reduced delay time.

5 Enter the IP address of the data server.

6 Enter the port number.

NOTE

- Enter the port number recommended for the used data server.

7 When the "Data Transfer" function is [ON], set the "IP Address", "Port No.", "Transmission Speed" for the data server to output the data.

8 Press [Regist] to finalize the setup.

- On the confirmation window, press [Regist].

9 Press [Comm. Test].

- If properly communicating, <Pass> will be displayed.
- If any failure occurs to the communication, <Fail> will be displayed. If <Fail> is displayed, check the network setting, and perform the setup again.

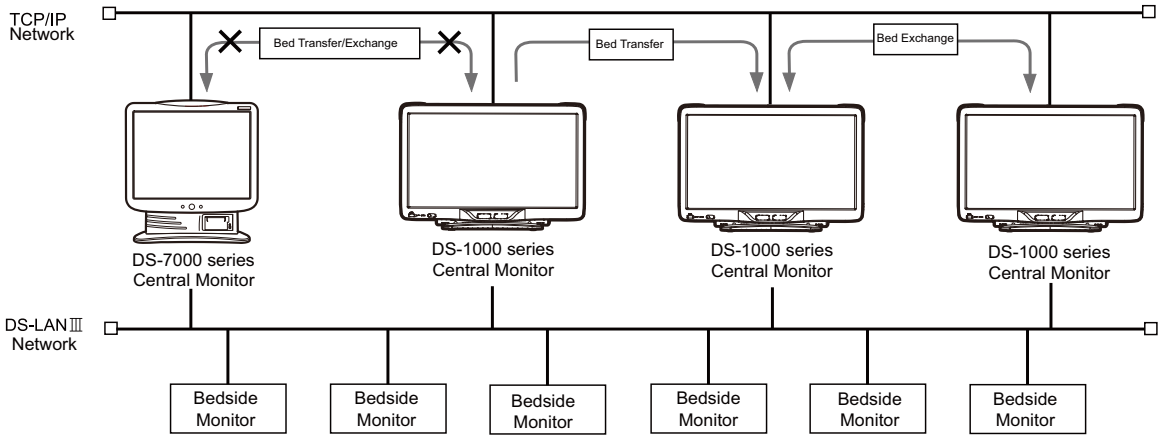
10 Select the waveform to output to the data server.
(☞Operation Manual "Data Server Output Waveform Setup" P13-21)

Central Monitor Communication

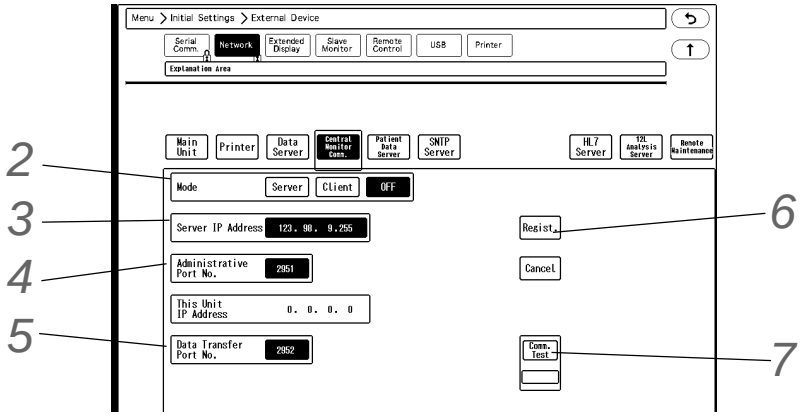
By performing central monitor communication setup, transfer/exchange of patient information and alarm settings among several DS-1800 System central monitors can be performed through the TCP/IP network.

NOTE

- One central monitor should be set as the server, and other central monitors should be set as the client.
- The bed transfer/bed exchange function is not available with the DS-7000 and DS-8000 series central monitors.



1 Press [Menu > Initial Settings > External Device > Network > Central Monitor Comm.].



2 Select from [Server]/[Client]/[OFF].

▸ The setup items will differ for [Server] and [Client].

3 Only when [Client] is selected, enter the "Server IP Address".
Enter the IP address of the server.

4 Set the "Administrative Port No." .

5 Enter the "Data Transfer Port No." .

6 Press [Regist] to finalize the setup.

- On the confirmation window, press [Regist]. The settings will be finalized.

7 Press [Comm. Test] and check if the communication is properly performed.

- If properly communicating, <Pass> will be displayed.
- If any failure occurs to the communication, <Fail> will be displayed. If <Fail> is displayed, check the network setting, and perform the setup again.

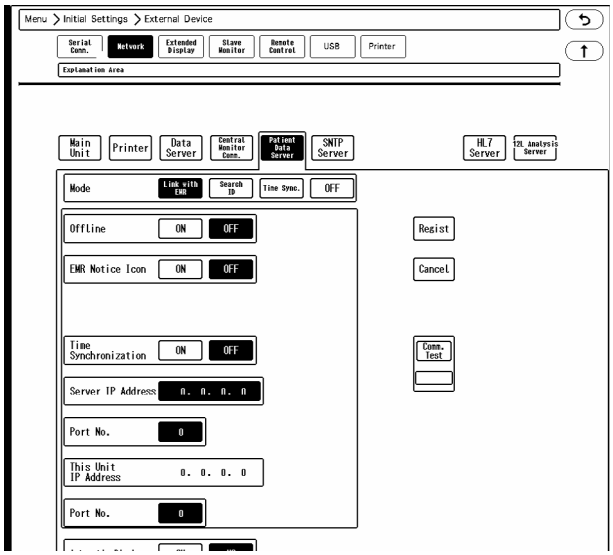
Patient Data Server

By using the patient data server, patient information (ID, name, etc.) can be searched on the server to perform admit process on this device.

❑To Display the Patient Data Server Setup Screen

1 Press [Menu > Initial Settings > External Device > Network > Patient Data Server].

- The patient data server setup window will be displayed.



NOTE

- When not using the patient data server, select [OFF] for "Mode".

❑EMR Link Function

Using the EMR link function through the patient data server allows to perform the following operation on this device.

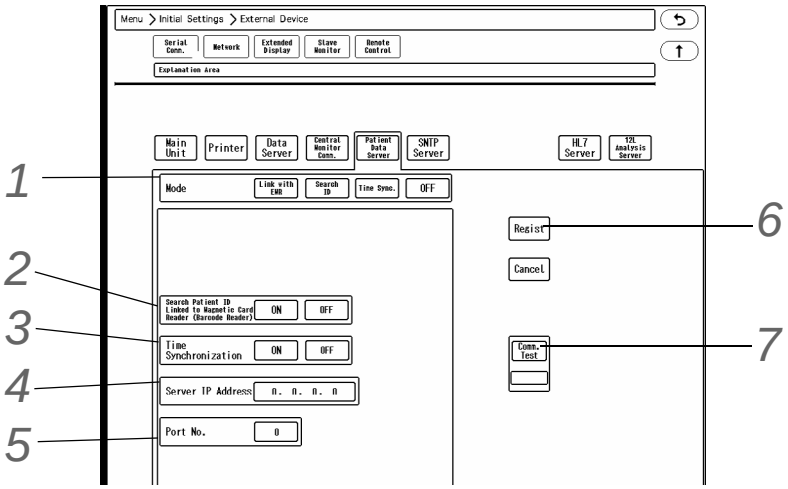
- When a patient is admitted on EMR, the same patient will be admitted on the DS-1800 System.
- When a patient is discharged on EMR, this patient's information on the DS-1800 System will be initialized.
- When a patient information is changed on the EMR, the patient information on the DS-1800 System will also change.

(☞Maintenance Manual "EMR Link Function" P4-1)

❑Search ID Function

Search ID function displays [Search Patient] on the "Admit/Discharge" setup window, and allows to automatically acquire patient information from the entered ID.

1 Select [Search ID] for "Mode" on the patient data server setup window.



2 Set "Search Patient ID Linked to Magnetic Card Reader (Barcode Reader)" .

- Select [ON] if using the magnetic card reader or barcode reader. If not, select [OFF].
- [ON]: Patient information will be automatically acquired from the magnetic card (or barcode).
- [OFF]: After reading the data from the magnetic card (or barcode), it is necessary to press [Search ID] to acquire patient information.

3 Set the "Time Synchronization".

- [ON]: Synchronizes the time with patient data server by communicating with the server every minute.
- [OFF]: Time synchronization with the patient data server will not be performed.

4 Enter the IP address of the patient data server.

5 Enter the port number.

NOTE

- Enter the port number recommended for the used patient data server.

6 Press [Regist] to finalize the setup.

- On the confirmation window, press [Regist].

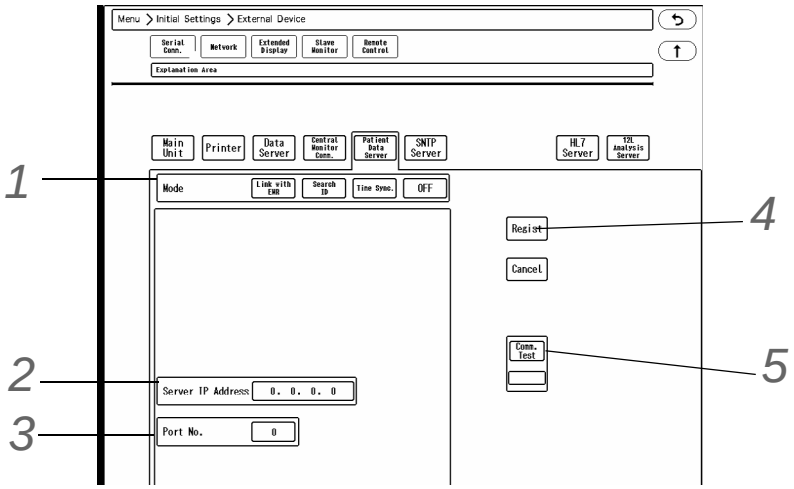
7 Press [Comm. Test].

- If properly communicating, <Pass> will be displayed.
- If any failure occurs to the communication, <Fail> will be displayed. If <Fail> is displayed, check the network setting, and perform the setup again.

❑Time Synchronization

Time synchronization with the patient data server will be performed. The time will synchronize with the patient data server every minute. However, if higher priority time synchronization is present (see below), this setting will be invalid.

1 Select [Time Sync.] for "Mode" on the patient data server setup window.



2 Enter the IP address of the patient data server.

3 Enter the port number.

NOTE

- Enter the port number recommended for the used patient data server.

4 Press [Regist] to finalize the setup.

- On the confirmation window, press [Regist].

5 Press [Comm. Test].

- If properly communicating, <Pass> will be displayed.
- If any failure occurs to the communication, <Fail> will be displayed. If <Fail> is displayed, check the network setting, and perform the setup again.

SNTP Server

By using the SNTP (Simple Network Time Protocol) server, the time can be synchronized to SNTP server once every minute.

However, if higher priority time synchronization is present, this setting will be invalid.

Refer to the following for the priority of time synchronization.

NOTE

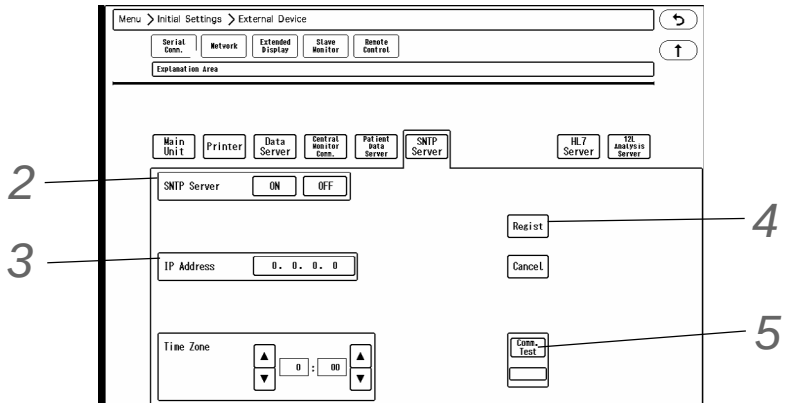
- Priority of the Time Synchronization
  The time will be synchronized with the following priority.

  1 Administrating monitor

3 SNTP server, if used.

4 Patient data server, if used, and if [Time Synchronization] is selected on Patient Data Server setup, or "Time Synchronization" is set to [ON] for [Link with EMR] or [Search ID].

1 Press the [Menu], [Initial Settings], [Network] ("External Device"), [SNTP Server] keys.



2 Select [ON]/ [OFF] for SNTP server function.

3 Enter the IP address of the SNTP server.

4 Press the [Regist] key to finalize the setup.

- On the confirmation window, press the [Regist] key.

5 Press the [Comm. Test] key.

- If properly communicating, <Pass> will be displayed.
- If any failure occurs to the communication, <Fail> will be displayed. In such case, check the network setting, and perform the setup again.

HL7 Server

If the HL7 (Health Level Seven) server is used in the hospital, patient information and current measurement data monitored on the DS-1800 System can be transmitted to the HL7 server when requested.

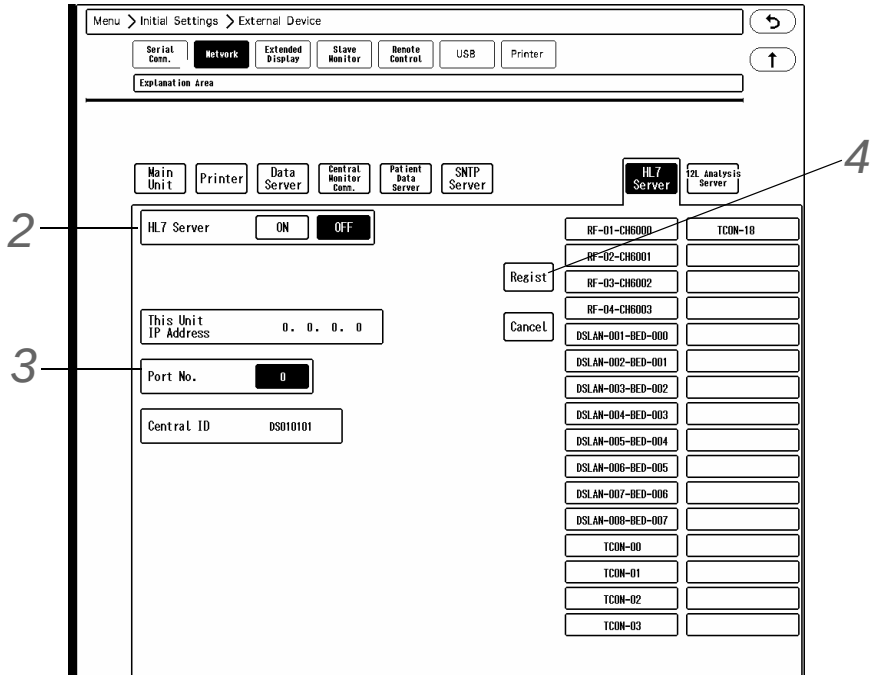
NOTE

- Only one HL7 server can access to one central monitor.
- There may be some parameters without measurement data if parameter display is set to OFF on the bedside monitor, or monitoring is suspended, or telemetry condition is not good. In such case, those measurement data will not be transmitted to the HL7 server from the central monitor.
- When using the HL7 server, synchronize the time with the DS-1800 System. Perform SNTP server setup or select [ON] for " Time Synchronization" on the "Network Configuration (Patient Data Server)" screen.

Parameters that can be transmitted to the HL7 Server.

HR, ST1, ST2, RR (Impedance/CO_2/Ventilator) , BP1 to BP8, $EtCO_2$, $InspCO_2$, SpO_2, PR (SpO_2), T1 to T8, VPC, NIBP, E-O_2, I-O_2, E-N_2O, I-N_2O, E-CO_2,
I-CO_2, E-Agent1, I-Agent1, E-Agent2, I-Agent2, SvO_2, CCO, CCI, BT

1 Press the [Menu], [Initial Settings], [Network] ("External Device"), [HL7 Server] keys.



For "This Unit IP Address", IP address for the DS-1800 System will be displayed.
For the "Central ID" , an unique ID for this unit will be displayed.

On the right side of the screen, the registered beds (max. 32) will be displayed.
(☞"Bed Register" P5-26)

2 Select from [ON] / [OFF].

3 Enter the port number for HL7 server using the numeric keys.

NOTE

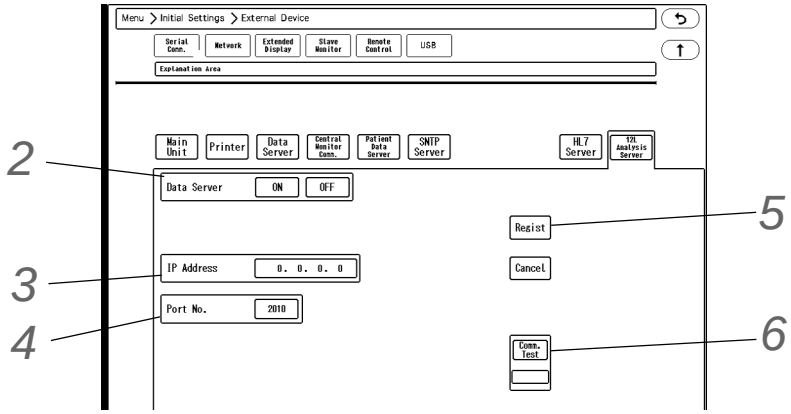
- Input the port number recommended for the used HL7 server.

4 Press the [Regist] key to finalize the setup.

12-Lead Analysis Server

By using the 12-lead analysis server, the 12-lead analysis data can be transmitted to the server.

1 Press [Menu > Initial Settings > External Device > Network > 12L Analysis Server].



2 Select [ON]/[OFF] for "Data Server" .

3 Enter the IP address of the server.

4 Enter the port number.

NOTE

- Enter the port number recommended for the used 12-lead analysis server.

5 Press [Regist] to finalize the setup.

- On the confirmation window, press [Regist].

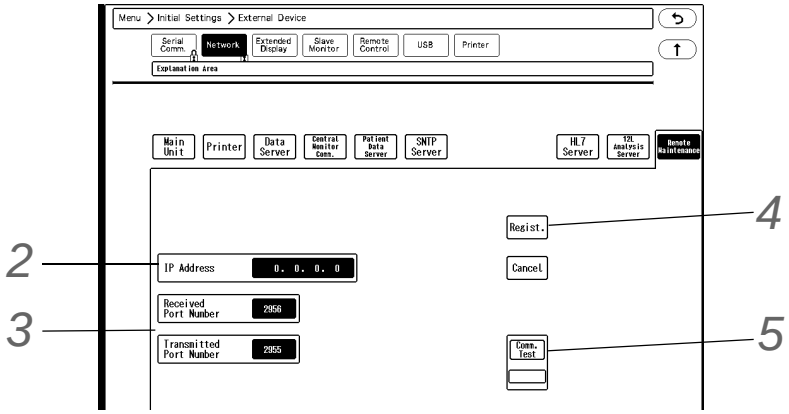
6 Press [Comm. Test].

- If properly communicating, <Pass> will be displayed.
- If any failure occurs to the communication, <Fail> will be displayed. If <Fail> is displayed, check the network setting, and perform the setup again.

Remote Maintenance

By using the remote maintenance function, log data of the central monitor can be transmitted to the specified server.

1 Press [Menu > Initial Settings > External Device > Network > Remote Maintenance].



2 Enter the IP address of the remote maintenance server.

NOTE

- By default, the IP address of the data server is set.

3 Enter the port number.

NOTE

- Enter the port number recommended for the used remote maintenance server.

4 Press [Regist] to finalize the setup.

- On the confirmation window, press [Regist].

5 Press [Comm. Test].

- If properly communicating, <Pass> will be displayed.
- If any failure occurs to the communication, <Fail> will be displayed. If <Fail> is displayed, check the network setting, and perform the setup again.

Chapter 3 Using the Storage Media

The following storage media can be used for this device.

- SD card (standard accessory, 2 GB)
  SD card is equipped as standard in SD card slot 1.
  Maximum of 48 hours of data (tabular trend, graphic trend, and ST measurement results) will be automatically stored.
- SD card for full disclosure waveform recording: FSD-64G (optional accessory, 64 GB)
  Maximum of 336 hours of full disclosure waveform data can be stored.
- USB Memory (for data transfer)
  The patient data and setup data can be backed up and copied.

NOTE

- Use only the specified storage media.
- By inserting the formatted media to this device, the writing of data will automatically start.
- If the media is removed during the process, the patient data after removal of media will not be saved. Even if SD card and USB memory are both inserted, the destination to save the data will not automatically switch when one of the storage media is removed.
- When number of waveforms or printing duration of the full disclosure waveform is changed, full disclosure waveform, trend, recall, ST measurement result, 12-lead analysis, hemodynamics data, QT waveform, ODI data stored on the storage media will be deleted.
- When turning OFF the power of the device, set to standby mode, and then disconnect the power cable to avoid deletion of data stored on the storage media,
- Inserting/removing the SD card will be performed by our service representative. Users should not attempt it.

SD Card for Full Disclosure Waveform Recording

❑Format

1. Press [Menu > Maintenance (enter password) > Memory Media].
2. If the writing is in process for "SD Card 1" , press [Cancel] for more than 2 seconds.
3. Remove SD card (standard accessory) from SD card slot 1, and insert the FSD-64G (optional accessory).
4. Press [Format] for more than 2 seconds.
   - <Format in progress> will be displayed.
   - It will take about 3 minutes to format. Do not remove the storage media or turn off the power during the format process.
   - When <Format succeeded.> is displayed, the format process is complete.

❑To Change the Recording Duration

1 Press [Menu > Maintenance (enter password) > Memory Media > SD Card 1].

2 If the writing is in process for "SD Card 1" , press [Cancel] for more than 2 seconds.

3 Change the recording duration.

4 Press [Format] for more than 2 seconds and start the format process.

Data Backup/Copy

This section explains about the backup and copy procedure of the setup data using the optional USB memory.

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 USB memory.

For details of the setup data/patient data which can be backed up, refer to "☞"Data that can be Backed Up/Copied" P3-5".

⚠ CAUTION

- Make sure the power is ON before setting the USB memory to this device.
- Use only the USB memory specified by Fukuda Denshi.
- During access to the USB memory, all keys will become inoperative until the process is complete.

NOTE

- Make sure to format the USB memory in advance.
- Remove write protection before using the USB memory.
- If read/write is incorrectly selected, the data on the USB memory may be unintentionally overwritten with the data on the patient monitor. Make sure to check that the selection is correct before pressing [Yes].
- Do not connect more than one USB memory at the same time.

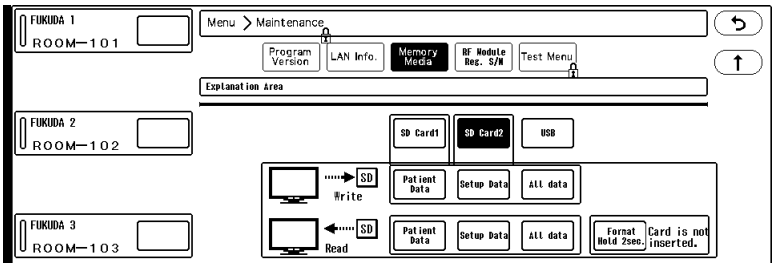
To Format the USB Memory

❑Procedure to Format the USB Memory

1 Connect the specified USB memory to one of the USB slots 1 to 4.

2 Press [Menu > Maintenance (enter password) > Memory Media].

▸ "Memory Media" window will be displayed.



3 Select [USB], and press [Format] for more than 2 seconds.

▸ <Format in progress> will be displayed. Wait until <Card for Data Transfer> is displayed.

▸ It will take about 1 minute to format. Do not remove the storage media or turn off the power during the format process.

▸ When <Card for Data Transfer> is displayed, the format process is complete.

Writing/Reading the Setup Data

The writing/reading procedure of setup data is explained below.

1 Press the [Menu], [Maintenance], enter password, [Memory Media] keys.

▸ The "Memory Media" menu will be displayed.

2 Select [USB].

3 To Write the Setup Data

1 Set the USB memory to this device.

2 Press the [Setup Data] key for "Write".
A confirmation message will be displayed.

3 Press the [Yes] key if OK to write the data to the USB memory.

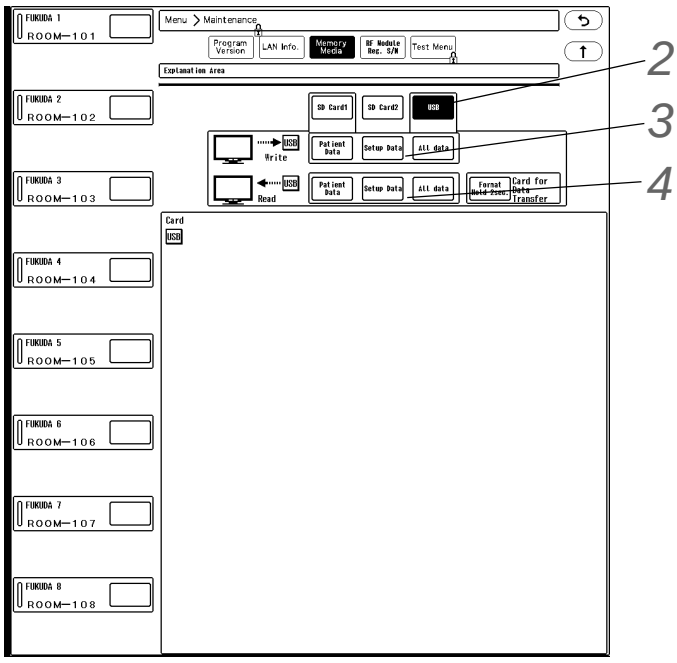
4 To Read the Setup Data

1 Make sure that the USB memory is properly set.

2 Press the [Setup Data] key for "Read".
A confirmation message will be displayed.

3 Press [Yes] to read the data from the USB memory.

4 When the display returns to home display after the reading process is completed, restart the system.



Writing/Reading the Patient Data

The writing/reading procedure of patient data is explained below.

1 Press [Menu > Maintenance (enter password) > Memory Media].

▸ "Memory Media" window will be displayed.

2 Select [USB].

3 To Write the Patient Data

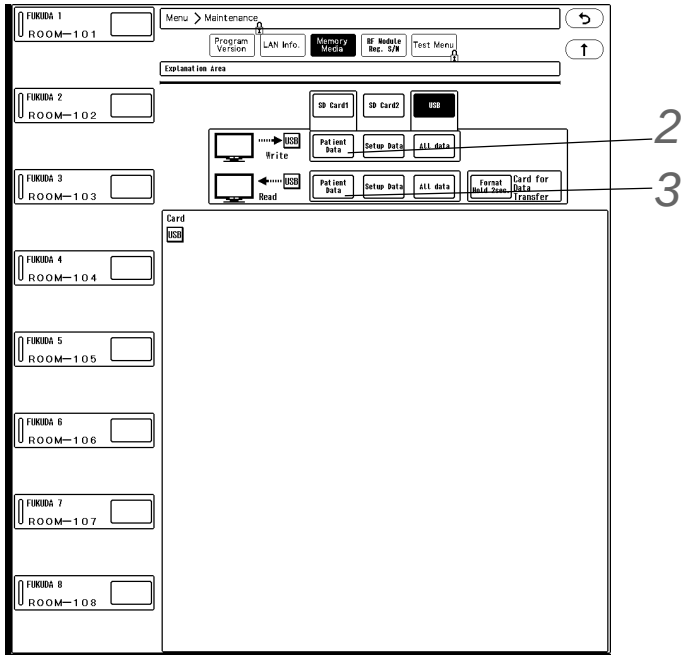
1 Set the USB memory to this device.

2 Press the [Patient Data] key for "Write".

3 On the patient list displayed on the left side, press the [Write] key for the patient to write the data.

4 Select the area on the right side to write the data.
A confirmation message will be displayed.

▸ In this area, patient data saved in the USB memory will be displayed.



5 Press the [Yes] key to write the data to the USB memory.

4 To Read the Patient Data

1 Make sure that the USB memory is properly set.

2 Press the [Patient Data] key for "Read".

3 Select the patient data on the right side to read the data.

4 On the patient list displayed on the left side, press [Write] for the patient to write the data. A confirmation message will be displayed.

5 Press [Yes] to read the data from the USB memory.

6 The display will return to the home display when the reading process is completed.

7 When the reading process is completed for all the selected patient data, restart the system.

⚠ CAUTION

- Reading the patient data from the USB memory will erase all previous patient data stored in the patient monitor. The erased patient data cannot be restored.

Data that can be Backed Up/Copied

The following data can be backed up/copied using the USB memory.

❑Patient Data

Patient Admit/Discharge

Setup Item		Data Transfer by USB memory
Patient Information	ID	Yes
	Birth Date/Age	Yes
	Height/Weight/BSA	Yes
	Admit Date	Yes
	Bed Name	-
	Patient Classification	Yes
	Sex	Yes
	Nurse Team	-
	Pacemaker	Yes
	Comment	Yes
Monitor Suspend	Monitor Suspend Condition	-

Alarm

Setup Item		Data Transfer by USB memory
Alarm Suspend	Alarm Suspend Condition	-
Alarm Setup	All Arrhythmia Alarms	Yes
	HR	Yes
	ST1/ST2	Yes
	ΔST1/ΔST2	Yes
	QTc	Yes
	BP1 to BP8 (mmHg/kPa)	Yes
	CVP (cmH_2O)	Yes
	PR-IBP	Yes
	NIBP (mmHg/kPa)	Yes
	RR	Yes
	Apnea	Yes
	$EtCO_2$/$InspCO_2$ (mmHg/kPa/%)	Yes
	$ExpO_2$, $InspO_2$	Yes
	$ExpN_2O$/$InspN_2O$	Yes
	ExpAgent/InspAgent	Yes
	MAC	Yes
	MVe (Adult, Child/Neonate)	Yes
	PEAK	Yes
	PEEP	Yes
	SpO_2, SpO_2-2	Yes
	PR_SpO_2, PR_SpO_2-2	Yes
	ExtSpO_2, ExtSpO_2-2	Yes
	SpMet, SpMet-2	Yes

Alarm

Setup Item		Data Transfer by USB memory
	SpCO, SpCO-2	Yes
	SpHb, SpHb-2	Yes
	T1 to T8 (°C/°F)	Yes
	Tb (°C/°F)	Yes
	12-Lead ST	Yes

Parameter

Setup Item		Data Transfer by USB memory
ECG	Leads	Yes
	Waveform Size	Yes
	Filter Mode	Yes
	Synchronized Mark/Tone	Yes
	Pacemaker	Yes
	Pacemaker Pulse	Yes
	Pace Pulse Mask Time	Yes
	QRS Detection	Yes
	Drift Filter*	Yes
	AC Filter*	Yes
	Auto Lead	-
	ST/VPC/Arrhy. Alarm Display	-
	HR Delay	Yes
RESP	Waveform Size	Yes
	RR Synchronized Mark	Yes
	RR/APNEA Alarm Source	-
	CVA Detect	Yes
SpO_2	Waveform Size	Yes
	Synchronized Mark/Tone	Yes
	Perfusion Index	Yes
NIBP	NIBP Periodic Measurement	Yes
	Measurement Interval	Yes
	Timer	Yes
	Patient Classification	Yes
	PR Display	Yes
	MAP	-
	Time Display	Yes
BP1 to BP8	Label	-
	Scale	Yes
	Synchronized Mark/Tone	Yes
	Display Type	-
TEMP	Label	-
CO_2	Unit	Yes
	Scale	Yes

Parameter

Setup Item		Data Transfer by USB memory
Ventilator	Scale	Yes
Multigas	GAS_CO_2/GAS_O_2/GAS_AGT Scale	Yes
	AWP/AWF/AWV Scale	Yes
	Wave Clip	-
SI	All Setup	Yes
RPP	All Setup	Yes

*Only the LX beds will be transferred.

Data Review

Setup Item		Data Transfer by USB memory
Graphic Trend	Trend A to D	Yes
	Time	-
	Display Selection	Yes
	Scale, Display Selection	Yes
	Alarm Display Selection	Yes
	Trend Data Setup	Yes
Tabular Trend	Display Time Interval	-
	Group	Yes
	Fixed Parameters	Yes
	Parameter Selection	Yes
	Filtering (Sampling Interval)	Yes
Recall	Waveform	Yes
	Display Selection	-
	Recall Factor	Yes
ODI	ODI Setup	Yes
Alarm History	Display Selection	-
	Alarm Type	-
Past Data		-

Waveform Review, Calculation

Setup Item		Data Transfer by USB memory
Full Disclosure Waveform	Compressed Waveform/Quantity	-
	Compressed Waveform/ Parameter	-
	Enlarged Waveform/Quantity	-
	Enlarged Waveform/Parameter	-
	Time per Line	-
	Slide Show Interval	-
	Enlarged Waveform Scroll Interval	-
	Trend Display	No
	Size of ECG1, ECG2, ECG (I) to (V6)	-
	BP Scale	-

Waveform Review, Calculation

Setup Item		Data Transfer by USB memory
	SpO_2 Size	-
	RESP Size	-
	CO_2 Scale	-
	O_2 Scale	-
	Agent Scale	-
	AWP Scale	-
	AWF Scale	-
ST	All Setup	-
12-Lead Analysis	All Setup	-
Hemodynamics	All Setup	-

Each Bed

Setup Item		Data Transfer by USB memory
Manual Printing	Waveform	Yes
	Print Duration	Yes
	Delay Time	Yes
Alarm Printing	Mode	Yes
	Factor	Yes
	Waveform	Yes
	Print Duration	Yes
Periodic Printing	Print Settings	Yes
	Printing Mode	Yes
	Interval	Yes
	Timer	Yes
	Waveform	Yes
	Print Duration	Yes
12-Lead Printing Setup	Printing Format	Yes
	Position	Yes
	Wave Format	Yes
	Printer Auto Scale	Yes
	Print Calibration	Yes
	Lead Boundary	Yes
Printer	Graphic Trend	Yes
	Tabular Trend	Yes
	Recall Enlarged Waveform	Yes
	ST	Yes
	Full Disc. Compressed Wave	Yes
	Full Disc. Zoom Wave	Yes
	12-Lead Waveform	Yes
	12-Lead Analysis	Yes
	Hemodynamics	Yes
	Alarm History	Yes

Each Bed

Setup Item		Data Transfer by USB memory
Color Setup	Palette	-
	Color settings for all parameters	Yes
	Patient Name	Yes
Nurse Call Setup	Nurse Call	Yes
	Nurse Call Factor	Yes
Full Disclosure Waveform	Waveforms to Save	-
Data Server Waveform	Waveform	-
Parameter ON/OFF	ECG1, BP1 to BP8, NIBP, SpO_2, SpO_2-2, RESP, CO_2, T1 to T8, SvO_2/CCO, GAS, BIS, INVOS, SPIRO, VENT	Yes

❑Setup Data

Parameter

Setup Item		Data Transfer by USB memory
Scoring	Score Setup	Yes
	Source Select	-
	Score Mode General Setup	Yes
	Score Mode	Yes
	Update Setup	Yes

Basic Setup

Setup Item		Data Transfer by USB memory
Display Layout	Display Pattern	-
	Numeric Data Box	-
	Numeric Data	-
	Waveform	-
	User Key	-
Detail Setup	Alarm Limit Display	Yes
	At Alarm Occurrence	Yes
	Grid	Yes
	Scale	Yes
	Thickness	Yes
	Clip	Yes
	Fill CO_2 Waveform	Yes
	Fill O_2 Waveform	Yes
	Fill Agent Waveform	Yes
	BP Overlap	Yes
	RR Overlap	Yes
	12-Lead ST Wave	Yes
	ST/VPC/Arrhy. Alarm Display	Yes
Block Cascade	Waveform Quantity	Yes

Basic Setup

Setup Item		Data Transfer by USB memory
	Displayed Waveform	Yes

Function > Network View

Setup Item		Data Transfer by USB memory
Network View	Area Name	Yes
	Color	Yes

Function > All Beds Events

Setup Item		Data Transfer by USB memory
This Display		-
Other Display		-
Nurse Team		-
Event Group	Label	Yes
	Event Setup	Yes
	Color Setup	Yes
Event List Setup		Yes

Function > All Beds Nurse Call

Setup Item	Data Transfer by USB memory
This Display	-
Other Display	-
Nurse Team	-
Alarm Items	-
Highlight	-

Common Setup > Display Config.

Setup Item		Data Transfer by USB memory
All Beds	Layout Selection	-
	Layout Change	-
	Bed Selection	-
Other Setup	Numeric Data Box	-
	Zoom Numeric Data	-
	Layout Registration	Yes
Each Bed	Numeric Data	-
	Waveform	-
Detail Setup		
Patient Name/Bed Name	Patient Data Area	Yes
	Waveform Area	Yes
Numeric Data	ST/VPC/Arrhy. Alarm Display	Yes
	Alarm Limit Display	Yes
	At Alarm Occurrence	Yes
	Display Priority	Yes
Waveform	Circulatory, Respiratory [mm/s]	Yes
	Grid	Yes

Common Setup > Display Config.

Setup Item		Data Transfer by USB memory
	Scale	Yes
	Thickness	Yes
	Wave Clip	Yes
	Fill CO_2 Waveform	Yes
	Fill O_2 Waveform	Yes
	Fill Agent Waveform	Yes
	BP Overlap / RR Overlap Waveform	Yes
	Display Priority	Yes
Other	Patient Data Area	Yes

Common Setup > Tone/Volume, Brightness, Monitor Suspend, Nurse Team

Setup Item		Data Transfer by USB memory
Physiological Alarm	-	-
Urgent, Caution	Volume, Tone	Yes
Status	Volume, Tone	Yes
Ventilator Alarm	Volume, Tone	Yes
Device Status Alarm (Urgent, Caution, Status)	Volume, Tone	Yes
Sync. Tone	Volume, Tone	Yes
Key Sound	Volume, Tone	Yes
Other	Volume, Tone	Yes
Boot Sound	Volume, Tone	Yes
Brightness	Main Unit	Yes
Monitor Suspend	Monitor Suspend Label	Yes
	Monitor Suspend Timer	Yes
	Label 1 to Label 15	Yes
Nurse Team ON/OFF Name: 7 characters Color: 8 colors	Team Name 1 to 8	Yes

Initial Settings > Alarm

Setup Item		Data Transfer by USB memory
Alarm System		Yes
Basic Alarm Parameter		Yes
Asystole, VF, VT Alarm		Yes
Ventilator Alarm		Yes
Suspend Arrhythmia Analysis during Noise Interference		Yes
Lower Limit for Alarm Volume		Yes
Alarm Indicator		Yes
Alarm Level: Numeric Data	All Parameters	Yes
Alarm Level: Arrhythmia	All Arrhythmia	Yes
Alarm Level: Technical	Ventilator	Yes
Alarm Auto Setup		Yes

Initial Settings > Alarm

Setup Item		Data Transfer by USB memory
Alarm Threshold Limit		Yes
Alarm Suspend Time		Yes
Alarm Silence Time		Yes
Too Far Alarm	Setup	Yes
	Time	Yes
During Lead OFF	Alarm Judgement	Yes
	Alarm Printing	Yes
	Lead OFF Message	Yes
	Lead OFF Alarm Interval	Yes
During "Check SpO_2 Sensor"	Alarm Judgement	Yes
Alarm Occurrence at NIBP Failure		Yes
Alarm Wave Background		Yes
Event Display		Yes
Alarm Suspend/Alarm Silence from Central Monitor		Yes
Link with Alarm Sound Suspend		Yes
Status Alarm Control		Yes

Initial Settings > Nurse Call Custom

Setup Item		Data Transfer by USB memory
1 to 6	Customized Notification	Yes
	Name	Yes
	Message	Yes
	Condition	Yes

Initial Settings > Measurement

Setup Item		Data Transfer by USB memory
Unit	ST	Yes
	Blood Pressure	Yes
	Temperature	Yes
	CO_2 Atmospheric Pressure	Yes
	Unit	Yes
Other	Disregard Artifact Ch. at QRS Detect	Yes
	Display measurement error on NIBP list	Yes
	Drift Filter	Yes
	Auto Resume Monitoring	Yes

Initial Settings > User I/F

Setup Item		Data Transfer by USB memory
Display/Print	Date Format	Yes
	BP Alarm Increment	Yes
	RR Alarm Increment	Yes
	Trend Clip	Yes
	Built-in Printer Message	Yes

Initial Settings > User I/F

Setup Item		Data Transfer by USB memory
	ST Display Lead Setup (A to C)	Yes
	QRS Classification	Yes
	Speed	Yes
	Print Calibration	Yes
	BP Printing Scale	Yes
	CO_2 Printing Scale	Yes
	Meas. Info. Printing	Yes
	LX Remote Printing	Yes
	Setup at Discharge	Yes
	Home Display	Yes
	Dim All Data Other than Numeric	Yes
	Message Icon	Yes
	Room/Bed ID Display	-
	LAN_ID Unique Name Setup	-
	Event Label Setup	Yes
	Optimize Display	-
	Register Fixed Comment	Yes
	Waveform Size on Individual Bed Display	Yes
Admit: Parameter ON/OFF	ECG1, BP1 to BP8, NIBP, SpO_2, SpO_2-2, RESP, CO_2, T1 to T8, SvO_2/ CCO, GAS, BIS, INVOS, SPIRO, VENT	Yes
Admit: Alarm Setup	All Arrhythmia Alarms	Yes
	All Parameters	Yes
Admit: Nurse Call	Nurse Call ON	Yes
	Factor	Yes
User Key: Central Monitor Display	Color selection for central monitor display user key	Yes
User Key: Individual Bed Display	Color selection for individual bed display user key	Yes
Operation	Mouse Speed	Yes
	Auto Hide Window	Yes
	Waveform Area Function	Yes
Shortcut Key		Yes

External Device > Serial Communication

Setup Item		Data Transfer by USB memory
Serial Communications	COM1 to COM2	-
Nurse Call	Monitor ID	-
	Higher Priority (than others)	Yes
	Nurse Call during Alarm Silence	Yes
	Alarm Factor Length	Yes
	Re-notify Nurse Call	Yes

External Device > Serial Communication

Setup Item		Data Transfer by USB memory
	Duration until re-notification	Yes
	Night Use	Yes
	Night Start/End Notice	Yes
	Night Start/End Time Setup	Yes
PC Communication	Protocol Version	Yes
	Parity	Yes
	Stop Bit Length	Yes
	Communication speed	Yes
Magnetic Card Reader	Starting Digit / Ending Digit: All Setups	Yes
	Birth Date	Yes
	Sex (Character String for Male)	Yes
	Exclude "-" from Patient ID	Yes
	Control Type	Yes
	Data Length	Yes
	Stop Bit Length	Yes
	Parity	Yes
	Significant Bit Length	Yes
	Communication speed	Yes
	Retry times	Yes
	Data type	Yes
	Maximum Data Size	Yes
Barcode Reader	Starting Digit / Ending Digit: All Setups	Yes

External Device > Network

Setup Item		Data Transfer by USB memory
Main Unit	IP Address	-
	Subnet Mask	-
	Default Gateway	-
Printer	Usage	-
	IP Address	Yes
	MAC Address	Yes
	Printer Specification	Yes
Data Server	Data Server	-
	Protocol	Yes
	Near Real Time	Yes
	IP Address	Yes
	Port No.	Yes
	Data Transfer	-
	IP Address	Yes
	Port No.	Yes
	Transmission Speed	Yes
Central Monitor Communication	Mode	-

External Device > Network

Setup Item		Data Transfer by USB memory
	Server IP Address	Yes
	Data Transfer Port No.	Yes
	Administrative Port No.	Yes
Patient Data Server	Mode	-
(Link with EMR)	Offline	-
	EMR Notice Icon	Yes
	Time Synchronization	Yes
	Server IP Address	Yes
	Server Port No.	Yes
	This Unit Port No.	Yes
(Search ID)	Search Patient ID Linked to Magnetic Card Reader (Barcode Reader)	Yes
	Time Synchronization	Yes
	Server IP Address	Yes
	Server Port No.	Yes
(Time Synchronization)	Server IP Address	Yes
	Server Port No.	Yes
SNTP Server	SNTP Server	-
	IP Address	Yes
HL7 Server	HL7 Server	-
	Port No.	Yes
12-Lead Analysis Server	Data Server	-
	IP Address	Yes
	Port No.	Yes

Initial Settings > External Device > Extended Display, Remote Control, USB, Printer

Setup Item		Data Transfer by USB memory
Extended Display Unit	Extended Display Unit Usage	-
	Extended Display Unit Location	-
	Alarm Silence Key Function	-
Slave	Function	-
	Patient Name	-
	Menu Display	-
	Mouse Pointer	-
Remote Control	Usage	-
(Main Unit, Extended Display Unit)	Room ID	-
	Bed ID	-
USB	USB Connector	-
Printer	Printer Connection	-

System

Setup Item		Data Transfer by USB memory
Central ID	Room ID	-
	Central ID	-
Bed Register		-
Channel	Stored Channel No.	Yes
Receiver Setup	Switch Antenna	-
	Diversity Threshold	-
	Garbled Circuit	-
Bed Name	Bed Name Registration	Yes
Other	AC Frequency	Yes
	Synchronized Tone	Yes
	Synchronized Mark	Yes
	Data Transfer ON/OFF	-
	Upload Waveform Selection	Yes
	ON/OFF of DS-LAN Output of RF Bed	-
	Number of RF Beds	-

Administrator Setup

Setup Item		Data Transfer by USB memory
Lock	Central Monitor Display	Yes
	Individual Bed Display	Yes
Password	Password Setup	Yes

The following items will not be backed up/copied.

- Time/Date
- Room ID/Bed ID
  (If the Bed ID is duplicated, wired network connection will not be possible.)
- Main Unit Port Setup for External Device Connection
  (After reading the setup data, make sure to restart the monitor and check the system 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.)

Screenshot of the Display

The screenshot of the display can be saved using the optional USB memory.

⚠ CAUTION

- While saving the screenshot, all keys will become inoperative. A tone set under [Tone/ Volume > Other] will be generated when the saving process is completed.

NOTE

- Make sure to format the USB memory in advance.
- Remove write protection before using the USB memory.
- Do not connect more than one USB memory at the same time.

❑Screenshot of the Whole Display

1 Press [Screenshot] on the central monitor user key area.

2 The screenshot of the whole display will be saved on the USB memory with a file name of "17ALxxxx.BMP" (xxxx: 0000 to 9999).

❑Screenshot of the Individual Bed Display

1 Press [Screenshot] on the individual bed user key area.

2 The screenshot of the individual be display will be saved on the USB memory with a file name of "17INxxxx.BMP" (xxxx: 0000 to 9999).

Chapter 4 Connection to the External Devices

The following external devices can be connected to this device.

- EMR Machine
- Nurse Call System
- Magnetic Card Reader
- Barcode Reader

EMR Link Function

Using the EMR link function through the patient data server allows to perform the following operation.

- When a patient is admitted on EMR, the same patient will be admitted on the DS-1800 System.
- When a patient is discharged on EMR, this patient's information on the DS-1800 System will be initialized.
- When a patient information is changed on the EMR, the patient information on the DS-1800 System will also change.

Restrictions of EMR Link Function

There are following restrictions when using the EMR link function.

Function	Item	Network Configuration (Patient Data Server)		
		EMR Link Function		
		EMR Admitted	EMR Discharged	EMR Offline
Individual Bed Menu	[Discharge]	No	Yes	Yes
Menu (Central Monitor Display)	[Bed Transfer]	No	No	Yes
User Key	[Bed Transfer]	No	No	Yes
USB Menu	[Read Patient Data]	No	No	Yes
	[Write Patient Data]	Yes	Yes	Yes
Admit/Discharge	[ID]	No	No	Yes
	[Search Patient]	No	No	No
	[Name]	No	No	Yes
	[Discharge]	No	Yes	Yes
	[Suspend]	Yes	Yes	Yes
	[Admit Date/Time]	No	No	Yes
	[Bed Name]	Yes	Yes	Yes
	Other patient information	Yes	Yes	Yes
	Confirmation window display during reading data from the magnetic card, barcode	No	No	No

Function	Item	Network Configuration (Patient Data Server)		
		EMR Link Function		
		EMR Admitted	EMR Discharged	EMR Offline
DS-LAN Network (Operation on the bedside monitor)	Change of patient ID	No	No	Yes
	Change of patient name	No	No	Yes
	Change of admit date	No	No	Yes
	Change of patient information	Yes	Yes	Yes
	Discharge process	No	Yes	Yes

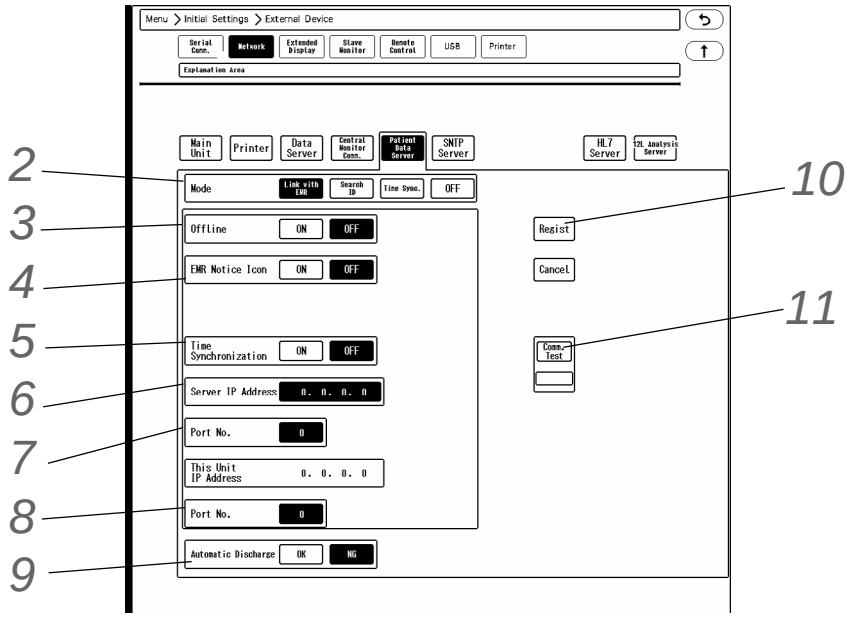
"Yes": Can display, edit, and change settings.

"No": Cannot display, edit, and change settings.

Patient Data Server Setup

1 Press [Menu > Initial Settings > External Device > Network > Patient Data Server].

- "Patient Data Server" setup window will be displayed.



2 Select [Link with EMR] for "Mode".

3 Offline

- Select [ON]/[OFF] for "Offline". (☞"Suspending the Function" P4-4)

4 EMR Notice Icon

- [ON]: Displays the EMR notice icon (Ex.;) on the home display when a patient is admitted on EMR. Pressing this icon will display the "Admit/Discharge" menu.
- [OFF]: EMR notice icon will not be displayed.

5 Time Synchronization

- [ON]: Synchronizes the time of the DS-1800 System with patient data server by communicating with the server every minute.

NOTE

- However, if higher priority time synchronization is present, this setting will be invalid.
- Priority of the Time Synchronization
  The time will be synchronized with the following priority.
  1 Administrating monitor, if wired network is constructed.
  2 SNTP server, if used.
  3 Patient data server, if used, and if [Time Synchronization] is selected on Patient Data Server setup or "Time Synchronization" is set to [ON] for [Link with EMR] or [Search ID].

▸ [OFF]: Synchronization with the patient data server will not be performed.

6 Server IP Address (IP address of the patient data server)

7 Port Number for Communication

▸ Enter the port number recommended for the used patient data server.

8 Port Number of DS-1800 System

▸ The port number in the range from 1024 to 65535 can be entered. The recommended port number is "2809".

9 Automatic Discharge

▸ [OK]: When the patient is discharged on the external device, the patient will be also discharged on this central monitor. The patient information, review data, settings at admittance will be initialized.

▸ [NG]: When the patient is discharged on the external device, the patient will not be discharged on this central monitor. Only the patient information will be initialized.

10 Press the [Regist] key to finalize the setup.

11 Communication Test

▸ If properly communicating, <Pass> will be displayed.

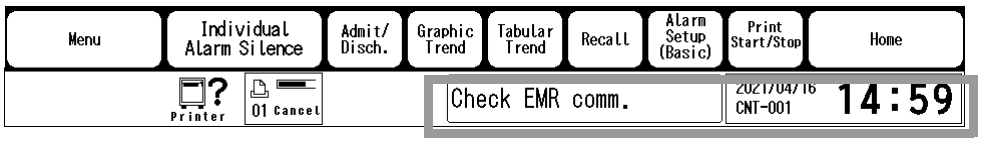
▸ If any failure occurs to the communication, <Fail> will be displayed. If <Fail> is displayed, check the network setting, and perform the setup again.

Admit/Discharge on the EMR

Patient admit/discharge process can be linked with EMR.
(☞Operation Manual "EMR Link Function" P6-7)

Suspending the Function

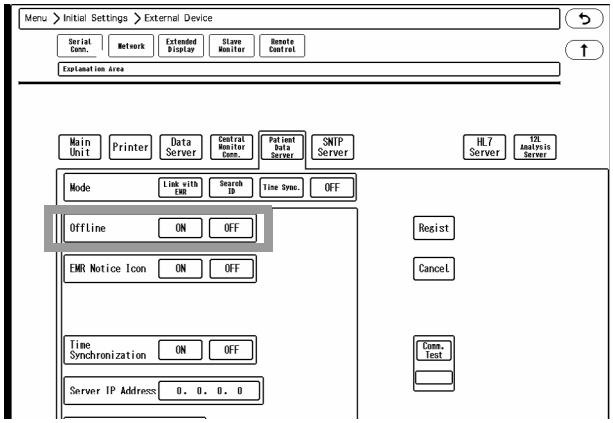
If communication failure occurs between the DS-1800 System and patient data server, <Check EMR comm.> will be displayed.



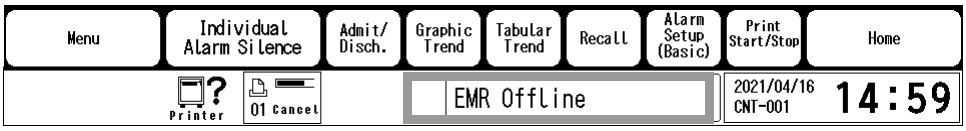
In such case, suspending the EMR link function will allow to perform the standard patient admit/discharge operation (admit/discharge, edit patient ID, bed transfer/exchange) on the central monitor.

During this offline condition, admit/discharge on the EMR will not be linked to the central monitor.

1 Select [ON] for "Offline" under [Menu > Initial Settings > External Device > Network > Patient Data Server].



▸ <EMR Offline> will be displayed in the message area.



2 To resume the EMR link function, select [OFF] for "Offline".

Nurse Call System

PHS nurse call system can be connected to the DS-1800 System.

When a specified alarm generates, it will be notified to the PHS of the hospital staffs, and the alarm factor will be displayed on the PHS.

NOTE

- When the alarm is silenced or when the alarm sound is suspended, the newly generated alarm will not be notified to the nurse call system.

Nurse Call Alarm Factors

The alarm factors to be notified to the nurse call system can be selected from the following.

REFERENCE

- The alarm factor length to be displayed on the PHS (7 or 4 characters) can be set under [Menu > Initial Settings > External Devices > Serial Comm. > Nurse Call]. (☞"Nurse Call Detail Setup" P4-8)

Alarm Type	Alarm Factor	PHS Display		Note
		7 characters	4 characters	
Numeric Data Alarm	HR	HR	HR	
	ST1/ST2	STx	STx	x: ST measurement channel
	ΔST1/ΔST2	STx	STx	x: ST measurement channel
	12-Lead ST	ST	ST	
	BP1, ART	xxx	xxx	xxx: BP label
	BP other than BP1, ART	xxx	xxx	xxx: BP label
	NIBP	NIBP	NIBP	
	SpO_2	SpO2	SpO2	
	Ext SpO_2	ExtSpO2	ExSp	
	PR-1	PR	PR	
	RR	RR	RR	
	Apnea	Apnea	APN	
	T1 to T8	xxx	xxx	xxx: TEMP label
	$EtCO_2$	CO2-E	CO2	
	$InspCO_2$	CO2-I	CO2	
	SpO_2-2	SpO2-2	SpO2	
	ExtSpO_2-2	ExtSpO2	ExSp	
	PR-2	PR-2	PR	
	SpCO-1	SpCO	SpCO	
	SpMet-1	SpMet	SpMt	
	SpHb-1	SpHb	SpHb	
	SpCO-2	SpCO-2	SpCO	
	SpMet-2	SpMet-2	SpMt	
	SpHb-2	SpHb-2	SpHb	
	PR_IBP	PR_IBP	PR	
	MV	MV-E	MV-E	
	PEAK	PEAK	PEAK	
	PEEP	PEEP	PEEP	
	SI	SI	SI	
	RPP	RPP	RPP	
Arrhythmia Alarm	Asystole	ASYSTOL	ASYS	
	VF	VF	VF	
	VT	VT	VT	

Alarm Type	Alarm Factor	PHS Display		Note
		7 characters	4 characters	
	Ext Tachy	EX TACH	EXTA	
	Ext Brady	EX BRAD	EXBR	
	SLOW VT	SLOW VT	SLVT	
	Tachy	Tachy	TACH	
	Brady	Brady	BRAD	
	Run	Run	Run	
	Pause	Pause	PAUS	
	Triplet	Triplet	TPLT	
	Couplet	Couplet	CPLT	
	R on T	R on T	RONT	
	Multiform	MLTFORM	MLTF	
	Vent Rhythm	V RHTM	VRTM	
	Bigeminy	BIGEMIN	BIGM	
	Trigeminy	TRIGEMI	TRGM	
	Frequent	FREQUEN	FREQ	
	SVT	SVT	SVT	
	AFib	AFib	AFib	
	Ireg RR	Ireg RR	IREG	
	Prolong RR	PLNG RR	PLNG RR	
	S Frequent	S FREQ	SFRQ	
	S Couplet	S CPLT	SCLT	
	VPC	VPC	VPC	
	SVPC	SVPC	SVPC	
	Not Capt	NO CAPT	NOCA	
	Not Pacing	NO PACE	NOPA	
Ventilator Alarm	Airway Pressure	V_AWP	VENT	
	Minute Ventilation Volume	V_MV	VENT	
	Apnea	V_APN	VENT	
	Continuous High Pressure	V_CHP	VENT	
	Oxygen Concentration Upper Limit	V_FiO2	VENT	
	Oxygen Concentration Lower Limit	V_FiO2	VENT	
	Upper CO_2	V_CO2	VENT	
	Lower CO_2	V_CO2	VENT	
	Upper RR	V_RR	VENT	
	Lower RR	V_RR	VENT	
	PEEP Low	V_PEEP	VENT	
	Check Connection	V_COMM	VENT	
	Urgent	V_URGT	VENT	
	Ventilator	VENT	VENT	(no detailed factor)

Alarm Type	Alarm Factor	PHS Display		Note
		7 characters	4 characters	
Measurement Status	Too Far	Telemeter	TELE	
	Lead OFF	Lead OFF	LEAD	
Other	Daily Inspection	TESTx	TEST	x: 1 to 3
	Night Mode End Notice	NC_OFF	OFF	
	Night Mode Start Notice	NC_ON	ON	

NOTE

- The priority level of the nurse call alarm factors are the same with that of the alarms unless [ON] is set for "Higher Priority (than others)" under [Menu > Initial Settings > External Devices > Serial Comm. > Nurse Call].

Connecting the Nurse Call System

⚠ CAUTION

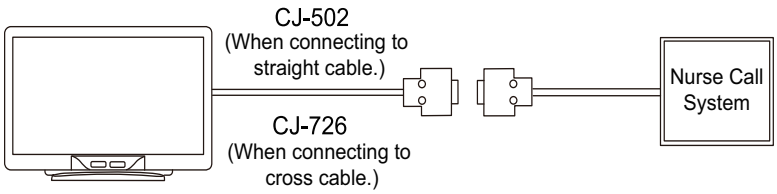
- The cable to connect the nurse call system and the DS-1800 System differs depending on the connecting system. Make sure to use the correct cable.
- When connecting multiple central monitors to one nurse call system, LAN adapter is required. When using the LAN adapter, contact your nearest service representative.

1 Make sure that the power is turned OFF on the nurse call system and this device.

2 Connect the cable.

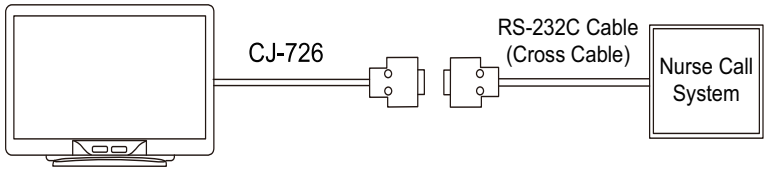
<Connection of Carecom Nurse Call System to One DS-1800 System>

1 Use the CJ-502 connection cable (cross) or CJ-726 relay cable (straight) to connect the nurse call system to the serial connector on this device.



<Connection of Aiphone Nurse Call System to One DS-1800 System>

1 Use the CJ-726 relay cable (straight) to connect the nurse call system to the serial connector on this device.

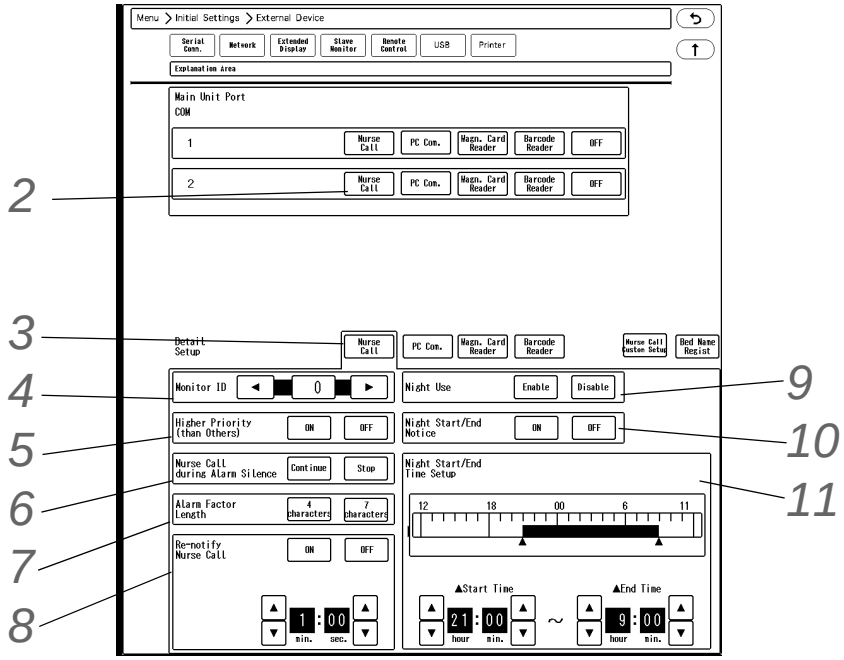


3 Turn ON the power.

Nurse Call Detail Setup

1 Press [Menu > Initial Settings > External Device > Serial Comm.].

- The setup window for the serial communication will be displayed.



2 For COM1 to 2, select [Nurse Call] for the port which the nurse call system is connected.

3 Select [Nurse Call] for "Detail Setup".

4 Monitor ID

- This ID is used to distinguish the central monitors on the nurse call system.
  Make sure to set a unique ID for each central monitor.

5 Higher Priority (than others)

- [ON]: [ON (Priority)] key will be displayed on each nurse call factor setup window under [Menu > Each Bed Setup > Nurse Call]. The nurse call factor with [ON (Priority)] set will be notified with higher priority.
- [OFF]: Higher priority notification will not be performed. Only [ON] / [OFF] keys will be displayed on each nurse call factor setup window under [Menu > Each Bed Setup > Nurse Call].

6 Nurse Call during Alarm Silence

- [Continue]: Alarm notification to the nurse call system will continue even when the [Alarm Silence] key is pressed.
- [Stop]: Alarm notification to the nurse call system will stop when the [Alarm Silence] key is pressed.

7 Alarm Factor Length

- Select from [4 characters] / [7 characters].

8 Re-notify Nurse Call

- [ON]: Alarm will be re-notified to the nurse call system if the alarm factor still remains after the specified duration. The duration for re-notification can be set from 0 min. 30 sec. to 5 min. 00 sec.

- [OFF]: Alarm will not be re-notified to the nurse call system.

9 Night Use

- [Enable]: Nurse call notification will be enabled only at night during the specified duration.
- [Disable]: Night use will be disabled.

10 Night Start/End Notice

- [ON]: Nurse call notification will be performed at the beginning and end of the night use mode.
- [OFF]: Nurse call notification will not be performed at the beginning and end of the night use mode.

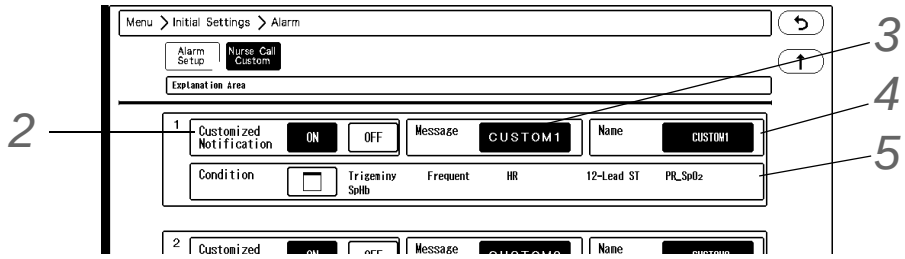
11 ⬆/⬇: Use these keys to set the start time and end time of the night use mode.

- Set the time duration for the night use mode.
- The time can be set in 10 minutes interval. The time bar can be also used to set the time interval.

Nurse Call Custom Setup

Maximum of 6 custom settings for nurse call notification can be made.

1 Press [Menu > Initial Settings > Alarm > Nurse Call Custom].



2 Select [ON]/[OFF] of "Customized Notification" for custom 1 to 6.

3 Enter the nurse team name for custom 1 to 6.

- The set message will be displayed on "Nurse Call " setup window under [Menu > Each Bed Setup] and [Menu > Initial Settings > User I/F > Admit].

4 Enter the notification message for custom 1 to 6.

- The set name will be displayed on the PHS of the hospital staffs.

5 Select the notifying alarm factor for custom 1 to 6.

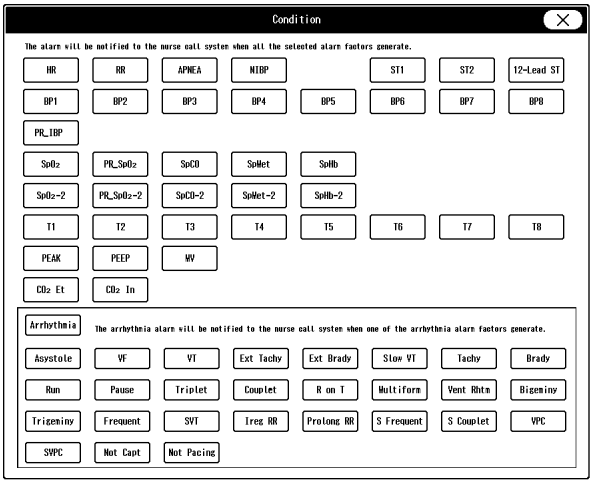
- From the currently set alarm factors, maximum of 10 alarm factors will be displayed.

1 Press the key for "Condition" .

- The window to select the alarm factors will be displayed.

2 Select the parameters to notify as nurse call custom factors.

- The arrhythmia alarm factors will be displayed when [Arrhythmia] is selected as the alarm factor.



Bed Name Acquisition (When Carecom PHS nurse call system is used)

The bed name will be used for the PHS nurse call notification and can be also displayed on the home display.
In this section, the procedure for the bed name setup is explained when using the Carecom PHS nurse call system.

WARNING

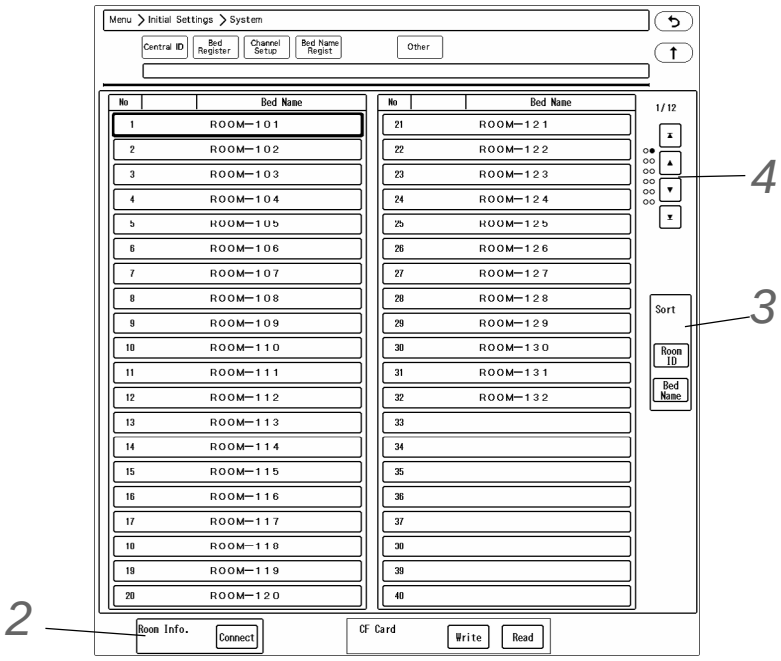
- When PHS nurse call system is used, bed name needs to be set, as nurse call bed will be specified by the bed name.
  If the bed name is not set, the patient cannot be specified on the nurse call system.
  The registered bed name on the "Bed Name Regist" menu can be assigned to the patient during the admit process. (☞Operation Manual "Entering the Patient Information" P6-2)

NOTE

- When using the Carecom PHS nurse call system, the bed name cannot be edited/changed on this device as the bed name registered on the nurse call system will be used.

1 Press the [Bed Name Regist] key displayed on the nurse call detail setup menu. (Initial Settings > External Devices > Serial Comm.)
Or, press the [Menu], [Initial Settings], [Bed Name Regist] ("System") keys.

▸ The bed name list will be displayed.



2 Press the [Connect] key for "Room Info." to acquire the room information from the nurse call system.

▸ The communication with the nurse call system will start, and "Room ID" and "Bed Name" information will be acquired.

3 Press the [Room ID]/[Bed Name] key to sort the displayed bed name list.

4 Use the ⏫/🔼/🔽/⏬ keys to scroll the screen.

▸ ⏫: The first page will be displayed.

▸ 🔼: Previous page will be displayed.

▸ 🔽: Next page will be displayed.

▸ ⏬: The last page will be displayed.

Bed Name Registration (When Aiphone PHS nurse call system is used)

The bed name will be used for the PHS nurse call notification and can be also displayed on the home display.
In this section, the procedure for the bed name registration is explained when using the Aiphone PHS nurse call system. Maximum of 480 bed names can be registered.

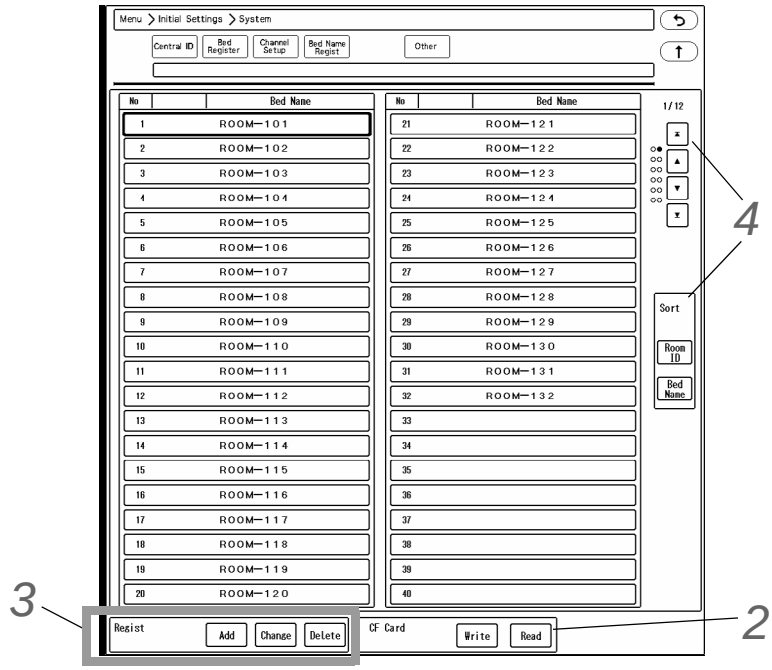
⚠ WARNING

- When PHS nurse call system is used, bed name needs to be set, as nurse call bed will be specified by the bed name.
  If the bed name is not set, the patient cannot be specified on the nurse call system.
  The registered bed name can be assigned to the patient during the admit process.
  (☞Operation Manual "Entering the Patient Information" P6-2)

1 Press the [Bed Name Regist] key displayed on the nurse call detail setup menu. (Initial Settings > External Devices > Serial Comm.)

Or, press the [Menu], [Initial Settings], [Bed Name Regist] ("System") keys.

▸ The bed name list will be displayed.



2 The bed name will be read from the storage media. Adding, changing, deleting of data can be performed.

NOTE

- When the bed name data is read from the storage media, the previously registered bed name data on this device will be overwritten with the read data.

1 Set the storage media to this device.

2 Press the [Read] key.

▸ The bed name file list on the storage media will be displayed.

3 Select the file from the list.

▸ A confirmation message will be displayed.

4 Press the [OK] key.

▸ When a beep tone generates, the reading process is complete.

▸ The bed name read from the storage media will be displayed.

3 Use the [Add] / [Change] / [Delete] keys to edit the bed names.

1 Select the bed name to edit.

2 To add or change the bed name, press the [Add] or [Change] key.

▸ A keyboard will be displayed to enter the bed name.

▸ Maximum of 16 characters can be entered.

3 To delete the bed name, press the [Delete] key.

▸ A confirmation message will be displayed.

4 Press the [OK] key.

4 Press the [No]/[Bed Name] key to sort the displayed bed name list. Use the ⏫/🔼/🔽/⏬ keys to scroll the screen.

Nurse Call Operating Specifications

❑Normal Operation

- When the alarm condition continues for the preset "Alarm Duration Before Notification", the alarm will be notified to nurse call (Figure 1).
- When the alarm factor is resolved during the preset "Alarm Duration Before Notification", the alarm will not be notified to nurse call (Figure 2).

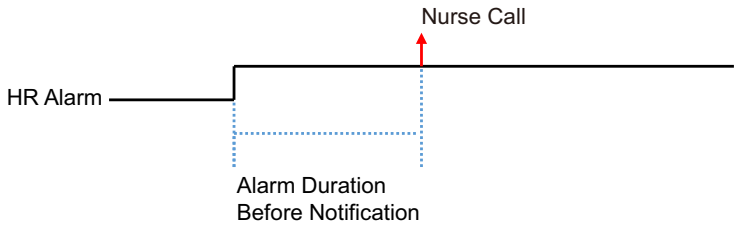


Figure 1: Normal Operation of the Nurse Call

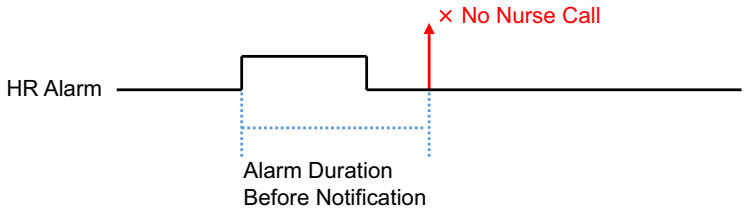


Figure 2: When the alarm factor is resolved during the preset "Alarm Duration Before Notification"

❑Alarm Silence

- When the alarm is silenced during the preset "Alarm Duration Before Notification", the alarm will not be notified to nurse call (Figure 3).
- When the alarm sound is resumed after the alarm silence duration, or when the alarm generates again during the alarm silence duration, the alarm will not be notified to nurse call (Figure 4, 5).
- The alarm silence condition of other alarm factor will not affect the nurse call notification. (Alarm status, alarm level of other alarm factor will affect the nurse call notification.)

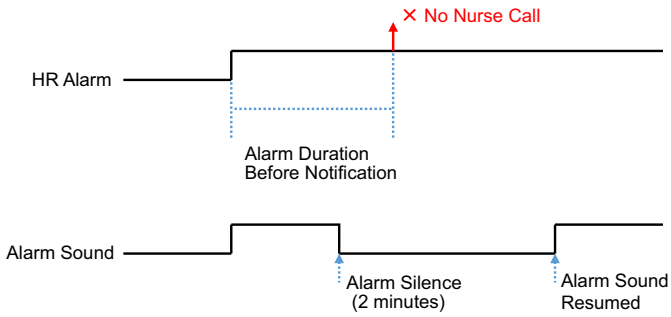


Figure 3: When the alarm is silenced during the preset "Alarm Duration Before Notification"

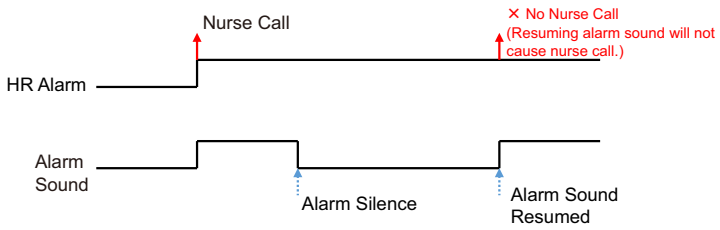


Figure 4: When the alarm sound is resumed after the alarm silence duration

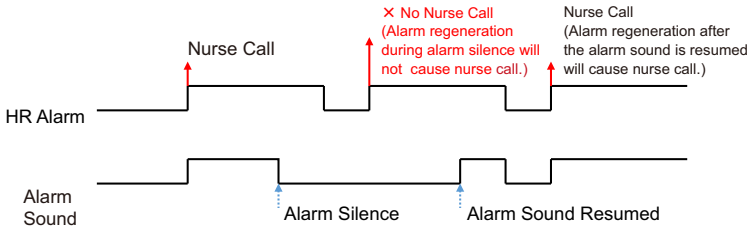


Figure 5: When the alarm generates again during the alarm silence duration

❑Custom Notification

- When all the preset custom alarm factors generates alarm, it will be notified to nurse call (Figure 6).
- By setting more than one alarm factors, the accuracy of nurse call notification can be improved.
  - The arrhythmia alarm will be notified to nurse call when one of the selected factors generates alarm.
  - The numeric data alarm will be notified to nurse call when all the selected factors generate alarms.
  - The custom factors which are not monitored, not measured, or alarm OFF status are excluded from the nurse call notification.

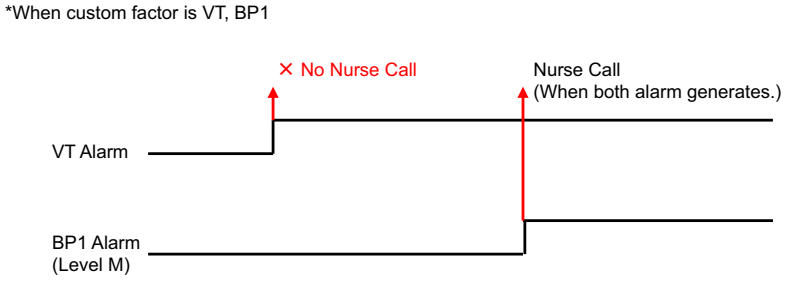


Figure 6: Custom Notification

❑High Priority Factor for Notification

- When the alarm generates for the high priority factors, it will be notified to nurse call regardless of the condition of other alarm factors.
- By setting the high priority alarm factors, the nurse call notification of those alarm factors can be ensured.
- By setting all factors as high priority, all the alarms can be notified.
- When an alarm occurs during the nurse call notification of other alarm factor, the previous nurse call notification will be canceled to notify new alarm (Figure 7).

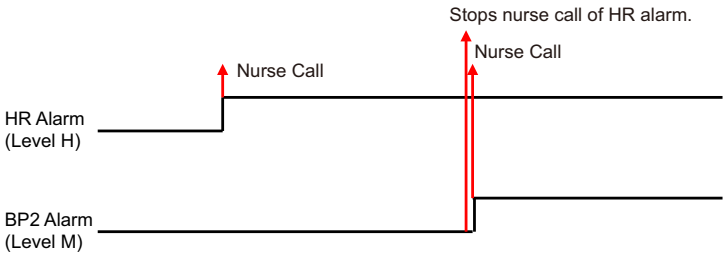


Figure 7: High Priority Factor for Notification

❑Re-notification

- By setting "Re-notification" to ON, nurse call will be re-notified if the alarm condition remains after the specified duration for re-notification (Figure 8).
- It can be used as a reminder if the nurse call could not be responded immediately such as in case of taking care of other patient.

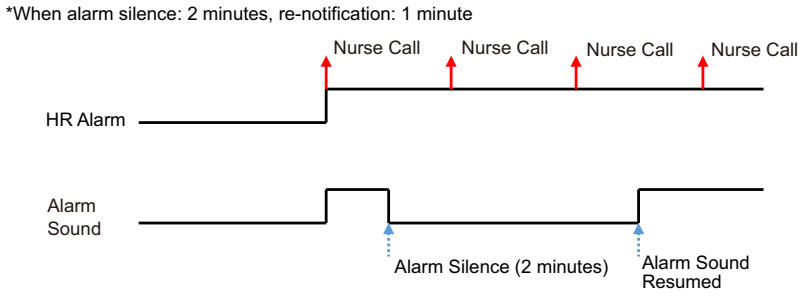


Figure 8: Re-notification

❑Operation When Multiple Alarm Occurs

- When the alarm of same or higher level generates during the nurse call notification of other alarm, the new alarm will be notified to nurse call (Figure 9).
- If the alarm level of new alarm is lower than the previous alarm, the new alarm will not be notified to nurse call (Figure 10).

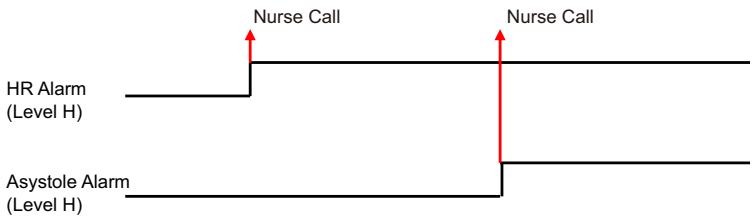


Figure 9: When a new alarm of the same or higher alarm level generates

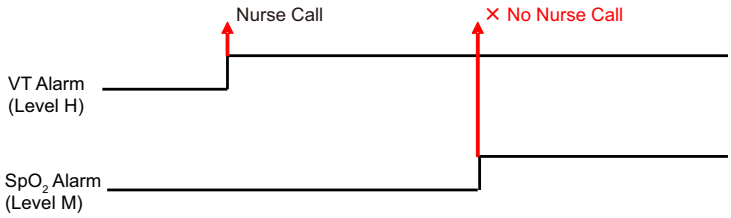


Figure 10: When a new alarm of the lower alarm level generates

❑Nurse Call System Error

- When there is no response from nurse call system, the alarm will be re-notified to nurse call after the time-out period (3 seconds) (Figure 11).

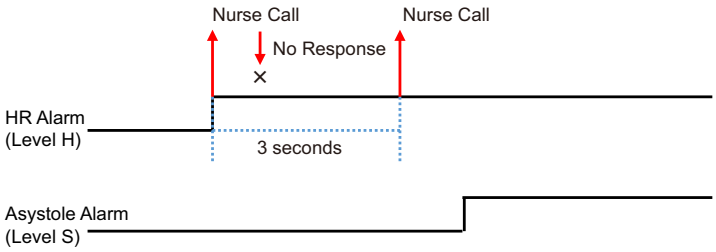


Figure 11: When there is no response from nurse call system

Using the Magnetic Card Reader

By using the magnetic card reader, patient information can be automatically entered from the magnetic card at patient admittance.
(☞"To Enter the Patient Information from the Magnetic Card or Barcode" P6-4)

NOTE

- Only the following code type cards can be read on this device.
  - ISO/IEC 646 (Patient Name, Patient ID)
- The magnetic card reader and barcode reader cannot be used simultaneously.

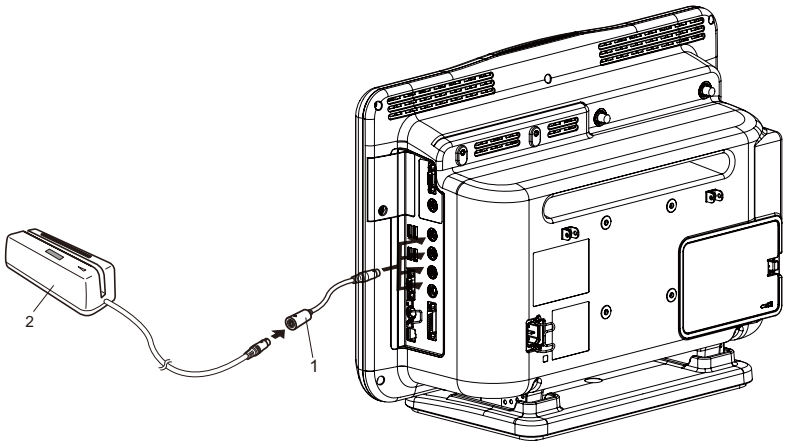
Connection Procedure

1 Connect the cable of the magnetic card reader to the conversion cable (CJ-756).

2 Connect the other end of the connection cable (CJ-756) to the serial connector of this device.

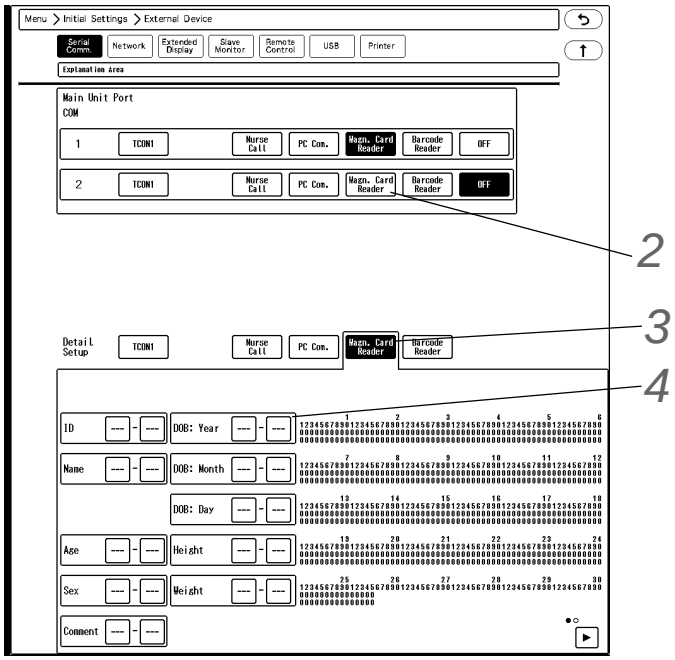
1 CJ-756 Connection Cable

2 Magnetic Card Reader



Setup Procedure

1 Press [Menu > Initial Settings > External Device > Serial Comm.].



2 Select [Magn. Card Reader] for the port which the magnetic card reader is connected.

3 Press [Magn. Card Reader] for "Detail Setup" to perform the setup for the magnetic card.

- On this screen, starting and ending digit of each data such as [ID], [DOB: Year] can be set.
- Starting Digit: Starting digit number of the data to be read from the magnetic card
- Ending Digit: Ending digit number of the data to be read from the magnetic card

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

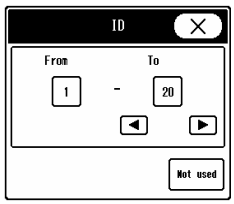
1 Pressing the key will display the subwindow. (shown on right)

2 Enter the starting digit or ending digit in the range of 1 to 255.

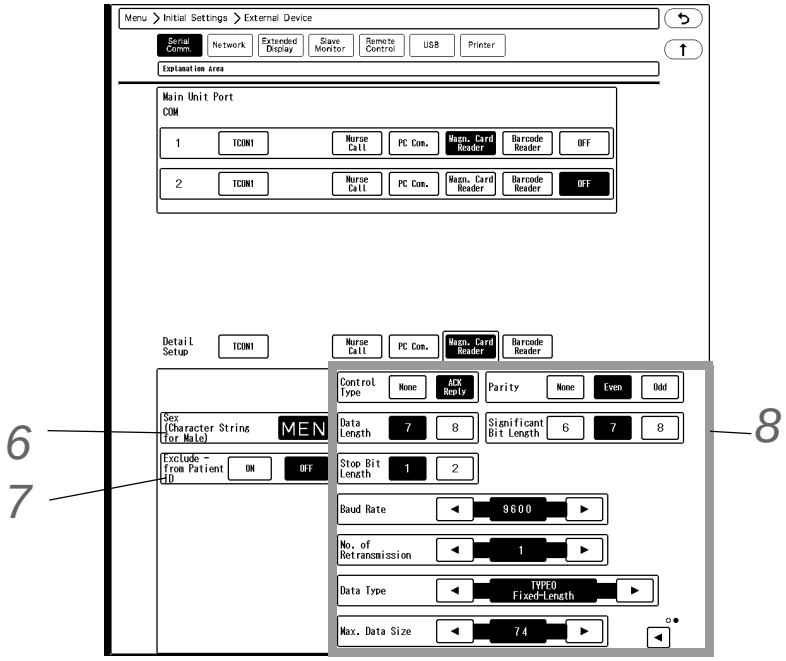
3 If the data is not present on the magnetic card, enter [OFF] for both starting and ending digit.

4 (X) Press the key to close the window.

5 Repeat step 1 to 4.



5 Perform the setup on the second page.



6 Enter the character string (max. 3 characters) used on the magnetic card.

7 Set the "Exclude - from Patient ID" .

- [ON]: "-" will not be included in the patient ID.
- [OFF]: "-" will be included in the patient ID.

8 Perform settings for communication with the magnetic card reader.
(For default settings, refer to ☞"Initial Settings" P6-1.)

1. For "Control Type" , select from [None] / [ACK Reply].
2. For "Data Length" , select from [7] / [8] bit.
3. For "Stop Bit Length" , select from [1] / [2] bit.
4. For "Parity" , select from [None] / [Even] / [Odd].
5. For "Significant Bit Length" , select from [6] / [7] / [8].
6. For "Baud Rate" , select from 1200/2400/4800/9600/19200 by pressing the ◀/▶ keys.
7. For "No. of Transmission", select from 1 to 9 by pressing the ◀/▶ keys.
8. For "Data Type" , select from [TYPE0 (Fixed Length)] / [TYPE1 (CR, LF)] / [TYPE2 (STX-ETX)] / [TYPE3 (STX-ETX, BCC)] by pressing the ◀/▶ keys.
9. For "Max. Data Size" , select the maximum data size from 1 to 256 by pressing the ◀/▶ keys.

Using the Barcode Reader

By using the barcode reader, patient information can be automatically entered from the barcode at patient admittance.
(☞Operation Manual "To Enter the Patient Information from the Magnetic Card or Barcode" P6-4)

NOTE

- Only the following code type barcodes can be read on this device.
  - ISO/IEC 646 (Patient Name, Patient ID)

- The magnetic card reader and barcode reader cannot be used simultaneously.

Connection Procedure

There are two types of barcode readers which can be connected to serial connector or USB connector.

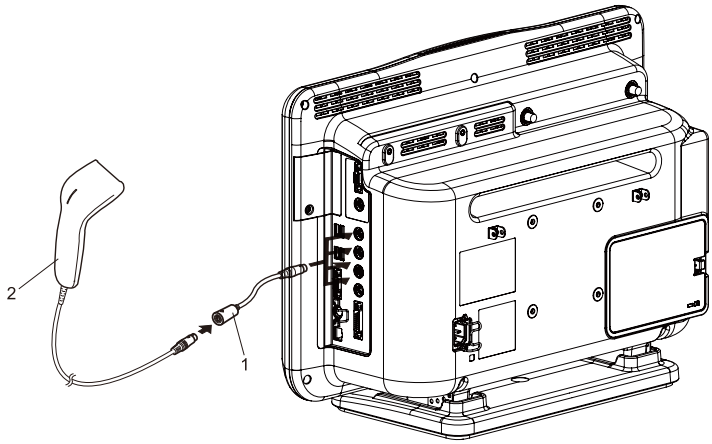
❑For Serial Connector

1 Connect the cable of the barcode reader to the connection cable (CJ-756).

2 Connect the other end of the connection cable (CJ-756) to the serial connector of this device.

1 CJ-756 Connection Cable

2 Barcode Reader



❑For USB Connector

1 Connect the USB barcode reader to the USB connector of this device.

Setup Procedure

The setup procedure differs for serial connection and USB connection.

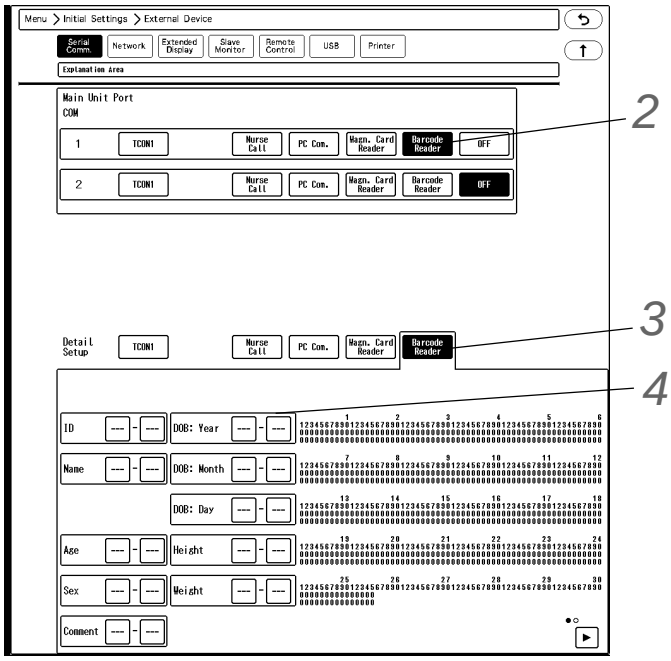
❑For Serial Connection

1 Press [Menu > Initial Settings > External Device > Serial Comm.].

2 Select [Barcode Reader] for the port which the barcode reader is connected.

3 Select [Barcode Reader] for "Detail Setup" and perform the setup.

4 Perform setup for the barcode reader.



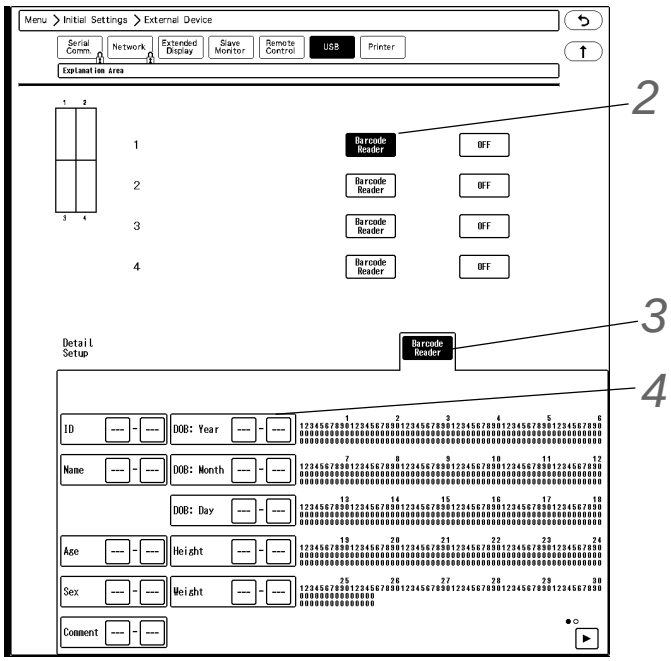
❑For USB Connection

1 Press [Menu > Initial Settings > External Device > USB].

2 Select [Barcode Reader] for the port which the barcode reader is connected.

3 Select [Barcode Reader] for "Detail Setup" and perform the setup.

4 Perform setup for the barcode reader.

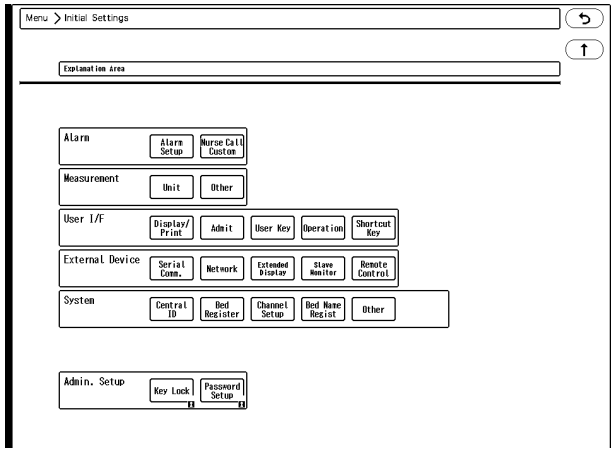


REFERENCE

- The detail setup for the barcode reader is the same as that of the magnetic card reader. (☞"Setup Procedure" P4-17)

Chapter 5 Initial Settings

This section explains about the "Initial Settings" of the central monitor menu.
On the central monitor menu, press [Menu > Initial Settings].



The initial settings menu consists of 6 categories.
If using more than one DS-1800 System central monitors, the same settings can be applied to all monitors using the storage media.

Category	Subcategory	Description
Alarm	Alarm Setup	Alarm-related settings, alarm indicator settings, etc.
	Nurse Call Custom	Settings such as ON/OFF, Message, etc.
Measurement	Unit	Measurement unit settings for BP, TEMP, ST, CO_2 atmospheric pressure
	Other	Measurement related setup such as ECG drift filter
User I/F	Display/Print	Display and print settings such as date format, BP alarm limit increment, etc.
	Admit	Settings at admittance
	User Key	Registration of user keys
	Operation	Settings for mouse operation, window minimizing settings, etc.
	Shortcut Key	Settings for shortcut keys
External Device Connection	Serial Communications	Settings of device connected to the serial connector
	Network	Network settings for laser printer, server, etc.
	Extended Display Unit	Settings for extended display unit connection (☞"Setup" P1-10)
	Slave Monitor	Settings for slave monitor connection (☞"Setup" P1-12)
	Remote Control	Settings of Room ID/Bed ID for the remote control (☞"Remote Control Setup" P1-7)
	USB	Settings of device connected to the USB connector
	Printer	Settings for the printer
System	Central ID	Settings of central ID
	Bed Register	Registration of beds to be monitored on this device
	Channel	Settings for the telemetry channel (☞"Channel ID and Antenna Setup for the Receiver" P2-11)
	Bed Name	Registration/deletion of bed name
	Time/Date	Settings of time/date
	Other	Settings of AC frequency, synchronized tone, synchronized mark

Category	Subcategory	Description
Administrator Setup	Key Lock	Settings of key lock level for display and setting
	Password Setup	Settings for password and administrator

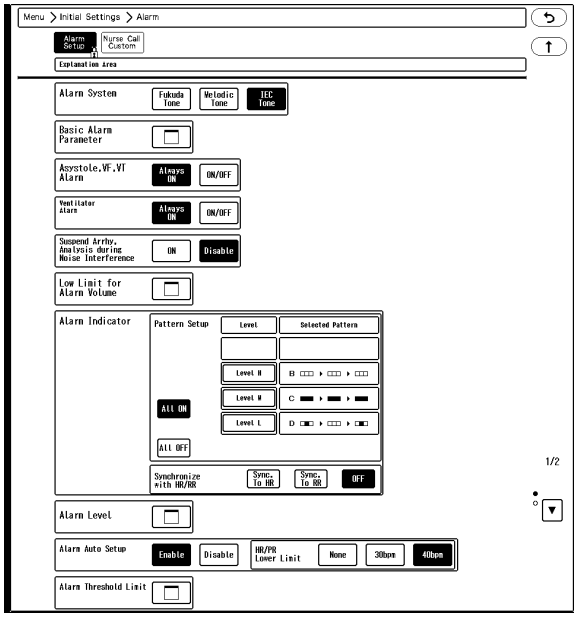
CAUTION

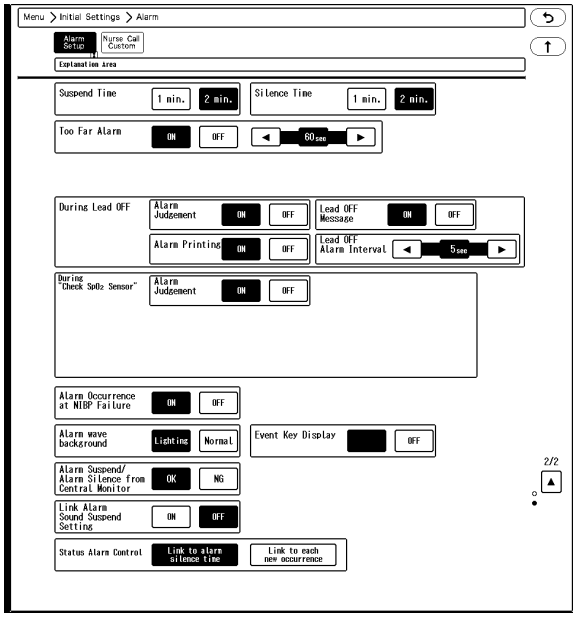
- Some settings are restricted to network-administrating monitor (central ID: 001) when connected to a wired network system.

Alarm

Alarm

Press the [Alarm Setup] key under "Initial Settings" to display the alarm setup menu.





1 Alarm System

The alarm sound and alarm indicator flash pattern can be changed.

(☞Operation Manual "Settings for Each Alarm System" P17-8)

WARNING

- Changing the setting for "Alarm System" (Initial Settings > Alarm) will also change the alarm volume and tone setting. Make sure to check the volume and tone when the setting is changed.

- [Fukuda Tone]: The Fukuda original tone 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.

2 Basic Alarm Parameter

- Select the basic alarm parameters to be displayed for the individual bed menu.

3 Ventilator Alarm

- [Always ON]: The ventilator alarm will be always ON and cannot be turned OFF.
- [ON/OFF]: The ventilator alarm can be turned ON or OFF.

CAUTION

- For the DS-LANIII network, this setting will synchronize with the network-administrator.

4 Suspend Arrhythmia Analysis during Noise Interference

When a noise is interfering on the ECG signal, arrhythmia analysis can be suspended.

- [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.

NOTE

- This setting is effective only for the patients monitored by the built-in RF module or LW-7000. Even when a wired system is constructed, the setting will not be synchronized with the bedside monitor.
- The settings will be synchronized with the administrating central monitor.

5 Lower Limit for Alarm Volume

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.

NOTE

- The sound test cannot be performed when the vital alarm and device alarm is generated.

6 Alarm Indicator

1 Pattern Setup

- Select the alarm level to set the flash pattern.
- [Pattern Test]: Test the flash pattern.
- [All ON]: Alarm indicator function will be turned ON for all levels with the current settings.
- [All OFF]: Alarm indicator function will be turned OFF for all levels.

2 Synchronize with HR/PR

- [Sync. to HR]: The green LED at the center of alarm indicator will flash synchronizing to HR.
- [Sync. to RR]: The green LED at the center of alarm indicator will flash synchronizing to RR.

- [OFF]: The alarm indicator will not flash synchronizing to HR/RR.

7 Alarm Level

- For [Numeric Data]/[Arrhythmia]/[Technical], select the alarm level from [S]/ [H]/ [M]/ [L].
- Press the [Initialize] key to initialize the alarm level setting.
  (☞"Alarm" P6-1)
- Only the displayed alarm level can be selected.

8 Alarm Auto Setup

- [Enable]: [Auto] key will be displayed on the alarm setup menu. The "HR/PR Lower Limit" key will be also displayed.
- [Disable]: [Auto] key will not be displayed on the alarm setup menu.

9 Alarm Threshold Limit

- The alarm threshold range for each parameter can be set. For the parameter set to [Enable], the alarm threshold level outside the set range cannot be set.

10 HR/PR Lower Limit

- [30bpm]/[40bpm]: When [Auto] key is pressed on the alarm setup menu, the alarm lower limit will be fixed to 30bpm/40bpm.
- [None]: No restriction will be set to HR/PR alarm lower limit.

11 Alarm Suspend Time

- Select from [1 min.] / [2 min.].

12 Alarm Silence Time

- Select from [1 min.] / [2 min.].

13 Too Far Alarm

Whether or not to generate an alarm when a telemetry transmitter is out of receiving range can be selected.

- [ON]: Alarm will generate.
- [OFF]: Alarm will not generate.
- Use the ◀/▶ keys to set the duration to generate the alarm. The duration can be set from 5 sec. to 60 sec..

14 Alarm Operations during Lead OFF

⚠ WARNING

- The settings for "During Lead OFF" is effective for telemetry beds only. For the wired network beds, HR alarm and arrhythmia alarm will not generate regardless of this setting.

REFERENCE

- When an ECG electrode is detached, some waveforms may become immeasurable depending on the detached electrode.
- In such case, ECG waveform or respiration waveform will be displayed as baseline, and ECG related alarm will generate.
  ECG related alarms during Lead OFF are as follows.

- HR Alarm
- Arrhythmia Alarm
- ST Alarm
- RR Alarm of Impedance Respiration
- Apnea Alarm of Impedance Respiration

- If the alarm generated during lead-off condition is considered not reliable, selecting [OFF] for "Alarm Judgment" will not generate the ECG related alarm during lead-off condition. (☞Operation Manual "ECG Alarm at Lead-Off Condition" P7-18)

1 Alarm Judgment

- [ON]: Alarm will be generated even during lead-off condition. HR and other ECG related alarms will generate.
- [OFF]: Alarm judgment will not be performed during lead-off condition.
  When the "Alarm Judgment" is set OFF, a continuous tone different from standard lead-off alarm tone (low priority) will generate if other alarm of level M or higher is not generating. Selecting [OFF] for "Alarm Judgment" will automatically set "Alarm Printing" to [OFF], and "Lead OFF Message" to [ON]. When a lead is detached, <Lead OFF> message will be displayed inside the numeric data box.

⚠ WARNING

- While the <Lead OFF> message is displayed, HR alarm and arrhythmia alarm will not function. Leaving this condition unresolved may result in missing a sudden change of the patient. Promptly check the electrodes when this message is displayed.

NOTE

- The settings will be synchronized with the administrating central monitor.

2 Alarm Printing

- [ON]: Alarm printing will be performed for ECG related alarms even during lead-off condition. When [OFF] is set for "Alarm Judgment", "Alarm Printing" will be automatically set to [OFF].
- [OFF]: Alarm printing will not be performed for ECG related alarms during lead-off condition.
- Alarm printing will be performed if an alarm other than ECG (BP, SpO_2, etc.) generates during lead-off condition.

3 Lead OFF Message

- [ON]: <Lead OFF> message will be displayed. When [OFF] is set for "Alarm Judgment", "Lead OFF Message" will be automatically set to [ON].
- [OFF]: The message will not be displayed.

4 Lead OFF Alarm Interval

- Set the lead OFF alarm interval from 5 sec. / 30 sec. / 60 sec. using the ◀/▶ keys.
- An alarm sound will generate with the set interval.

15 "During "Check SpO_2 Sensor"

When the pulse wave cannot be detected due to low amplitude or inappropriate probe attachment, whether or not to generate the alarm message/sound can be selected.

⚠ WARNING

- This setting is effective only for the telemetry beds. For the wired network beds, alarm will

not generate regardless of this setting.

◆Alarm Judgment

- [ON]: SpO_2 alarm will generate when the SpO_2 value exceeds the alarm limit during <Check SpO_2 Sensor> condition.
- [OFF]: SpO_2 alarm of Level M will generate when the SpO_2 value becomes 0% during <Check SpO_2 Sensor> condition.

NOTE

- The settings will be synchronized with the administrating central monitor.

16 Alarm Occurrence at NIBP Failure

- [ON]: <NIBP meas. failed.> alarm of medium alarm priority will generate at NIBP measurement failure.
- [OFF]: Alarm will not generate even at NIBP measurement failure.

17 Alarm wave background

- [Lighting]: The background of the alarm-generated waveform will light. The background color will be either red, yellow, or blue depending on the alarm level.
- [Normal]: The background of the alarm-generated waveform will not light.

18 Event Key Display

- [ON]: Event key will be displayed at alarm generation.
- [OFF]: Event key will not be displayed even when an alarm generates.

NOTE

- When the "Alarm System" is set to other than [Fukuda Tone], this setting cannot be set to OFF.

19 Alarm Suspend, Alarm Silence from Central Monitor

- [OK]: The alarm generated on the bedside monitor can be silenced or suspended from the central monitor.
- [NG]: The alarm generated on the bedside monitor cannot be silenced or suspended from the central monitor.

20 Link Alarm Sound Suspend Setting

- [ON]: When an alarm sound is suspended on the bedside monitor, it will be also suspended on the central monitor.
- [OFF]: Even when an alarm sound is suspended on the bedside monitor, it will not be suspended on the central monitor.

NOTE

- The alarm sound suspend operation cannot be performed on the central monitor.

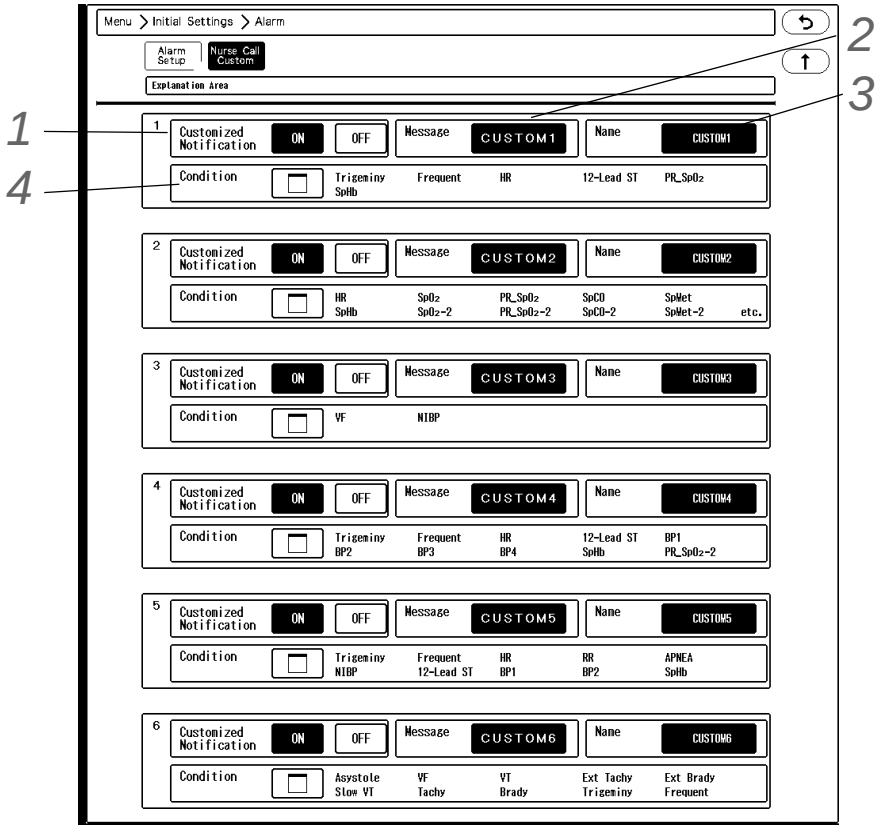
21 Status Alarm Control

- [Link to Alarm Silence Time]: When the level L device status alarm generates, pressing the [Alarm Silence] key for all beds/individual bed or the displayed event key will suspend the alarm sound for the duration set for "Silence Time".If the alarm factor still remains at completion of silence time, the alarm sound will generate again.

- [Link to each new occurrence]: When the level L device status alarm generates, pressing the [Alarm Silence] key for individual bed or the displayed event key will suspend the alarm sound.
  While the same device status alarm is generated, the alarm will remain silenced.
  If the alarm factor is resolved during the alarm silence time, the alarm will be canceled, and if the same device status alarm generates again, the alarm sound will generate.
  When the [Alarm Silence] key for all beds is pressed, this setting is not applicable. The operation will be the same with [Link to Alarm Silence Time].

Nurse Call Custom

Press the [Nurse Call Custom] under initial settings menu to display the nurse call custom setup menu.
Maximum of 6 parameters can be registered for nurse call custom.



1 Select [ON]/[OFF] for "Customized Notification".

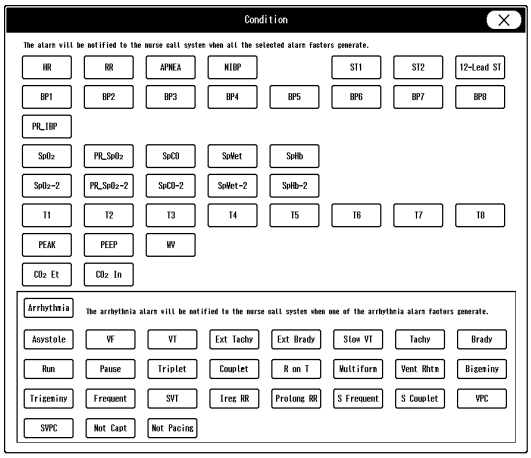
2 Enter the message to be displayed.

- The set message will be displayed on "Nurse Call " setup screen, and "Admit" setup screen under "Initial Settings".
- Maximum of 8 characters can be entered.

3 Enter the name to be notified.

- The set name will be displayed on the PHS of the hospital staffs.
- Maximum of 7 characters can be entered.

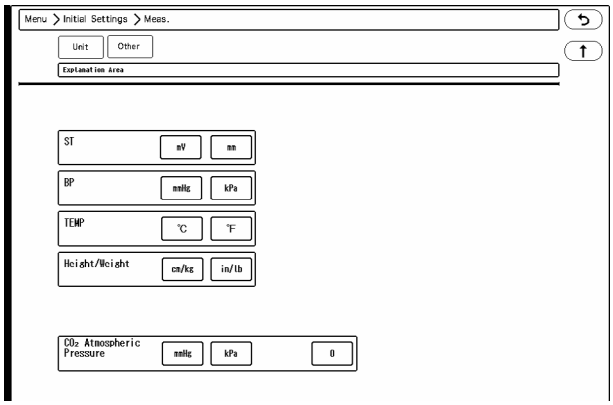
4 Enter the condition to be notified.
Select the parameters to notify as nurse call custom factors.



Measurement

Unit

The measurement units can be selected on this menu.
Press the [Initial Settings], [Unit] keys to display the measurement unit menu.



1 ST, BP, TEMP, Weight/Height

- Select the measurement unit for each parameter.

NOTE

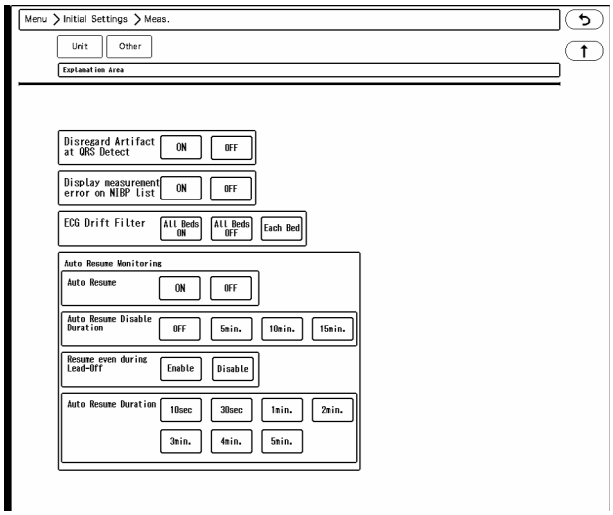
- When the BP unit is changed, the tabular/graphic trend data with the previous measurement unit will be deleted. Also, when a measurement unit is changed, make sure to set the alarm limits for the new measurement unit.

2 CO_2 Atmospheric Pressure and Unit

- By entering the atmospheric pressure value, the pressure difference will be compensated and allows more accurate measurement. Enter the atmospheric pressure value on the "Atmos. Pressure" window, and press the [Set] key.
- Set the measurement unit for CO_2 atmospheric pressure.

Other

Settings for "Disregard Artifact at QRS Detect", "Display measurement error on NIBP List", "ECG Drift Filter", "Auto Resume Monitoring" can be performed under [Menu > Initial Settings > Meas. > Other].



1 Disregard Artifact Ch. at QRS Detect

- [ON]: Normally, QRS is detected by merging ECG1 and ECG2, but if artifact is present on one of the waveforms, detection is made using only the stable ECG waveform.
- [OFF]: QRS is detected by always merging ECG1 and ECG2.

NOTE

- When [ON] is selected, and if artifact is present on both ECG1, ECG2, QRS will be detected by merging ECG1 and ECG2. Also, if the QRS amplitude is low for the ECG waveform without the artifact, QRS may not be detected and may generate HR alarm or asystole alarm. Make sure both ECG1 and ECG2 waveforms are displayed in appropriate size.
- This setting is effective only when monitoring 2 channels of ECG waveform (ECG1 and ECG2).
- Merging the ECG1 and ECG2 waveform will allow QRS detection if one of the ECG waveform has stable QRS amplitude. However, if either of the ECG waveforms is in lead-off condition or artifact such as body motion or myopotential interferes, QRS may be erroneously detected causing inaccurate heart rate measurement. In such case, "Disregard Artifact at QRS Detect" allows selection of suitable QRS detection procedure.
- This setting can be performed only for the telemetry beds. Even when a wired system is constructed, the setting will not be synchronized with the bedside monitor.
- The setting will be synchronized with the administrating central monitor.

2 Display measurement error on NIBP list

Whether or not to display the error data on the NIBP list displayed inside the numeric data box can be selected. The error data will be displayed on the NIBP list for review display regardless of this setting.

- [ON]: Error data will be displayed.
- [OFF]: Error data will not be displayed.

3 Drift Filter

- [All Beds ON]: Drift filter will be set to ON for all beds. ON/OFF selection on the ECG setup menu will become ineffective.

- [All Beds OFF]: Drift filter will be set to OFF for all beds. ON/OFF selection on the ECG setup menu will become ineffective.
- [Each Bed]: Drift filter can be set to ON or OFF for each bed on the ECG setup menu.

⚠ CAUTION

- The drift filter setup should be the same for all central monitors. Proper operation will not be performed if the setting is different among the central monitors.

NOTE

- The drift filter setting can be performed only for the telemetry beds.

4 Auto Resume Monitoring

1. Select ON/OFF for "Auto Resume". Selecting [ON] will enable the auto resume monitoring function.
2. Select [OFF]/[5min.]/[10min.]/[15min.] for "Auto Resume Disable Duration". The auto resume monitoring function will be disabled for the set duration from the point the [Monitor Suspend] key is pressed.
3. Select [Enable]/[Disable] for "Resume even during Lead-Off". Whether or not to automatically resume monitoring during lead-off condition can be set.
   [Enable]: Monitoring will automatically resume even during lead-off condition if ECG is measured.
   [Disable]: Monitoring will not automatically resume during lead-off condition even if ECG is measured.
   (☞Operation Manual "Condition for Auto Resume Monitoring" P6-17)
4. Select from [10sec.]/[30sec.]/[1min.]/[2min.]/[3min.]/[4min.]/[5min.] for "Auto Resume Duration". When "Auto Resume" is set to [ON], monitoring will automatically resume after the set "Auto Resume Disable Duration" elapses, and the measurement has been performed for the set "Auto Resume Duration".

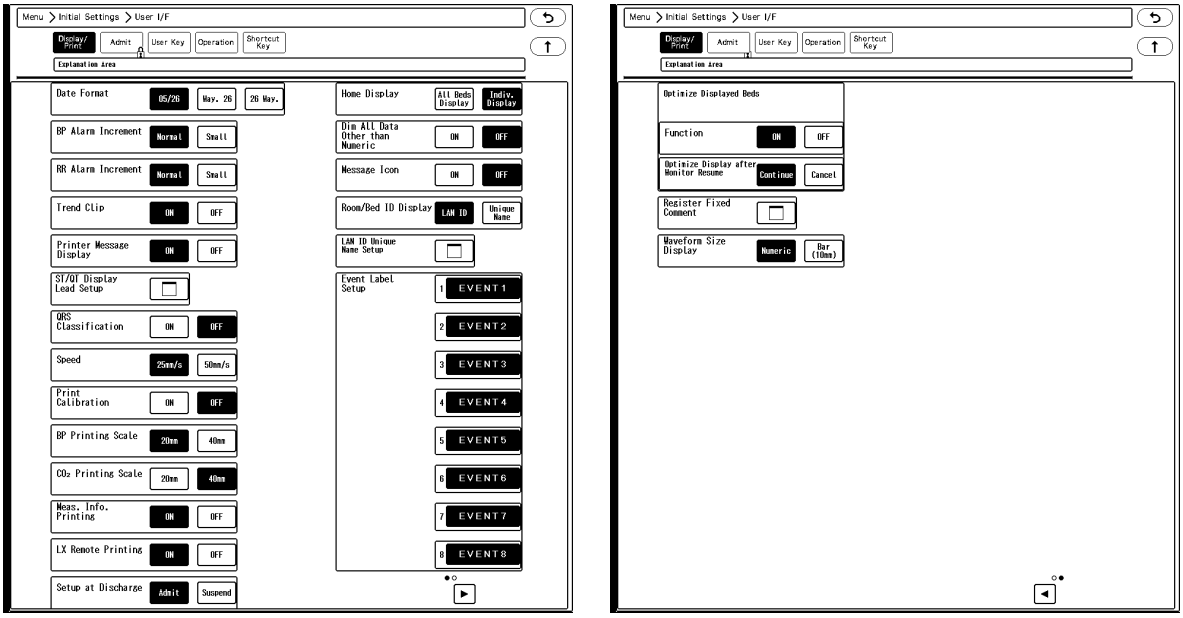
NOTE

- When [Resume] is pressed during the auto resume duration, the [Resume] key operation will be prioritized.

User I/F

Display/Print

The initial settings for displaying/printing can be performed.
Press [Menu > Initial Settings > User I/F > Display/Print].



1 Date Format

The selected format will be applied to display and printing.

2 BP Alarm Increment

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

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

3 RR Alarm Increment

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

	[Normal]	[Small]
Adult	5 Bpm	1 Bpm
Child, Neonate	2 Bpm	

4 Trend Clip

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

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

- [OFF]: The exceeded portion will not be displayed.

5 Printer Message Display

- [ON]: The printer status (icon and message) will be displayed in central monitor information area.
- [OFF]: The printer status will not be displayed.

6 ST/QT Display Lead Setup

- The lead to be displayed for ST-A to ST-C, QTc-A to QTc-C in the numeric data box can be set.

NOTE

- The numeric data of ST-A to ST-C, QTc-A to QTc-C will be displayed only for the DS-LAN beds and LW beds. The data will not be displayed for the RF beds.

7 QRS Classification

- [ON]: The QRS classification symbol indicated below will be printed.
- [OFF]: QRS classification symbol will not be printed.

NOTE

- The QRS symbol cannot be printed for manual printing when delay time is set to [None]. To print the QRS symbol, set the delay time to [8 sec.] or [16 sec.] on the "Manual Printing" menu. (☞"Manual Printing Setup" P12-2)

Symbol	Description
N (Normal)	Normal QRS beat
V (VPC)	Ventricular extrasystole
P (Pacing Beat)	Pacing beat
F (Fusion Beat)	Fusion beat of pacing and spontaneous beat
S (SVPC)	Supraventricular extrasystole
? (Undetermined beat)	Learning arrhythmia, or unmatched beat

8 Speed

- [25mm/s]: The printing speed will be set to 25 mm/s.
- [50mm/s]: The printing speed will be set to 50 mm/s.

9 Print Calibration

The calibration will be printed along with the waveform.

- [ON]: Calibration waveform will be printed at the beginning of the waveform.
- [OFF]: Calibration waveform will not be printed.

10 BP Printing Scale, CO_2 Printing Scale

The printing scale for BP and CO_2 waveform can be set.

- [40mm]: The waveform will be printed in 40 mm scale. The printing accuracy will be higher.
- [20mm]: The waveform will be printed in 20 mm scale. The printing accuracy is lower but overlapping onto other waveforms can be avoided.

11 Meas. Info. Printing

- [ON]: The status information will be printed on the recorder.

- [OFF]: The status information will not be printed.

NOTE

- This function is for maintenance only. For details, contact your nearest service representative.
- The settings will be synchronized with the administrating central monitor.

12 LX Remote Printing

- [ON]: Remote printing from the telemetry transmitter will be performed.
- [OFF]: Remote printing will not be performed.

13 Setup at Discharge

- [Admit]: Monitoring will continue even after the discharge operation has been performed.
- [Suspend]: Monitoring will be suspended after the discharge operation has been performed. The numeric data display will be cleared, and alarm generation, periodic printing will not be performed.

⚠ CAUTION

- When the discharge operation is performed on the bedside monitor or other central monitors, the monitoring on this device will not be suspended even if [Suspend] is selected for "Setup at Discharge".

14 Home Display

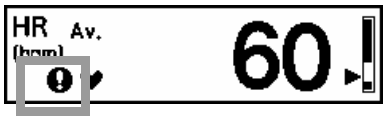
- [All Beds Display]: Home display with all beds display will be displayed when the [Home] key is pressed.
- [Indiv. Display]: Home display of individual bed will be displayed when the [Home] key is pressed.

15 Dim All Data Other than Numeric

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

16 Message Icon

When there are many numeric data display, the numeric data box size will be reduced which may disable the message to be displayed inside the numeric data box. A message icon will be displayed instead to notify that a message is present.



- [ON]: A message icon will be displayed.
- [OFF]: A message icon will not be displayed.

17 Room/Bed ID Display, LAN ID Unique Name Setup

On the Room/Bed ID display area of the home display and individual bed display, the item to display can be selected.

18 Event Label 1 to 8

8 event labels can be registered. By setting [Event] on the user key, the registered event label can be stored as recall event. On the monitor management system (ex. CVW-6000), it will be stored as "Monitor Event".

19 Optimize Display

- [ON]: When [Optimize Display] is pressed, the discharged beds which [Suspend] is set for "Setup at Discharge" will not be displayed, and the display area for the monitored beds will be enlarged to optimize the home display.
- [OFF]: The optimize display function will be set to OFF.

NOTE

- When [ON] is set for "Optimize Displayed Beds", PC communication function cannot be used.

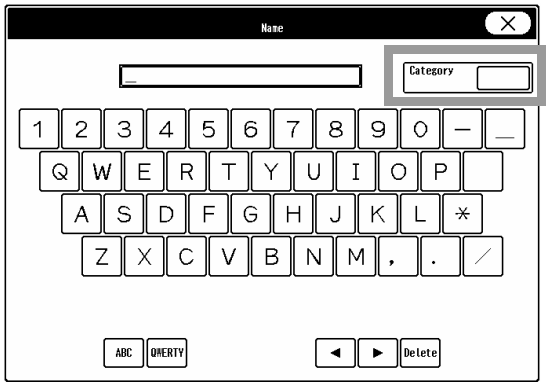
20 Optimize Display after Monitor Resume

- [Continue]: When the monitoring is resumed for the bed which [Suspend] is set for "Setup at Discharge", the display will be resumed for that bed and the home display will be optimized again.
- [Cancel]: When the monitoring is resumed for the bed which [Suspend] is set for "Setup at Discharge", the optimized display condition will be canceled and the display will return to original display configuration.

21 Register Fixed Comment

Maximum of 72 fixed comments can be registered to be entered on the patient admit/discharge screen. Maximum of 15 characters can be entered for the fixed comment.

1. Select the key area to register the comment.
2. On the displayed window, enter the comment.
3. By pressing the key for "Category", the comment can be classified by colors according to the monitoring purpose. (shown on right)
4. After entering, press the [X] key.

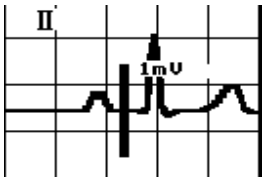


REFERENCE

- The registered comments can be sorted by category on patient admit/discharge screen.
- The comment can be entered using the displayed keys and keyboard.

22 Waveform Size Display

- [Numeric]: The ECG waveform size of the individual bed will be displayed in numerics.
- [Bar (10mm)]: The ECG 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)



Admit

The initial settings at patient admittance can be set for the following items.

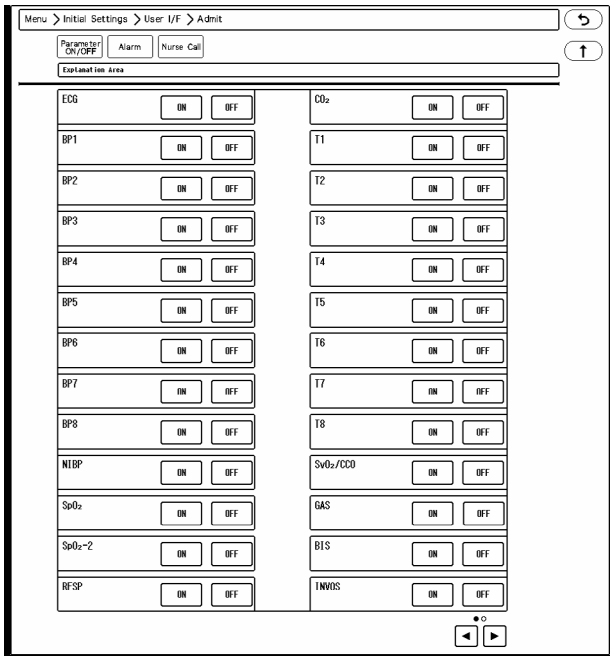
- Parameter ON/OFF
- Alarm
- Nurse Call Setup

Press the [Initial Settings], [Admit] ("User I/F") keys to display the admit settings menu.

❑Parameter ON/OFF

The initial parameter ON/OFF settings at patient admittance can be set.

Press the [Parameter ON/OFF] key on the admit settings menu.

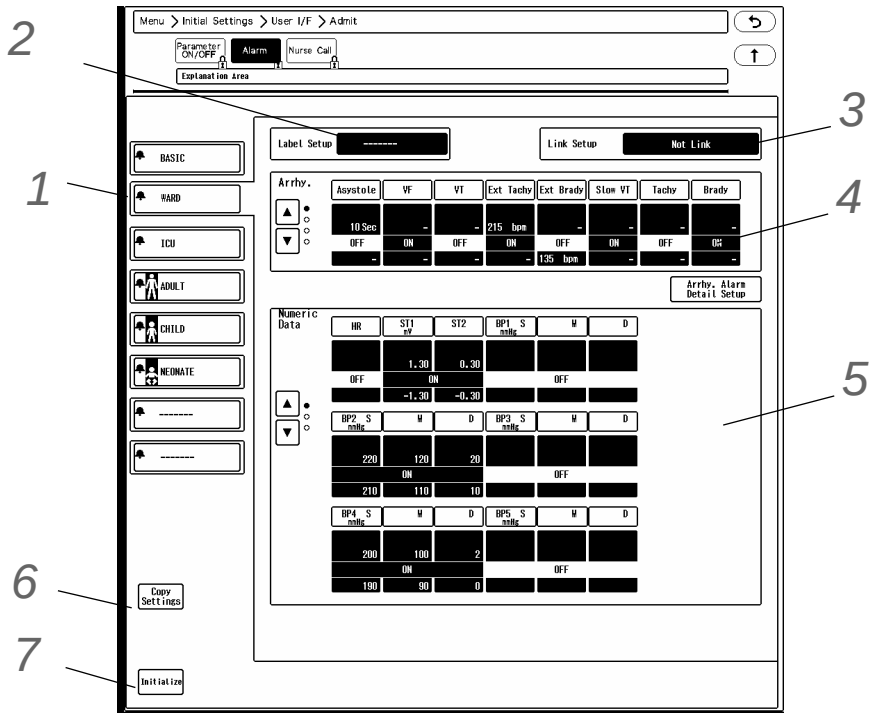


Select [ON]/ [OFF] for each parameter.

❑Alarm Settings at Admittance

The initial alarm settings at patient admittance can be set.

8 alarm modes with different alarm settings can be saved. By selecting the alarm mode on the patient admit/discharge screen, the alarm settings can be changed. By setting the alarm to link with patient classification ([Menu > Initial Settings > User I/F > Admit > Alarm], the alarm mode according to the patient classification will be set at admittance. (When the alarm setting is not linked to patient classification, the basic mode will be set at admittance.)



1 Select the alarm mode from the 8 alarm modes.

2 Pressing the [Label Setup] key will allow to change the alarm mode label.

3 Pressing the [Link Setup] key will allow to link the alarm mode to patient classification.

- [Not Link]: The alarm mode setting will not link with patient classification.
- [Link with Adult Setting]: The alarm mode to be applied when the patient classification is changed to adult or when the patient of adult classification is discharged can be set.
- [Link with Child Setting]: The alarm mode to be applied when the patient classification is changed to child or when the patient of child classification is discharged can be set.
- [Link with Neonate Setting]: The alarm mode to be applied when the patient classification is changed to neonate or when the patient of neonate classification is discharged can be set.

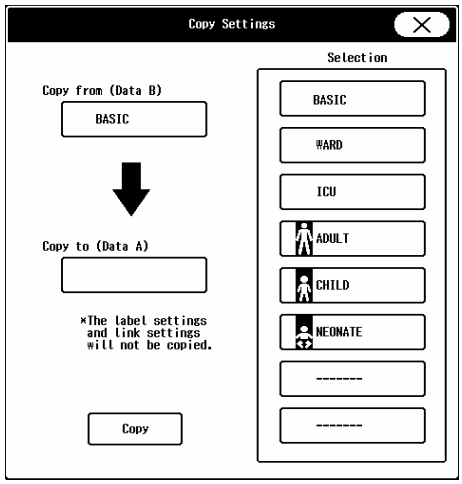
NOTE

- Each of [Link with Adult Setting], [Link with Child Setting], [Link with Neonate Setting] can be set to only one alarm mode.

4 Set the arrhythmia alarm for the alarm mode.

5 Set the numeric data alarm for the alarm mode.

6 By pressing the [Copy Settings], the alarm mode settings can be copied. (However, settings for "Label Setup" and "Link Setup" will not be copied.)

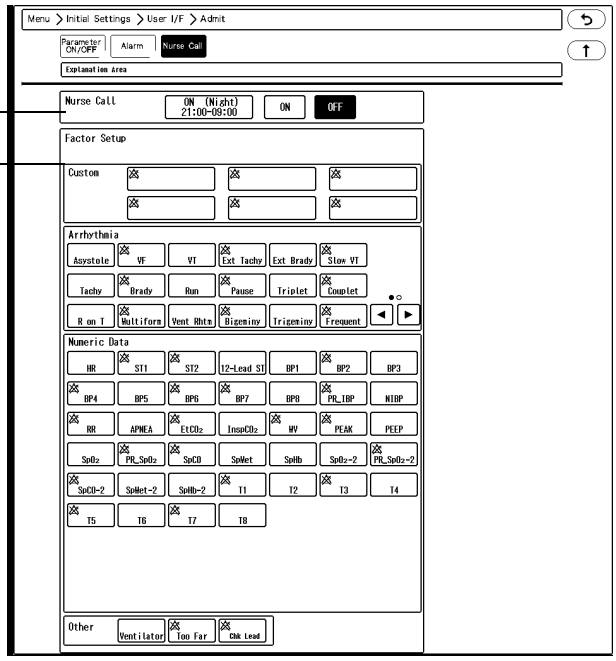


7 Pressing the [Initialize] key will initialize the alarm settings for all parameters to factory default settings.

❑Nurse Call Setup

The initial nurse call settings at patient admittance can be set.

Press the [Nurse Call] key on the admit settings menu.

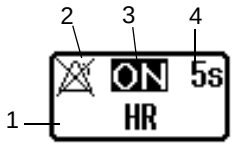


1 Nurse Call Mode Selection

- [ON (Night)] will be displayed only when [Enable] is selected for "Night Use" on the nurse call detail setup menu. (Initial Settings > External Device > Serial Comm.)

2 Nurse Call Factor Setup

Select ON/OFF for each parameter. The information displayed inside each key is explained below.



1 The blue key indicates that it is selected as the nurse call factor.

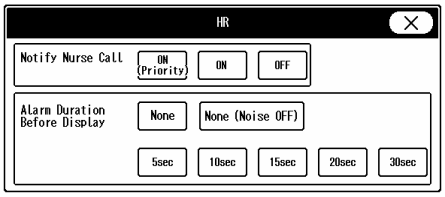
2 The alarm status (ON/OFF) at admittance is displayed. is displayed when OFF, and nothing is displayed when ON.

3 This indicates that the parameter is set as the high priority factor for notification. It is displayed when [ON (Priority)] is selected for "Notify Nurse Call".

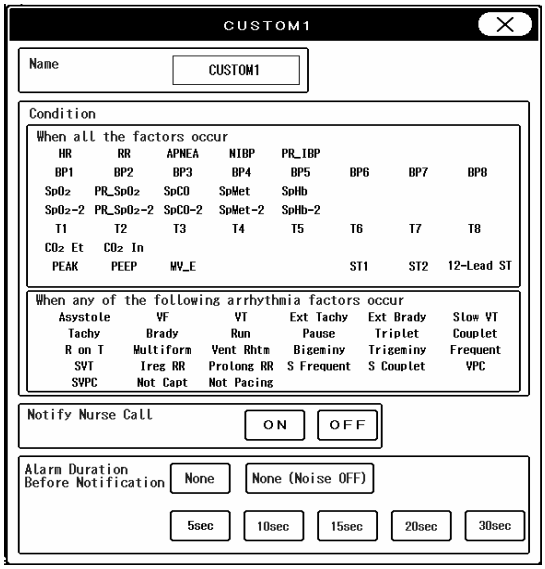
4 The alarm duration before notification is displayed. It will not be displayed if [None] or [None (Noise OFF)] is selected for "Alarm Duration Before Notification".

1 Select the nurse call alarm factor by pressing the key for the corresponding parameter or custom setting.

▸ The setup window will be displayed.



Example of [HR]



Example of Customized Notification

2 Set the "Notify Nurse Call" .

▸ [ON (Priority)]: The parameter will be set as the high priority alarm factor.

▸ [ON]: The parameter will be set as the normal alarm factor.

▸ [OFF]: The parameter will not be set as the alarm factor.

NOTE

- [ON (Priority)] will be displayed only when [ON] is selected for "Higher Priority (than others)" on the nurse call detail setup menu. (Initial Settings > External Device > Serial Comm.)

3 Set the "Alarm Duration Before Notification".
The alarm will be notified to the nurse call system when the alarm duration exceeds the set duration.

▸ Select from [5sec.]/ [10sec.]/ [15sec.]/ [20sec.]/ [30sec.]/ [None]/ [None (Noise OFF)].

▸ For HR, Tachy, Brady, Ext Tachy, Ext Brady, and the custom factor including these parameters, [None (Noise OFF)] will be displayed.

▸ [None]: Alarm will be notified to the nurse call system at alarm generation without any delay.

REFERENCE

- When [None (Noise OFF)] is selected, noise detection will be performed before nurse call notification. If detected as noise, the alarm will not be notified to the nurse call system.
- For "Arrhythmia Alarm", "APNEA", "NIBP", "Too Far", alarm duration before notification cannot be set. The alarm will be notified to the nurse call system at alarm generation without any delay.

User Key

The frequently used keys can be assigned as user keys at the lower display area.
By using the user keys, quick access to each menu can be performed.

Press [Menu > Initial Settings > User I/F > User Key].

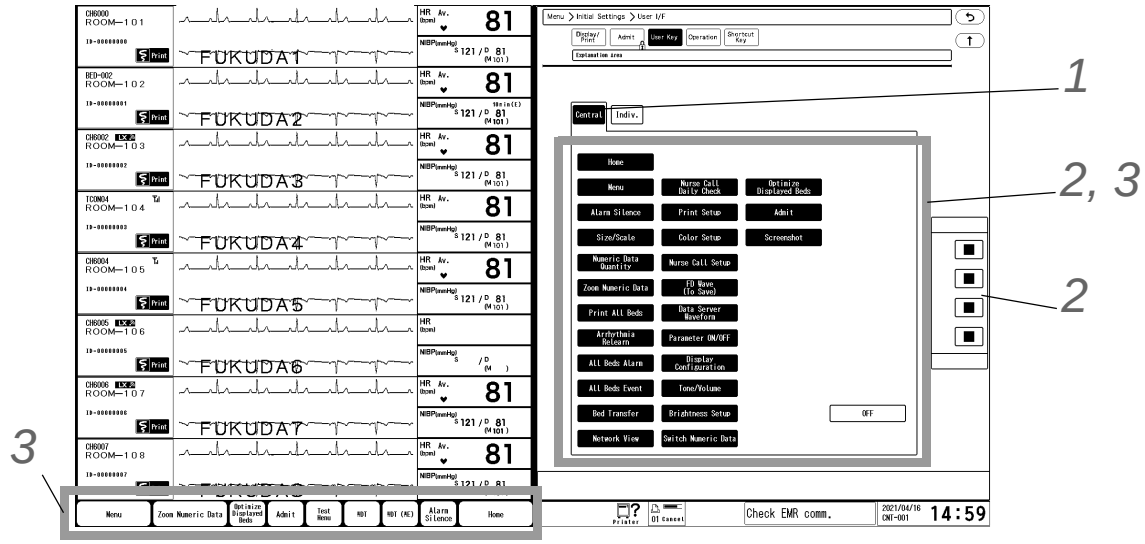
The user keys for central monitor display and individual bed display can be set.

The color of the user key can be changed.

❑Central Monitor User Key

1 Press [Central].

▸ The display will change to user key selection mode.



2 Set the color of the user key.

1 Select the color to assign to the user key.

2 Select the user key to assign the selected color.

3 Assign the user key to the display area.

1 Select the area to change the user key.

▸ By pressing the selected area again, the selection will be canceled.

▸ Adjust the size of the selected area which is indicated by blue box.

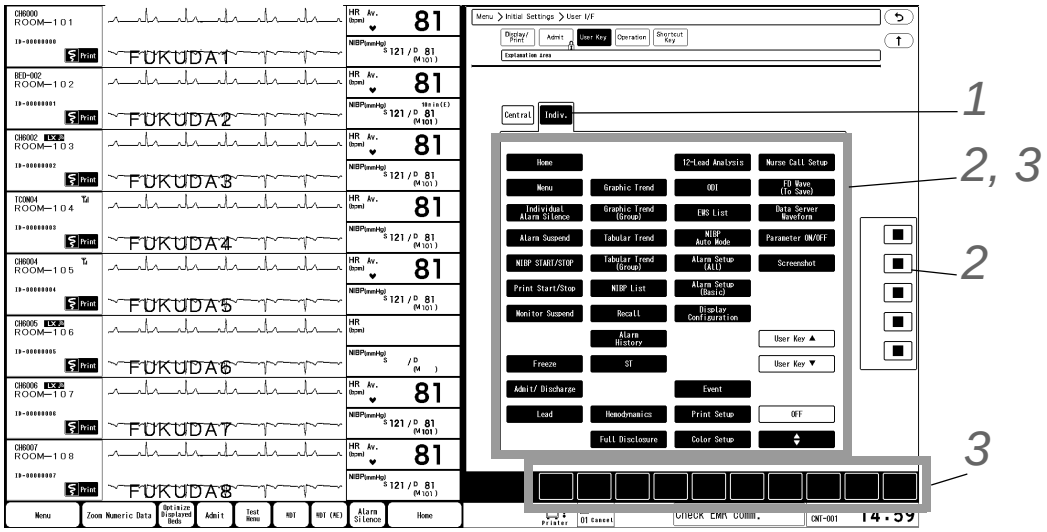
2 Select the function to assign to the user key.

▸ [OFF] will not assign any user key.

❑Individual Bed User Key

1 Press [Indiv.].

- The display will change to user key selection mode.



2 Set the color of the user key.

1 Select the color to assign to the user key.

2 Select the user key to assign the selected color.

3 Assign the user key to the display area.

1 Select the area to change the user key.

- By pressing the selected area again, the selection will be canceled.
- Adjust the size of the selected area which is indicated by blue box.

2 Select the function to assign to the user key.

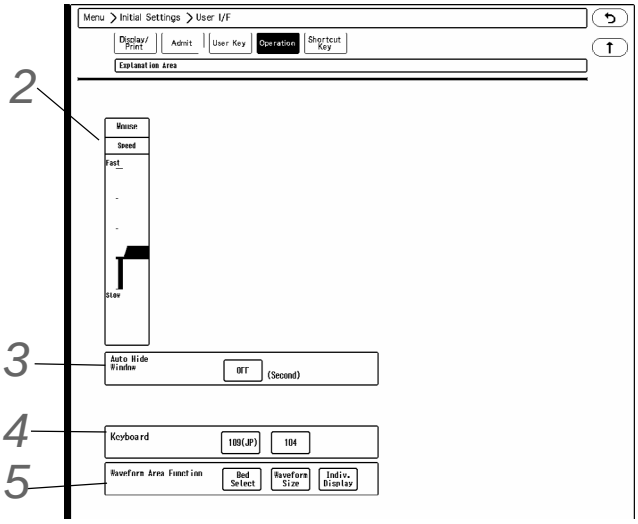
- By assigning [▲▼] to the user key area, 2 pages of user keys can be registered, and pressing [▲▼] will switch the pages.
  The user key can be enlarged by using 2 display areas.
- The user keys on the first page can be set by pressing the [User Key Up] key, and user keys on the second page can be set by pressing the [User Key Down] key.
- By assigning [Event] as user key, the past 12 seconds of waveform can be manually stored as recall data.
  Maximum of 8 labels can be set for [Event].
  (☞"Display/Print" P5-11)
- [OFF] will not assign any user key.

Operation

The initial settings for the operation can be performed.

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

- The "Operation" menu will be displayed.



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

3 The window can be automatically closed after fixed duration.

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

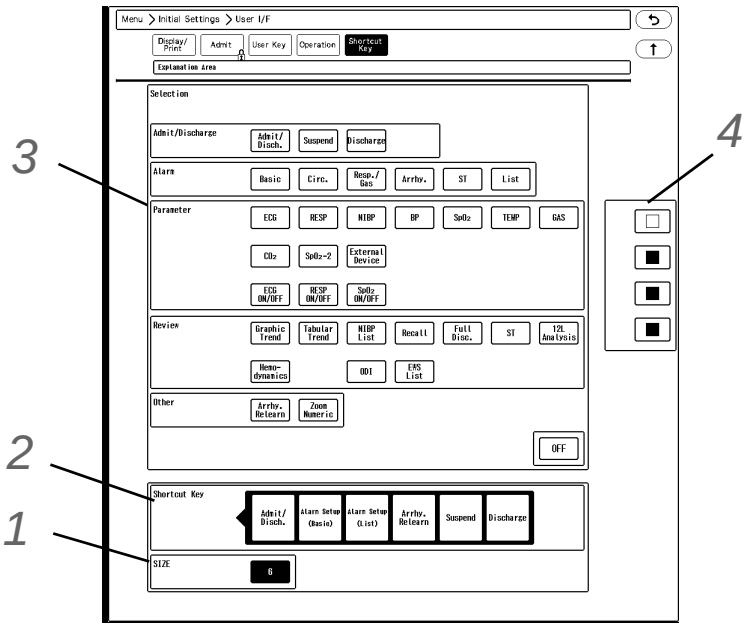
4 Select the keyboard type.

5 Select the operation to be performed when the waveform area is pressed.

- [Bed Select]: The bed selection will change when the waveform area is pressed.
- [Waveform Size]: The size/scale keys will be displayed when the waveform area is pressed.
- [Indiv. Display]: The individual bed display for the pressed waveform area will be displayed.

Shortcut Key

The functions can be assigned to the shortcut keys.
Press [Menu > Initial Settings > User I/F > Shortcut Key].



1 Select the number of shortcut keys from 3, 6, 12.

2 Select the key position from the lower area.

- The selected key position will be displayed in blue.

3 Select the key from the upper area to be assigned to the selected key position.

- [OFF] will not assign function.

4 Set the color of the shortcut key.

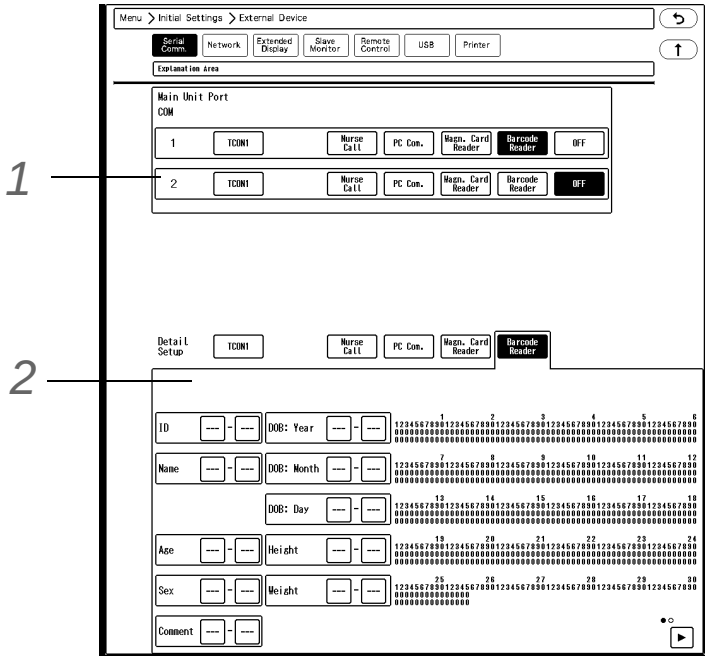
1. Select the color to assign to the shortcut key.
2. Select the shortcut key to assign the selected color.

External Device

Serial Communications

There are 2 serial connectors on this device for external device connection and allows to expand the function. When connecting the external device, serial communication setup needs to be performed.

Press [Menu > Initial Settings > External Device > Serial Comm.].



1 Select the device to connect to each COM port.

2 Set the details for each device. The above display is an example of detail setup for the barcode reader.

- For the PC communication setup, refer to the next section.
- For the setups other than PC communication, refer following. (☞"Nurse Call Detail Setup" P4-8)
  (☞"Using the Magnetic Card Reader" P4-16)
  (☞"Using the Barcode Reader" P4-18)

❑PC Communication

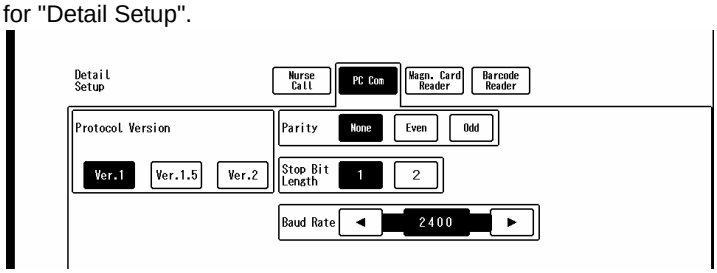
By using the PC communication function, vital data measured on the bedside monitor can be transmitted to PC.

NOTE

- When [ON] is set for "Optimize Displayed Beds", PC communication function cannot be used.

1 Under [Menu > Initial Settings > External Device > Serial Comm.], select [PC Com.] for the COM port which the PC is connected.

2 Select [PC Com.] for "Detail Setup".



- Select [Ver.1]/[Ver.1.5]/[Ver.2] for "Protocol Version".

NOTE

- For details of the protocol version, refer to your nearest service representative.

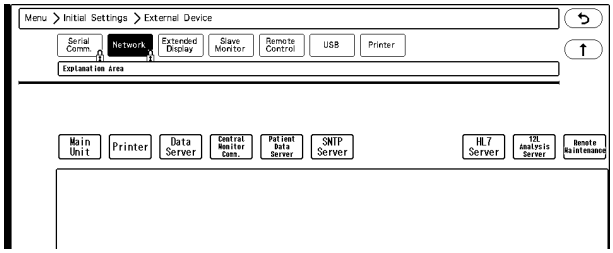
- Select [None] / [Even] / [Odd] for "Parity".
- Select [1]/[2] for "Stop Bit Length".
- For "Baud Rate" , select from 2400/9600/19200/38400 by pressing the ◀ / ▶ keys.

NOTE

- When [Ver.2] is selected for "Protocol Version" , [2400] cannot be set for the baud rate.

Network

By connecting the DS-1800 System to the TCP/IP network, laser printer and server can be used.
Under [Menu > Initial Settings > External Device > Network], network setup can be performed.



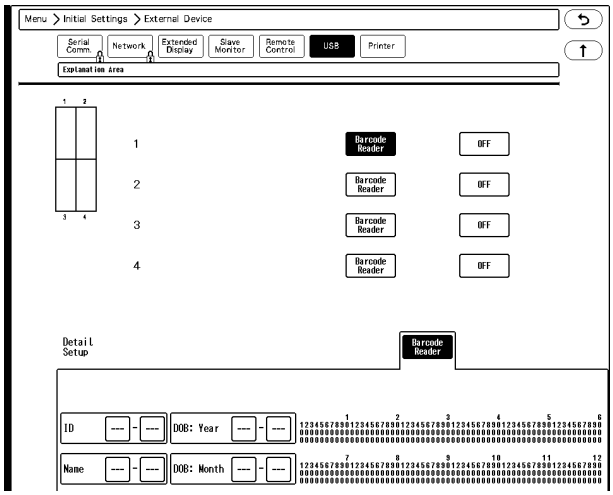
For details of the setup procedure, refer to ☞"TCP/IP Network" P2-15.

⚠ WARNING

- The operation cannot be guaranteed if connected to improper network. To change the network settings, refer to your nearest service representative.
- When connecting to an existing network, follow the instruction of the network administrator.

USB Setup

There are four (4) USB connectors on this device. When using the USB barcode reader, perform settings under [Menu > Initial Settings > External Device > USB].



NOTE

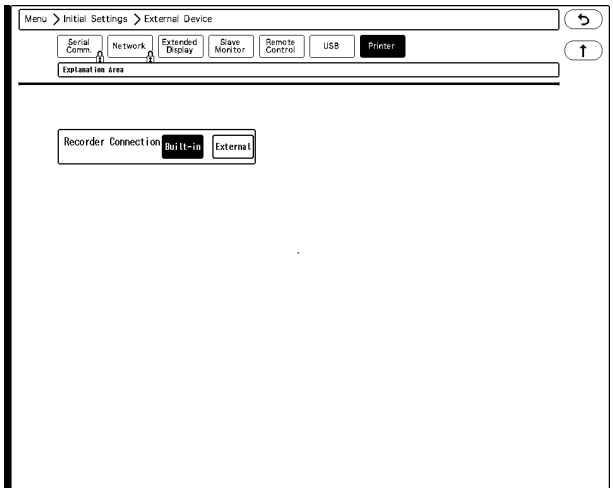
- The connected mouse and keyboard will be automatically detected.
- When using the mouse for both the main display unit and extended display unit, connect two mouses. At system startup, mouse will be detected in the order of connector number 2→1→4→3. The previously detected mouse will be assigned to the main display unit and the other will be assigned to the extended display unit.
  Connect the mouses to the appropriate connectors according to the detection priority.

Recorder Setup

The built-in recorder can be used for DS-18xxR, and for the model type without the built-in recorder, HR-800 Recorder can be attached externally.

Select [Built-in]/[External] for "Recorder Connection" under [Menu > Initial Settings > External Device > Printer]. When attaching the HR-800 to this device, perform this setting in advance.

(☞"Connecting the Recorder Unit (HR-800)" P1-9)



System Setup

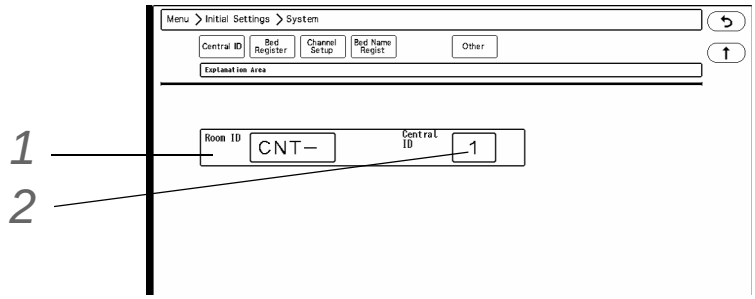
Central ID

When connecting to a wired network (DS-LANIII), a Room ID and Central ID must be set.

⚠ CAUTION

- The central monitor with the Central ID, "001" will function as a network-administrating monitor, and controls the whole LAN system. One of the central monitors must have the Central ID, "001" in a network system. Also, make sure not to duplicate the Central ID with other monitors.

Press the [Initial Settings], [Central ID] keys to display the Room ID, Central ID setup menu.



1 Room ID

On the displayed window, maximum of 4 characters can be entered.

2 Central ID

Select from [1] to [16].

Bed Register

The beds to be monitored on this device can be registered. Maximum of 32 beds can be registered.
The registered beds can be selected on the display configuration menu.
(☞"Selecting the Displaying Bed" P13-25)

⚠ CAUTION

- Canceling the bed registration will clear all data for that bed.

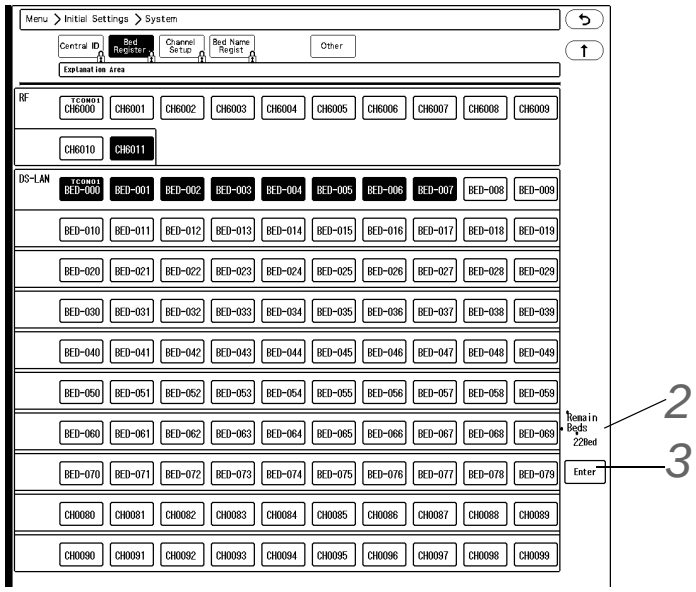
NOTE

- For DS-LAN beds and LW beds, some functions (ex. arrhythmia alarm such as Ext Tachy, Ext Brady) are restricted depending on the model type and software version.

1 Press [Menu > Initial Settings > System > Bed Register].

- The setup window will be displayed.
- The registered beds are displayed in blue. To cancel the bed registration, select the bed displayed in blue,

and press [Enter].



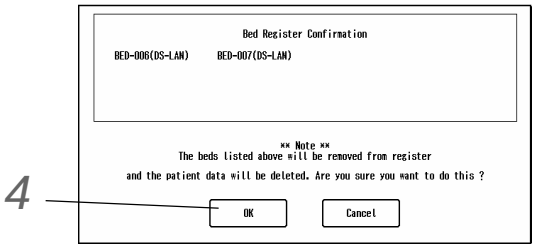
- "RF" [Chxxxx] indicates telemetry beds. (RF bed)
- "DS-LAN" [Chxxxx] indicates telemetry beds which the data is received through the wired network. (LW bed)
  [BED-xxx] indicates the beds which construct the wired network system. (DS-LAN bed)

2 Select the monitoring beds.

- "Remain Beds" will be displayed at the lower right. Use this as an indication of selectable number of beds.

3 Press [Enter].

- The confirmation window will be displayed.



NOTE

- The setup will not be validated until [Enter] is pressed. Make sure to press [Enter].

4 Press [OK].

Bed Name Registration

The registered bed name will be used for the PHS nurse call notification and can be also displayed on the home display.

In this section, the procedure for the bed name registration when not using the nurse call system is explained.

Maximum of 480 bed names can be registered.

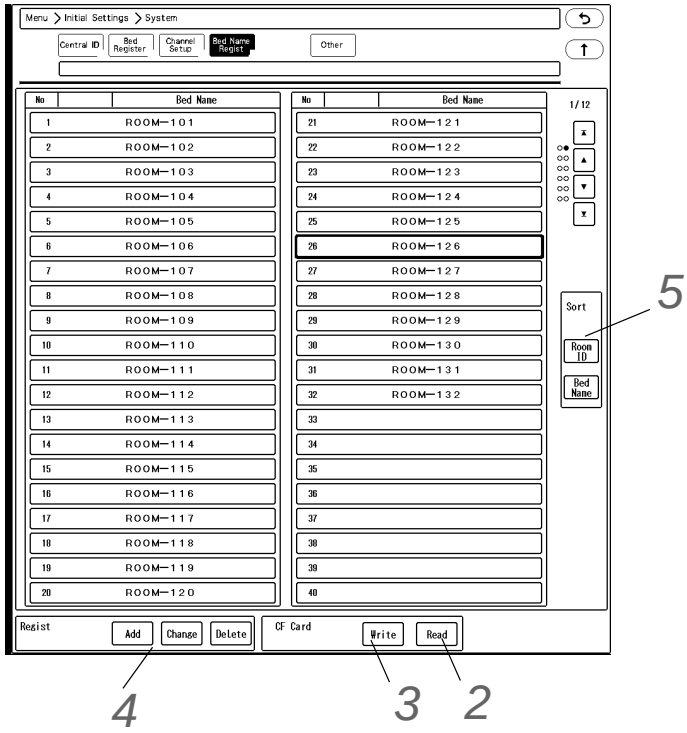
REFERENCE

- For procedure to register the bed name when using the nurse call system, refer to the corresponding section.

(☞"Bed Name Acquisition (When Carecom PHS nurse call system is used)" P4-10)
(☞"Bed Name Registration (When Aiphone PHS nurse call system is used)" P4-11)

- The registered bed name can be assigned to the patient during the admit process. (☞Operation Manual "Entering the Patient Information" P6-2)

1 Press [Menu > Initial Settings > System > Bed Name Regist].



2 Read the bed name data from USB memory.

1 Connect the USB memory to the USB connector.

2 Press [Read].

▸ A confirmation window will be displayed.

3 Press [OK].

NOTE

- All bed name data on this device will be replaced with the data read from the USB memory.
- Reading the bed name data will erase the currently registered bed name data on this device.

▸ The bed name read from the media will be displayed.

3 Write the bed name data to USB memory.

1 Set the storage media to this device.

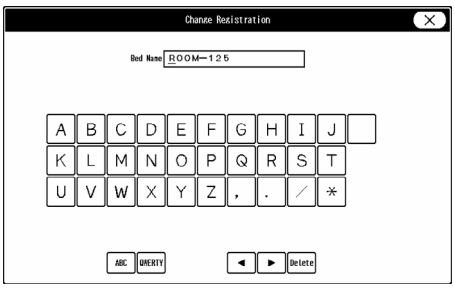
2 Press [Write].

▸ A confirmation window will be displayed.

3 Press [OK].

4 Add/change/delete the bed name.

- [Add]: New bed name can be registered.
- [Change]: Current bed name can be changed. (shown on right)
- [Delete]: Current bed name can be deleted.



5 The bed name display order can be sorted.

Time/Date

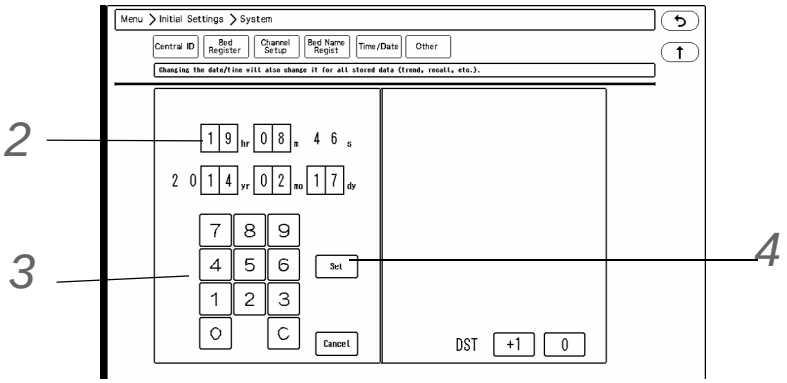
This section explains about the time/date setup procedure.

CAUTION

- If the time/date is not correctly set, or changed during monitoring, malfunction may occur with the periodic printing, graphic/tabular trend data, and age calculation from the birth date.
- The time/date can be set only on the administrating monitor. The time/date of other central monitors will synchronize with the administrating monitor.
- If the time/date is changed, the time/date for all the patient data stored such as graphic/ tabular trend, recall data will also change. The printed time/date before changing and the displayed time/date after changing will differ.

1 Press the [Time/Date] key on the initial settings menu.

- Time/Date setup window will be displayed.



2 Press on the area to perform the setup.

- A blue frame will be displayed on the selected area.

3 Use the numeric keys to enter the numerics.

- The blue frame will automatically move to the next item.

4 Enter the current date/time and press the [Set] key.

- The entered time/date will be validated. The number of seconds will be set to "00" sec.
- To cancel the time/date setup, press the [Cancel] key.

Follow the procedure below to adjust the current date/time.

⚠ CAUTION

- The time/date must be set before monitoring. If the time/date is changed during monitoring, error may be caused to the NIBP list data.

The time synchronization will be performed with the following priority.

1 Administrating monitor, if wired network is constructed.
(The time/date can be set only on the administrating monitor.)

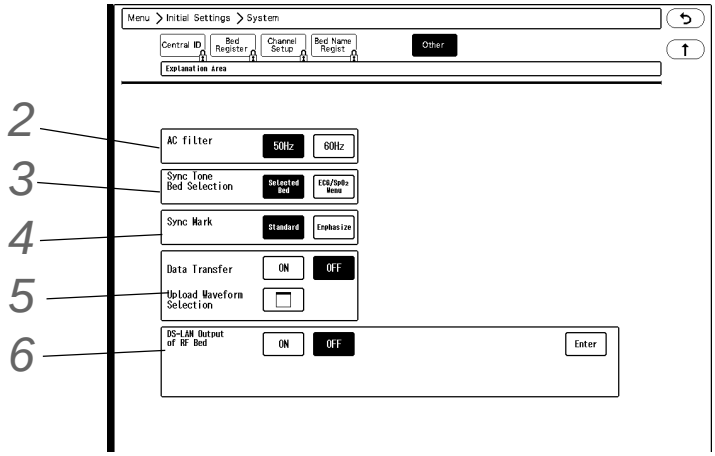
2 SNTP server, if used.

3 Patient data server, if used, and if [Time Synchronization] is selected on Patient Data Server setup or "Time Synchronization" is set to [ON] for [Link with EMR] or [Search ID].

Other

The settings such as AC frequency, HR synchronized tone can be set.

1 Press [Menu > Initial Settings > System > Other].



2 AC Frequency

- Select from [50Hz]/[60Hz].

3 Sync Tone Bed Selection

The bed to generate the HR/PR synchronized tone can be selected.

- [Selected Bed]: The synchronized tone for the currently selected bed will be generated. (The displayed individual bed, or the bed with the yellow human icon displayed in the information display area.)
- [ECG/SpO_2 Menu]: Only the beds which "Synchronized Mark/Tone" selection is made on the ECG, BP, or SpO_2 menu will generate the synchronized tone and display the synchronized mark ♥ in reversed color.

4 Synchronized Mark

The display type of the synchronized mark can be set.

- [Standard]: The synchronized mark for all beds will be displayed in the corresponding color of the parameter.
- [Emphasize]: The synchronized mark for the bed generating the synchronized tone will be emphasized by white background with black heart mark, and the mark for other beds not generating the synchronized tone will be displayed in the corresponding color of the parameter.

NOTE

- If [ECG/SpO_2 Menu] is selected for "Sync Tone Bed Selection", "Sync Mark" setting will be fixed to [Emphasize].
- If [ON] is selected for "Extended Display Unit Usage", "Sync Mark" setting will be fixed to [Emphasize].

5 Data Transfer

- [ON]: Data transfer function will turn ON.
- Upload Waveform Selection: Maximum of 5 waveforms can be selected to be uploaded from the transport monitor.

6 DS-LAN Output of RF Bed

- The RF beds monitored on this device can be monitored on other central monitor via DS-LAN network. [ON]: The function will turn ON.
- ↑/↓: Use these keys to select the bed ID of RF bed, and press [Enter].

⚠ CAUTION

- Make sure not to cancel the bed registration of the DS-LAN output RF bed.
- If monitoring of the DS-LAN output RF bed is suspended on this device, measurement data of the corresponding bed will not be output to the other central monitor.

Administrator Setup

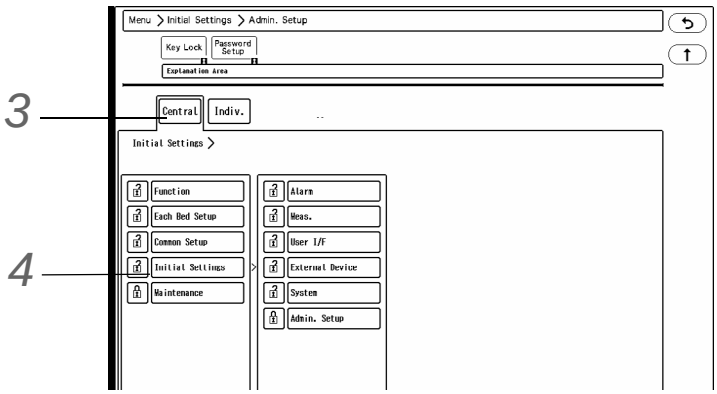
Key Lock

The control keys can be password-protected so that only administrator can use the keys.

1 Press the [Key Lock] key on the initial settings menu.

2 Enter the password.

- The key lock setup window will be displayed.



3 Select which menu ([Central] or [Indiv.]) to perform the setting.

- The items protected by password will be displayed in a tree format.

- This indicates unlocked item. It is displayed in white.
- This indicates locked item. To change the setting, an authorized password is required.

4 Select the item to lock the operation.

- Maximum of 3 types of password can be set for the administrator which can individually lock the setting with each password.
- To change the setting for the locked item, 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

Password Setup

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

CAUTION

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

NOTE

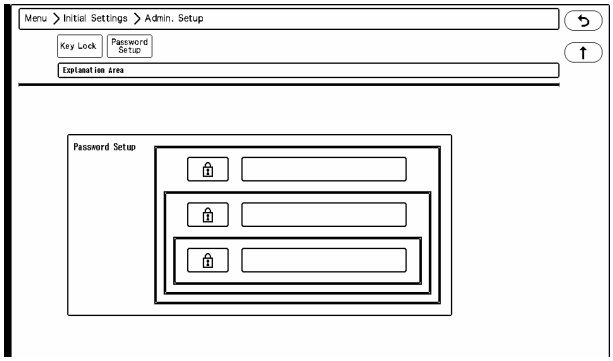
- The default passwords are set as follows.
  Red Key: 11111111
  Yellow Key: 22222222
  Green Key: 33333333
- Before using the device, make sure to change the password.
- For details of the password, contact Fukuda Denshi service representative.

1 Press the [Password Setup] key on the initial settings menu.

2 Enter the password.

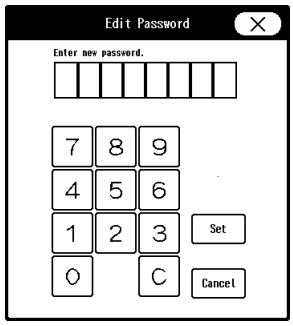
3 Press the [Password] key.

- The password setup window will be displayed.



4 Enter the password.

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



1 Press the key for the level to change the password.

▸ The "Password Setup" window will be displayed. (shown on right)

2 Enter the current password.

3 Press the [Set] key.

4 Enter the new password. Maximum of 8 digits can be entered.

NOTE

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

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.

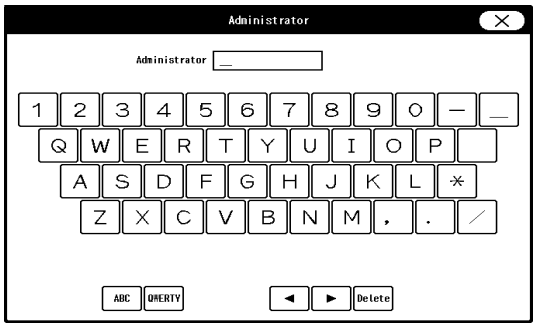
5 Set the administrator name.

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. Maximum of 8 characters can be entered.

Chapter 6 Setup Item/Default Value

This section lists the setup items and default settings.
The following indicates the selection, default setting and backup status for each setup item.

Initial Settings

Alarm

❑Alarm Setup

Item		Description	Default
Alarm System		Fukuda Tone, Melodic Tone, IEC Tone	IEC Tone
Basic Alarm Parameter		HR, SpO_2, Ext SpO_2, PR_SpO_2, SpO_2-2, Ext SpO_2-2, PR_SpO_2-2, SpCO, SpCO-2, SpMet, SpMet-2, SpHb, SpHb-2, NIBP-S to NIBP-M, PR_IBP, BP1-S to BP8-S, BP1-D to BP8-D, BP1-M to BP8-M, T1 to T8, Tb, APNEA, RR, CO_2 In, CO_2 Et, O_2 In, O_2 Ex, N_2O In, N_2O Ex, SEV In, SEV Ex, ISO In, ISO Ex, HAL In, HAL Ex, ENF In, ENF Ex, DES In, DES Ex, PEAK, PEEP, MV	ON: HR, SpO_2, NIBP(S), CO_2 Et, OFF: Other parameters
Asystole, VF, VT Alarm		Always ON, ON/OFF	Always ON
Ventilator Alarm		Always ON, ON/OFF	Always ON
Suspend Arrhythmia Analysis during Noise Interference		ON, Disable	Disable
Lower Limit for Alarm Volume	Physiological Alarm (Urgent, Caution, Status)	0 to 10 (11 levels)	0 for all alarm levels
	Ventilator Alarm		0
	Status Alarm (Urgent, Caution, Status)		0 for all alarm levels
Alarm Indicator	Level S	Pattern A to J, OFF	Pattern A
	Level H		Pattern A
	Level M		Pattern B
	Level L		Pattern C
	Enable/Disable	All OFF, All ON	All ON
	Synchronize with HR/RR	Sync. to HR, Sync. to RR, OFF	OFF
Alarm Level: Numeric Data	HR	S, H, M	M
	ST	H, M	M
	BP1	H, M	H
	BP2 to BP8	H, M	M
	PR_IBP	H, M	H
	Ext SpO_2, Ext SpO_2-2	S, H, M	H
	SpO_2, SpO_2-2	H, M	H
	PR_SpO_2, PR_SpO_2-2	H, M	H
	SpCO, SpCO-2	H, M, L	M

Item		Description	Default
	SpMet, SpMet-2	H, M, L	M
	SpHb, SpHb-2	H, M, L	M
	NIBP	H, M	H
	T1 to T8	H, M, L	M
	Tb	H, M, L	M
	RR	H, M	H
	Apnea	S, H, M	H
	CO_2 In	H, M	M
	CO_2 Et	H, M	H
	O_2 In	H, M	H
	O_2 Exp	H, M	H
	N_2O In	H, M	H
	N_2O Exp	H, M	H
	Agent In	H, M	H
	Agent Exp	H, M	H
	MAC	H, M	H
	PEAK	H, M, L	M
	PEEP	H, M, L	M
	MV Exp	H, M, L	M
	QTc	H, M, L	M
	SI	S, H, M	H
	RPP	S, H, M	M
Alarm Level: Arrhythmia	Asystole	S, H	H
	VF	S, H	H
	VT	S, H	H
	Ext Tachy	S, H	H
	Ext Brady	S, H	H
	Slow VT	H, M	M
	Tachy	S, H, M	M
	Brady	S, H, M	M
	Run	H, M	M
	Pause	H, M	M
	Triplet	H, M, L	L
	Couplet	H, M, L	L
	R on T	H, M, L	L
	Multiform	H, M, L	L
	Vent Rhtm	H, M, L	L
	Bigeminy	H, M, L	L
	Trigeminy	H, M, L	L
	Frequent	H, M, L	M
	SVT	H, M, L	M
	AFib	H, M, L	M
	Ireg RR	H, M, L	L

Item		Description	Default
	Prolong RR	H, M, L	L
	S Frequent	H, M, L	L
	S Couplet	H, M, L	L
	VPC	L	L
	SVPC	L	L
	Not Capt	H, M, L	L
	Not Pacing	H, M, L	L
Alarm Level: Technical	Ventilator	S, H	H
	Check Electrode	H, M, L	L
	SpO_2 Check Sensor	H, M, L, N	L
	Check SpO_2 Connector	H, M, L, N	M
	NIBP measurement failed	M, L, N	M
	Telemetry Check Battery	S, H, M, L, N	M
	Telemetry Check Reception	M, L	M
	Check DS-LAN Comm	L, N	N
Alarm Auto Setup		Enable, Disable	Disable
HR/PR Lower Limit		None, 30 bpm, 40 bpm	40 bpm
Alarm Threshold Limit	Parameter	HR, SpO_2, Ext SpO_2, SpO_2-2, Ext SpO_2-2, PR_SpO_2, PR_SpO_2-2, PR_IBP, NIBP-S, BP1-S, RR, APNEA, $EtCO_2$	All Disable
	Setting Range	(Standard alarm setting range will be applied.)	
Alarm Suspend Time		1 min., 2 min.	2 min.
Alarm Silence Time		1 min., 2 min.	2 min.
Too Far Alarm	Setup	ON, OFF	ON
	Time	5 sec. to 60 sec.	7 sec.
During Lead OFF	Alarm Judgement	ON, OFF	ON
	Alarm Printing	ON, OFF	ON
	Lead OFF Message	ON, OFF	ON
	Lead OFF Alarm Interval	5, 30, 60 sec.	5 sec.
During "Check SpO_2 Sensor"	Alarm Judgement	ON, OFF	OFF
Alarm Occurrence at NIBP Failure		ON, OFF	ON
Alarm Wave Background		Lighting, Normal	Lighting
Event Display		ON, OFF	ON
Alarm Suspend/Alarm Silence from Central Monitor		OK, NG	OK
Link with Alarm Sound Suspend		ON, OFF	OFF
Status Alarm Control		Link to alarm silence time, Link to each new occurrence	Link to alarm silence time

❑Nurse Call Custom Setup

Item	Description	Default
Customized Notification	ON/OFF	Custom 1 to 6: All OFF
Name	Numeric, Alphabet, Symbol (8 characters)	Custom 1 to 6: Custom N
Message	Numeric, Alphabet, Symbol (7 characters)	Custom 1 to 6: Custom N
Condition	HR, RR, APNEA, NIBP, ST1, ST2, 12-Lead ST, BP1 to BP8, PR_IBP, SpO_2, Ext SpO_2, PR_SpO_2, SpO_2_2, Ext SpO_2_2, PR_SpO_2-2, SpCO, SpCO_2, SpMet, SpMet_2, SpHb, SpHb_2, T1 to T8, PEAK, PEEP, MV, CO_2 In, CO_2 Et, Asystole, VF, VT, Ext Tachy, Ext Brady, SlowVT, Tachy, Brady, RUN, Pause, Triplet, Couplet, R on T, Multiform, Vent Rhtm, Bigeminy, Trigeminy, Frequent, SVT, AFib, Ireg RR, Prolong RR, S Frequent, S Couplet, VPC, SVPC, Not Capt, Not Pacing	Custom 1 to 6: No selection

Measurement

❑Unit

Item		Description	Default
ST		mm, mV	mV
BP		mmHg, kPa	mmHg
TEMP		°C, °F	°F
Height/Weight		cm/kg, in/lb	in/lb
CO_2 Atmospheric Pressure	Pressure	400 mmHg to 850 mmHg 53.4 kPa to 113.3 kPa	760 mmHg 101.3 kPa
	Unit	mmHg, kPa	mmHg

❑Other

Item		Description	Default
Disregard Artifact at QRS Detect		ON, OFF	ON
Display measurement error on NIBP list		ON, OFF	ON
ECG Drift Filter		All Beds ON, All Beds OFF, Each Bed	All Beds ON
Auto Resume Monitoring	Auto Resume	ON, OFF	ON
	Auto Resume Disable Duration	OFF, 5min., 10min., 15min.	5min.
	Resume even during Lead-Off	Enable, Disable	Enable
	Auto Resume Duration	10sec., 30sec., 1min., 2min., 3min., 4min., 5min.	2min.

User I/F

❑Display/Print

Item	Description	Default
Date Format	07/19, Jul.19, 19 Jul.	Jul. 19
BP Alarm Increment	Normal, Small	Normal

Item		Description	Default
RR Alarm Increment		Normal, Small	Normal
Trend Clip		ON, OFF	ON
Printer Message Display		ON, OFF	ON
ST/QT Display Lead Setup (A to C)		4 leads for each pattern of A to C I to V6, OFF	ST-A/QT-A: I, II, III, aVR ST-B/QT-B: aVL, aVF, V1, V2 ST-C/QT-C: V3, V4, V5, V6
QRS Classification		ON, OFF	ON
Speed		25 mm/s, 50 mm/s	25 mm/s
Print Calibration		ON, OFF	OFF
BP Printing Scale		20 mm, 40 mm	40 mm
CO_2 Printing Scale		20 mm, 40 mm	40 mm
Meas. Info. Printing		ON, OFF	OFF
LX Remote Printing		ON, OFF	ON
Setup at Discharge		Admit, Suspend	Admit
Home Display		All Beds Display, Indiv. Display	Indiv. Display
Dim All Data Other than Numeric		ON, OFF	OFF
Message Icon		ON, OFF	ON
Room/Bed ID Display		LAN_ID, Unique Name	LAN_ID
LAN_ID Unique Name Setup		7 single-byte characters	Blank
Event Label Setup	Event 1 to Event 8	8 characters	Event 1 to Event 8
Optimize Display	Function	ON, OFF	ON
	Optimize Display after Monitor Resume	Continue, Cancel	Continue
Register Fixed Comment		15 characters x 72	Blank
Waveform Size Display		Numeric, Bar (10 mm)	Numeric

❑Admit

Parameter ON/OFF

Item	Description	Default
ECG1, BP1 to BP8, NIBP, SpO_2, SpO_2-2, RESP, CO_2, T1 to T8, SvO_2/CCO, GAS, BIS, INVOS, SPIRO, VENT	ON, OFF	All ON

Alarm

Arrhythmia

Item	Description	Default	
		Adult/Child	Neonate
Asystole	ON 3 sec. to 10 sec.	ON 5 sec.	ON 3 sec.
VF	ON	ON	ON
VT	ON	ON	ON
Ext Tachy	ON, OFF 22 bpm to 300 bpm	OFF, 150 bpm	OFF, 230 bpm

Arrhythmia

Item	Description	Default	
		Adult/Child	Neonate
Ext Brady	ON, OFF 20 bpm to 295 bpm	OFF, 30 bpm	OFF, 60 bpm
Slow VT	ON, OFF	ON	ON
Tachy	ON, OFF	ON	ON
Brady	ON, OFF	ON	ON
Run	ON, OFF 2 to 8 beats	ON, 3 beats	ON, 3 beats
Pause	ON, OFF 1.5 sec. to 5 sec.	OFF, 3 sec.	OFF, 1.5 sec.
Triplet	ON, OFF	OFF	OFF
Couplet	ON, OFF	OFF	OFF
R on T	ON, OFF 200 ms to 600 ms	OFF, 320 ms	OFF, 240 ms
Multiform	ON, OFF	OFF	OFF
Vent Rhtm	ON, OFF	OFF	OFF
Bigeminy	ON, OFF	OFF	OFF
Trigeminy	ON, OFF	OFF	OFF
Frequent	ON, OFF 1 bpm to 50 bpm	OFF, 10 bpm	OFF, 10 bpm
SVT	ON, OFF 2 beats to 10 beats	OFF, 6 beats	OFF, 6 beats
AFib	ON, OFF 1% to 100%	OFF, 10%	OFF, 10%
Ireg RR	ON, OFF 10%, 15%, 20%	OFF, 10%	OFF, 10%
Prolong RR	ON, OFF	OFF	OFF
S Frequent	ON, OFF 1 bpm to 50 bpm	OFF, 10 bpm	OFF, 10 bpm
S Couplet	ON, OFF	OFF	OFF
VPC	ON, OFF	OFF	OFF
SVPC	ON, OFF	OFF	OFF
Not Capt	ON, OFF 80 ms to 480 ms	OFF, 320 ms	OFF, 320 ms
Not Pacing	ON, OFF 20 bpm to 200 bpm	OFF, 50 bpm	OFF, 50 bpm

Numeric Data

Item		Description	Default	
			Adult/Child	Neonate
HR		ON, OFF	ON	ON
		Upper Limit: 22 bpm to 300 bpm Lower Limit: 20 bpm to 295 bpm	40 bpm to 120 bpm	90 bpm to 200 bpm
ST1/ST2		ON, OFF	OFF	OFF
ΔST1/ΔST2		Upper Limit: -1.9 mV to +2.0 mV Lower Limit: -2.0 mV to +1.9 mV	±1.0 mV	±1.0 mV
		Upper Limit: -19 mm to +20 mm Lower Limit: -20 mm to +19 mm	±10 mm	±10 mm
QTc		ON, OFF	OFF	OFF
		Upper Limit: 204 ms to 800 ms Lower Limit: 200 ms to 796 ms	300 ms to 500 ms	300 ms to 500 ms
BP1 (mmHg)		ON, OFF	ON	ON
	SYS	Upper Limit: 2 mmHg to 300 mmHg Lower Limit: 0 mmHg to 295 mmHg	80 mmHg to 180 mmHg	50 mmHg to 110 mmHg
	MAP		OFF to OFF	OFF to OFF
	DIA		OFF to OFF	OFF to OFF

Numeric Data

Item		Description	Default	
			Adult/Child	Neonate
BP1 (kPa)		ON, OFF	ON	ON
	SYS	Upper Limit: 0.2 kPa to 40.0 kPa Lower Limit: 0.0 kPa to 39.5 kPa	10.0 kPa to 24.0 kPa	6.0 kPa to 14.0 kPa
	MAP		OFF to OFF	OFF to OFF
	DIA		OFF to OFF	OFF to OFF
BP2 to BP8 (mmHg)		ON, OFF	OFF	OFF
	SYS	Upper Limit: 0.2 kPa to 40.0 kPa Lower Limit: 0.0 kPa to 39.5 kPa	80 mmHg to 180 mmHg	80 mmHg to 180 mmHg
	MAP		OFF to OFF	OFF to OFF
	DIA		OFF to OFF	OFF to OFF
BP2 to BP8 (kPa)		ON, OFF	OFF	OFF
	SYS	Upper Limit: 0.2 kPa to 40.0 kPa Lower Limit: 0.0 kPa to 39.5 kPa	10.0 kPa to 24.0 kPa	10.0 kPa to 24.0 kPa
	MAP		OFF to OFF	OFF to OFF
	DIA		OFF to OFF	OFF to OFF
CVP (cmH_2O)		ON, OFF	OFF	OFF
		0 cmH_2O to 40 cmH_2O	OFF to OFF	OFF to OFF
PR-IBP		ON, OFF	OFF	OFF
		Upper Limit: 22 bpm to 300 bpm Lower Limit: 20 bpm to 295 bpm	40 bpm to 120 bpm	90 bpm to 200 bpm
NIBP (mmHg)		ON, OFF	ON	ON
	SYS	Upper Limit: 15 mmHg to 300 mmHg Lower Limit: 10 mmHg to 295 mmHg	80 mmHg to 180 mmHg	50 mmHg to 110 mmHg
	MAP		OFF to OFF	OFF to OFF
	DIA		OFF to OFF	OFF to OFF
NIBP (kPa)		ON, OFF	ON	ON
	SYS	Upper Limit: 2.0 kPa to 40.0 kPa Lower Limit: 1.5 kPa to 39.5 kPa	10.0 kPa to 24.0 kPa	6.0 kPa to 14.0 kPa
	MAP		OFF to OFF	OFF to OFF
	DIA		OFF to OFF	OFF to OFF
RR		ON, OFF	OFF	OFF
	Adult	Upper Limit: 10 Bpm to 150 Bpm Lower Limit: 5 Bpm to 145 Bpm	5 Bpm to 30 Bpm	-
	Child/Neonate	Upper Limit: 4 Bpm to 150 Bpm Lower Limit: 2 Bpm to 148 Bpm	20 Bpm to 80 Bpm	20 Bpm to 80 Bpm
Apnea		ON, OFF	ON	ON
		Upper Limit: 5 sec. to 60 sec. Lower Limit: none	15 sec.	10 sec.
$EtCO_2$ (mmHg)		ON, OFF	OFF	OFF
		Upper Limit: 3 mmHg to 115 mmHg Lower Limit: 1 mmHg to 98 mmHg	30 mmHg to 45 mmHg	30 mmHg to 45 mmHg
$EtCO_2$ (kPa)		ON, OFF	OFF	OFF
		Upper Limit: 0.3 kPa to 15.0 kPa Lower Limit: 0.1 kPa to 13.1 kPa	4.0 kPa to 6.0 kPa	4.0 kPa to 6.0 kPa
$EtCO_2$ (%)		ON, OFF	OFF	OFF
		Upper Limit: 0.3% to 15.0% Lower Limit: 0.1% to 13.1%	4.0% to 6.0%	4.0% to 6.0%
$InspCO_2$ (mmHg)		ON, OFF	OFF	OFF

Numeric Data

Item		Description	Default	
			Adult/Child	Neonate
		Upper Limit: 1 mmHg to 24 mmHg Lower Limit: none	3 mmHg	3 mmHg
$InspCO_2$ (kPa)		ON, OFF	OFF	OFF
		Upper Limit: 0.1 kPa to 3.0 kPa Lower Limit: none	0.4kPa	0.4kPa
$InspCO_2$ (%)		ON, OFF	OFF	OFF
		Upper Limit: 0.1% to 3.0% Lower Limit: none	0.4%	0.4%
MVe		ON, OFF	OFF	OFF
	Adult	2 L/min to 20 L/min	5 L/min to 10 L/min	-
	Child/Neonate	0.5 L/min to 5 L/min	2 L/min to 5 L/min	2 L/min to 5 L/min
PEAK		ON, OFF	OFF	OFF
		8 cmH_2O to 100 cmH_2O	8 cmH_2O to 26 cmH_2O	8 cmH_2O to 26 cmH_2O
PEEP		ON, OFF	OFF	OFF
		2 cmH_2O to 50 cmH_2O	2 cmH_2O to 10 cmH_2O	2 cmH_2O to 10 cmH_2O
SpO_2, SpO_2-2		ON, OFF	ON	ON
		Upper Limit: 51% to 100% Lower Limit: 50% to 99%	90 to OFF	90 to OFF
Ext SpO_2, Ext SpO_2-2		ON, OFF	ON	ON
		Lower Limit: 50% to 99%	80 to OFF	80 to OFF
PR-SpO_2, PR-SpO_2-2		ON, OFF	OFF	OFF
		Upper Limit: 22 bpm to 300 bpm Lower Limit: 20 bpm to 295 bpm	40 bpm to 120 bpm	90 bpm to 200 bpm
SpMet, SpMet-2		ON, OFF	OFF	OFF
		0% to 15%	OFF	OFF
SpCO, SpCO-2		ON, OFF	OFF	OFF
		0% to 40%	OFF	OFF
SpHb, SpHb-2		ON, OFF	OFF	OFF
		1 g/dL to 24.5 g/dL	OFF	OFF
T1 to T8 (°C)		ON, OFF	OFF	OFF
		Upper Limit: 31°C to 50°C Lower Limit: 30°C to 49°C	35°C to 40°C	35°C to 40°C
T1 to T8 (°F)		ON, OFF	OFF	OFF
		Upper Limit: 88.0°F to 122.0°F Lower Limit: 86.0°F to 120.0°F	95°F to 104°F	95°F to 104°F
Tb (°C)		ON, OFF	OFF	OFF
		Upper Limit: 31°C to 50°C Lower Limit: 30°C to 49°C	OFF	OFF
Tb (°F)		ON, OFF	OFF	OFF
		Upper Limit: 88.0°F to 122.0°F Lower Limit: 86.0°F to 120.0°F	OFF	OFF
12-Lead ST 12-Lead ΔST		ON, OFF	OFF	OFF
		Upper Limit: -1.9 mV to +2.0 mV Lower Limit: -2.0 mV to +1.9 mV	±1.0 mV	±1.0 mV

Numeric Data

Item	Description	Default	
		Adult/Child	Neonate
	Upper Limit: -19 mm to +20 mm Lower Limit: -20 mm to +19 mm	±10 mm	±10 mm
SI	ON, OFF	OFF	OFF
	Upper Limit: 0.5 to 2.0	1.0	1.0
RPP	ON, OFF	OFF	OFF
	Upper Limit: 200 to 300 (x100)	120	120
	Lower Limit: 10 to 290 (x100)	70	70
VENT	ON, OFF	ON	ON

Nurse Call

Item		Description	Default
Nurse Call ON		ON (Night), ON, OFF	OFF
Nurse Call Setup	Arrhythmia	Asystole, VF, VT, Ext Tachy, Ext Brady, SlowVT, Tachy, Brady, RUN, Pause, Triplet, Couplet, R on T, Multiform, Vent Rhtm, Bigeminy, Trigeminy, Frequent, SVT, AFib, Ireg RR, Prolong RR, S Frequent, S Couplet, VPC, SVPC, Not Capt, Not Pacing	No
	Numeric Data	HR, ST1, ST2, 12-Lead ST, BP1 to BP8, PR_IBP, NIBP, RR, APNEA, $EtCO_2$, $InspCO_2$,MV, PEAK, PEEP, SpO_2, PR-SpO_2, SpCO, SpMet, SpHb, SpO_2-2, PR_SpO_2-2, SpCO-2, SpMet-2, SpHb-2, T1to T8, SI, RPP	None
	Other	Ventilator, Too Far, Chk Lead	None

❑User Key

Item	Description	Default
Central	OFF, Home, Menu, Alarm Silence, Size/Scale, Numeric Data Quantity, Zoom Numeric Data, Print All Beds, Arrhythmia Relearn, All Beds Alarm, All Beds Event, Bed Transfer, Network View, Nurse Call Daily Check, Print Setup, Color Setup, Nurse Call Setup, FD Wave (To Save), Data Server Waveform, Parameter ON/OFF, Display Configuration, Tone/Volume, Brightness Setup, Switch Numeric Data, Optimize Display, Admit, Screen Shot	Page 1 1: Menu 2: Menu 3: Zoom Numeric Data 4: Zoom Numeric Data 5: Arrhythmia Relearn 6: Arrhythmia Relearn 7: Display Configuration 8: Display Configuration 9: Alarm Silence 10: Alarm Silence 11: Home 12: Home
Color selection for central monitor display user key	Gray, Blue, Red, Brown	Alarm Silence: Red Home: Blue Menu: Blue Other Keys: Gray

Item	Description	Default
Individual Bed Display	OFF, User Key Up/Down, Home, Menu, Individual Alarm Silence, Alarm Suspend, NIBP Start/Stop, Print Start/Stop, Monitor Suspend, Freeze, Admit/Discharge, Lead, Graphic Trend, Graphic Trend (Group), Tabular Trend, Tabular Trend (Group), NIBP List, Recall, Alarm History, ST, Hemodynamics, Full Disclosure, 12-Lead Analysis, NIBP Auto Mode, Alarm Setup (All), Alarm Setup (Basic), Display Configuration, Event, Print Setup, Color Setup, Nurse Call Setup, FD Wave (To Save), Data Server Waveform, Parameter ON/OFF, ODI, Score List, Screenshot	Page 1 1 to 2: Menu 3 to 4: Alarm Silence 5: Admit/Discharge 6: Graphic Trend 7: Tabular Trend 8: Recall 9: Full Disclosure 10: Alarm Setup (Basic) 11: Print Start/Stop 12: Home Page 2 1 to 2: Menu 3 to 4: Alarm Silence 5 to 10: OFF 11: Print Start/Stop 12: Home
Color selection for individual bed display user key	Light Gray, Gray, Blue, Red, Green	Home: Blue Menu: Blue Alarm Silence: Red NIBP Start/Stop: Blue Print Start/Stop: Green Other Keys: Light Gray

❑Operation

Item		Description	Default
Mouse	Moving Speed	5 levels	Bottom Level
Auto Hide Window		OFF, 5, 10, 20, 30, 60 sec.	OFF
Keyboard		109 (JP), 104	104
Waveform Area Function		Bed Select, Waveform Size, Indiv. Display	Bed Select

❑Shortcut Key

Item		Default
Q'ty	3, 6, 12	6
	Admit/Discharge: Admit/Discharge, Suspend, Discharge Alarm: Basic, Circ., Resp/Gas, Arrhy., ST, List Parameter: ECG, RESP, NIBP, BP, SpO_2, TEMP, GAS, External Device, CO_2, SpO_2-2, ECG ON/OFF, RESP ON/OFF, SpO_2 ON/OFF Review: Graphic Trend, Tabular Trend, NIBP List, Recall, Full Disc., ST, 12-Lead Analysis, Hemodynamics, ODI, Score List Other: Arrhy. Relearn, Zoom Numeric	Admit/Discharge, Alarm Setup (Basic), Graphic Trend, Tabular Trend, Recall, Arrhythmia Relearn
Color Setup	White, Blue, Red, Brown	No

External Device

❑Serial Communications

Main Unit Port

Item	Description	Default
COM1 to COM2	Nurse Call, PC Comm., Magnetic Card Reader, Barcode Reader, OFF	OFF

Nurse Call Detail Setup

Item		Description	Default
Nurse Call	Monitor ID	1 to 99	0
	Higher Priority (than others)	ON, OFF	OFF
	Nurse Call during Alarm Silence	Continue, Stop	Continue
	Alarm Factor Length	4 characters, 7 characters	7 characters
	Re-notify Nurse Call	ON, OFF	ON
	Duration until re-notification	0 min. 30 sec. to 5 min. 00 sec.	30 sec.
	Night Use	Enable, Disable	Disable
	Night Start/End Notice	ON, OFF	ON
	Night Start/End Time Setup	0:00 to 23:50	Start Time: 21:00 End Time: 09:00

PC Communication Detail Setup

Item		Description	Default
PC Communication	Protocol Version	Ver.1, Ver.1.5, Ver.2	Ver.1
	Parity	None, Even, Odd	none
	Stop Bit Length	1, 2	1
	Communication speed	2400, 9600, 19200, 38400	2400

Magnetic Card Reader Detail Setup

Item		Description	Default
Starting Digit / Ending Digit	Patient ID	1 to 255	OFF-OFF
	Patient Name		OFF-OFF
	Age		OFF-OFF
	Sex		OFF-OFF
	Comment		OFF-OFF
	Birth Year		OFF-OFF
	Birth Month		OFF-OFF
	Birth Day		OFF-OFF
	Height		OFF-OFF
	Weight		OFF-OFF
Sex (Character String for Male)		3 characters	MEN
Exclude "-" from Patient ID		ON, OFF	OFF
Control Type		None, ACK Reply	ACK Reply
Data Length		7, 8	7
Stop Bit Length		1, 2	1
Parity		None, Even, Odd	Even
Significant Bit Length		6, 7, 8	7
Communication speed		1200, 2400, 4800, 9600, 19200	9600
Retry times		1 to 9	1
Data type		TYPE0 (Fixed Length), TYPE1 (CR, LF), TYPE2 (STX-ETX), TYPE3 (STX-ETX, BCC)	TYPE3 (STX-ETX, BCC)

Item	Description	Default
Maximum Data Size	1 to 256	74

Barcode Reader Detail Setup

Item		Description	Default
Starting Digit / Ending Digit	Patient ID	1 to 255	OFF-OFF
	Patient Name		OFF-OFF
	Age		OFF-OFF
	Sex		OFF-OFF
	Comment		OFF-OFF
	Birth Year		OFF-OFF
	Birth Month		OFF-OFF
	Birth Day		OFF-OFF
	Height		OFF-OFF
	Weight		OFF-OFF
Sex (Character String for Male)		3 characters	MEN
Exclude "-" from Patient ID		ON, OFF	OFF

❑Network

Item		Description	Default
Main Unit	IP Address	Numeric (0 to 9)	0. 0. 0. 0
	Subnet Mask		0. 0. 0. 0
	Default Gateway		0. 0. 0. 0
Printer	Usage	ON, OFF	OFF
	IP Address	Numeric (0 to 9)	0. 0. 0. 0
	Printer Specification	LIPS IV, ESC/page, PCL 5	PCL 5
	Paper Size	A4, Letter	Letter
Data Server	Data Server	ON, OFF	OFF
	Protocol	Ver.01, Ver.02, Ver.03	Ver.01
	Near Real Time	ON, OFF	OFF
	IP Address	Numeric (0 to 9)	0. 0. 0. 0
	Port No.	Numeric (0 to 9)	2000
	Data Transfer	ON, OFF	OFF
	IP Address	Numeric (0 to 9)	0. 0. 0. 0
	Port No.	Numeric (0 to 9)	2020
	Transmission Speed	x1, x4, x8	x4
Central Monitor Communication	Mode	Server, Client, OFF	OFF
	Server IP Address	Numeric (0 to 9)	0. 0. 0. 0
	Data Transfer Port No.	Numeric (0 to 9)	2961
	Administrative Port No.	Numeric (0 to 9)	2960
Patient Data Server	Mode	Link with EMR, Search ID, Time Sync., OFF	OFF
(Link with EMR)	Offline	ON, OFF	OFF
	EMR Notice Icon	ON, OFF	ON
	Time Synchronization	ON, OFF	OFF
	Server IP Address	Numeric (0 to 9)	0. 0. 0. 0

Item		Description	Default
	Server Port No.	Numeric (0 to 9)	2806
	This Unit Port No.	Numeric (0 to 9)	2809
	Automatic Discharge	OK, NG	NG
(Search ID)	Search Patient ID Linked to Magnetic Card Reader (Barcode Reader)	ON, OFF	OFF
	Time Synchronization	ON, OFF	OFF
	Server IP Address	Numeric (0 to 9)	0. 0. 0. 0
	Server Port No.	Numeric (0 to 9)	2806
(Time Synchronization)	Server IP Address	Numeric (0 to 9)	0. 0. 0. 0
	Server Port No.	Numeric (0 to 9)	2806
SNTP Server	SNTP Server	ON, OFF	OFF
	IP Address	Numeric (0 to 9)	0. 0. 0. 0
HL7 Server	HL7 Server	ON, OFF	OFF
	Port No.	Numeric (0 to 9)	2900
12-Lead Analysis Server	Data Server	ON, OFF	OFF
	IP Address	Numeric (0 to 9)	0. 0. 0. 0
	Port No.	Numeric (0 to 9)	2010
Remote Maintenance	IP Address	Numeric (0 to 9)	0. 0. 0. 0
	Receiving Port No.	Numeric (0 to 9)	2956
	Transmitting Port No.	Numeric (0 to 9)	2955

❑Extended Display Unit

Item	Description	Default
Extended Display Unit Usage	ON, OFF	OFF
Extended Display Unit Location	Left, Right, Above, Below	Right
Alarm Silence Key Function	Common, Individual	Individual

❑Slave Monitor

Item		Description	Default
Main Unit	Function	Mirroring, All Beds Display	Mirroring
	Patient Name	Disp. ON, Disp. Room Name, Disp. OFF	Disp. ON
	Menu Display	Disp. ON, Disp. OFF	Disp. ON
	Mouse Pointer	Disp. ON, Disp. OFF	Disp. ON

❑Remote Control

Item		Description	Default
Main Unit	Usage	ON, OFF	OFF
	Room ID	A to H, S	A
	Bed ID	1 to 32	1
Extended Display Unit	Usage	ON, OFF	OFF
	Room ID	A to H, S	A
	Bed ID	1 to 32	1

❑USB Setup

Item	Description	Default
USB connectors 1 to 4	Barcode Reader, OFF	OFF

❑Recorder

Item	Description	Default
Recorder Connection	Built-in, External	DS-18xxR: Built-in DS-18xx (no recorder): External

System

❑Central ID

Item	Description	Default
Room ID	Numeric, Alphabet, Symbol (4 characters)	CNT-
Central ID	1 to 16	1

❑Bed Register

Item	Description	Default
Bed Register	RF: 12 beds, DS-LAN: 100 beds	DS-1812*: RF 12 beds DS-1800L*: Not registered

❑Channel Setup

Item	Description	Default
Stored Channels	-	Not registered.

❑Bed Name

Item	Description	Default
Bed Name Registration	480 Room ID, Bed Name Numeric, Alphabet, Symbol (16 characters)	Not registered.

❑Other

Item	Description	Default
AC Frequency	50 Hz, 60 Hz	60 Hz
Synchronized Tone	Selected Bed, ECG/SpO_2 Menu	Selected Bed
Synchronized Mark	Standard, Emphasize	Standard
Data Transfer	ON, OFF	OFF
Upload Waveform Selection	-	ECG1, SpO_2, RESP
DS-LAN Output of RF Bed	ON, OFF	OFF

Administrator Setup

❑Key Lock

Item	Description	Default
Central Monitor Display	OFF, red key, yellow key, green key for each item	Red key for the following items * Initial Settings > Alarm > Alarm Setup * Initial Settings > Measurement > Unit * Initial Settings > User I/F > Admit * Initial Settings > User I/F > Admit > Parameter ON/OFF * Initial Settings > User I/F > Admit > Alarm * Initial Settings > User I/F > Admit > Nurse Call * Initial Settings > External Device > Serial Comm. * Initial Settings > External Device > Network * Initial Settings > System > Central ID * Initial Settings > System > Bed Register * Initial Settings > System > Channel Setup * Initial Settings > System > Bed Name Regist. * Initial Settings > System > Time/Date Maintenance Green key for the following item * Initial Settings > Admin. Setup Other settings: OFF
Individual Bed Display		All OFF

❑Password Setup

Item	Description	Default
Password Setup	Administrator name: 8 characters each	Blank
	Password: 8 characters each	Red Key: 11111111 Yellow Key: 22222222 Green Key: 33333333

Chapter 7 Replacing/Disposing the Parts

Periodic Replacement

To ensure reliability of safety, function, and performance of this device, the following parts must be replaced periodically. When replacing, contact your nearest service representative.

Lithium-Ion Battery Pack (BTO-005)	Periodic Replacement Period: 300 times of charge/discharge or 1 year of usage whichever earlier

⚠ CAUTION

- The periodic replacement part must be replaced at specified period.

Disposing the Device

⚠ CAUTION

- When disposing of the device, 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

Handling After Use

After Use

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

Display

- The backlight of the display panel deteriorates by the life cycle. If the display gets extremely dark, scintillates, or does not light, contact your nearest service representative.
- Although the LCD utilizes highly accurate picture elements, occasionally, there may be few pixels which does not light or constantly lights. This is not an device failure and will not affect monitoring operation.
- If a still image is displayed for a long time, a minor afterimage may occur. This is a normal operation of the LCD of this device. If the afterimage affects the visibility, contact your nearest service representative.
- As the display panel is vulnerable, do not scratch or rub it with a hard item.

Cleaning the Touch Panel and Housing

Touch Panel

Since the display panel of the DS-1800 System incorporates a touch panel, finger prints and other stains are likely to appear on the touch panel.
Wipe the touch panel with an optional cleaning cloth, eyeglass cleaning cloth, soft cotton cloth, or non-woven cloth.

⚠ CAUTION

- Never use strong-acidic cleaning solution.
- If cleaning solution is left on the device, wipe with a dry cloth.

Housing

❑Cleaning

Wipe using a tightly squeezed gauze or an absorbent cotton dampened with alcohol (ethanol, isopropyl alcohol). Then wipe with a dry cloth.

Usable Cloth:

*Soft cloth (cotton)

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

⚠ CAUTION

- If cleaning solution is left on the device, wipe with a dry cloth. It may damage the surface resin coating, resulting in discoloration, scratches, malfunction, and deterioration.
- Do not wipe the metal part inside the connector.

❑Disinfection

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

Chemicals:

*Disinfectant Alcohol (ethanol, isopropyl alcohol)

*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 device frequently so stains can be removed easily.
- To prevent injury, it is recommended to wear gloves when cleaning the device.
- When cleaning or disinfecting, do not allow chemical solution to enter the device or connectors.
- Do not use organic solvents, thinner, toluene or benzene to avoid damaging the resin case.
- Do not polish the device with abrasive, chemical cleaner, alkaline or acidic detergent. The surface resin coating may damage, resulting in discoloration, scratches, and malfunction.
- For the precautions for storing and handling the chemicals, refer to the instruction manual for the respective chemical.

Storing the Device and Recording Paper

Device

- Store in a place where the device will not be exposed to splashing water.
- Install or store in an area where environmental conditions such as atmospheric pressure, temperature, humidity, ventilation, sunlight, dust, sodium, and sulfur will not adversely affect the system.
- Store in a level area where the device 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
  - Storage Humidity: 10% to 95% (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.

Chapter 9 Maintenance Check

Daily and Periodic Check

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

In this section, the maintenance check items that must be performed for this device 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.

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

⚠ CAUTION

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

❑Daily Check

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

❑Periodic Check

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

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

For more details, contact your nearest service representative.

Daily Check Items and Procedures

Make sure to perform the daily check.

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

No.	Check Items	Check Procedure	Criteria
1. External Appearance			
01	External Appearance	Visually check the exterior for scratches, cracks, and rust.	No abnormality should be found.
			No damage should be found on the cable. The cables should be firmly connected.
02	Installation	Check whether the device is installed on a level surface.	The installation area must be level and free from vibration and shock.
		Check whether the device is installed in a place susceptible to adverse environment.	The temperature and humidity of the installation area must be as specified. The device should not be subjected to splashing water or chemicals.
2. Operation			
01	Function	Connect the power cable, turn ON the standby switch, and check whether it operates normally.	The alarm indicator should light when the power is turned ON.
			The home display should appear, and the power LED should light.
			The date and time should be correct.
			The waveforms and measurement data should be properly received and displayed.
			Pressing the Print key should start the printing.
			Full disclosure waveform should be properly displayed. (When FSD-64G is used.)
02	Telemetry Reception Channel	Check if the channel ID is as specified by the telemetry channel administrator.	The channel ID should be as specified by the administrator.
04	Alarm Sound	On the "Tone/Volume" menu, check the alarm sound.	Pressing the [Test] key for each alarm level should generate the alarm sound.
05	Nurse Call	On the "Nurse Call Daily Check" menu, check the communication with the nurse call system.	Pressing the [1] to [3] keys on each bed should be properly notified to the nurse call system.
06	Recorder (Optional)	Visually check the installed condition of the paper.	The paper should be correctly installed.
			Neither damage nor discoloration should be found.
		Check if the printing operation is smooth, and no abnormal sound is occurring.	The operation should be smooth and no abnormal sound should occur.
3. Other Items			
01	Periodic Replacement Parts	Check the last replaced date of the lithium-ion battery pack.	The number of charging/discharging times should not exceed 300 times, or usage duration should not exceed one year.
02	Periodic Inspection	Check the date of the previous periodic inspection.	Should be within one year.
03	Operation Manual	Check that accompanying documents (operation manual, etc.) are stored in specified location.	Should be stored in specified location.

Periodic Check Items and Procedures

Perform the periodic check according to the following list.

- The periodic check should be performed once a year.
- If the device fails any check item on the periodic check list, the general judgment will be "Fail". Repair the device so that it passes all the check items.
- Use the device only if the judgments for all the items are "OK".
- Check all cables, devices, accessories, earth impedance, leakage current, and accuracy.

⚠ CAUTION

- Before the check procedure, back up the setup data and patient data on USB memory.

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

No.	Check Items	Check Procedure	Criteria
2. Power Supply			
01	Standby Switch	Check by connecting the power cable to AC and turning ON/OFF the standby switch.	Check that the power supply LED lights. Normal Operation: Green, Standby Mode: Orange
02	Battery-Charging Operation (When a battery is installed)	Install the battery, and check the charging operation.	Check that the battery charging LED lights. While charging: Orange, Fully charged: Green, No battery: Light Off
03	Battery Operation (When a battery is installed)	After charging the battery, unplug the power cable, and change to battery operation.	Check that the battery-operating condition is as specified on the operation manual.

No.	Check Items	Check Procedure	Criteria
3. Display/Operation/Print			
01	Label	Visually check the rating label and caution label of the device.	Should be neither peeled nor stained nor unclear.
02	Operation, Switch	Check by operating the control switches and keys on the touch panel.	Should operate correctly.
03	LCD	Perform VIDEO I/F test on the maintenance menu.	It should be clearly displayed with sufficient brightness, and there should be no flicker, color drift, ghosting.
04	Alarm Indicator	Check if the alarm indicator lights when the power is turned ON.	All segments on the alarm indicator should light when the power is turned ON.
05	Alarm Sound/ Operating Sound	On the "Tone/Volume" menu, check the alarm sound.	Alarm sound should generate with proper volume. There should be no beat noise.

No.	Check Items	Check Procedure	Criteria
06	Date/Time	Check the year, month, day, and time on the display.	The year, month, day, and time should be correctly displayed.
07	Printing Status (Optional)	Perform test printing on the maintenance menu. Visually check the printing condition and also if there are thin or missing points.	The printed characters should be clear and legible.
08	Printing Speed (Optional)	Perform test printing on the maintenance menu. Check by measuring the length of printed grid.	Error should be within ±5% for 25 mm/sec and 50 mm/sec waveform traces.
09	Remote Control (Optional)	Check that alarm can be silenced using the remote control unit.	Alarm should be silenced.
10	Receiving Condition (When using telemetry)	Check the receiving condition of waveforms and numeric data from the telemetry transmitter.	Correct waveforms and numeric data should be displayed and receiving condition should be stable.
11	Full Disclosure Waveform (Optional)	Check the full disclosure waveform on the review display.	It should be properly displayed.
12	USB memory	Check the data saving function.	The data should be properly saved.
13	DS-LAN Network	Connect the DS-LAN network bedside monitor, and check the operation.	The data should be properly received and displayed.
14	Output to the Slave Monitor/Extended Display Unit	Connect the slave monitor or extended display unit, and check the operation.	The data should be properly displayed.
15	Communication with the External Device	Connect the external device, and check the serial communication operation.	Proper communication should be performed.
16	Keyboard Operation	Enter the characters using the keyboard and check the operation.	The keyboard should properly function.
17	Mouse Operation	Test the mouse operation.	The cursor should properly move, and click operation should properly function.
18	TCP/IP Network Communication	Check the communication with the network printer and CVW server.	Proper communication should be performed.

No.	Check Items	Check Procedure	Criteria
4. Periodic Replacement Parts			
01	Lithium-Ion Battery Pack	Check the last replaced date of the lithium-ion battery pack.	The number of charging/discharging times should not exceed 300 times, or usage duration should not exceed one year.

No.	Check Items	Check Procedure	Criteria
5. Electrical Safety			
01	Earth Leakage Current (NC)	Measure the earth leakage current under normal condition using a leak measurement safety tester. Test according to the test method of IEC 60601-1 8.7.4.5.	Earth Leakage Current (NC) should be 5 mA or less.
02	Earth Leakage Current (SFC)	Measure the earth leakage current under single fault condition using a leak measurement safety tester. Test according to the test method of IEC 60601-1 8.7.4.5.	Earth Leakage Current (SFC) should be 10 mA or less.
03	Contact Current (NC)	Measure the contact current under normal condition using a leak measurement safety tester. Test according to the test method of IEC 60601-1 8.7.4.5.	Contact Current (NC) should be 100 µA or less.

04	Contact Current (SFC)	Measure the contact current under single fault condition using a leak measurement safety tester. Test according to the test method of IEC 60601-1 8.7.4.5.	Contact Current (SFC) should be 500 µA or less.
*Perform the following check item as appropriate. Check these items when you have disassembled the device to check or replace the boards or unit.			
05	Protective Earth Resistance	Measure using the AC resistance tester. (Test Current 25 A) Test according to the test method of IEC 60601-1 8.6.4.	Should be 0.1Ω or less between the protective earth terminal and accessible metal parts with protective earth. The protective earth conductor resistance in the power cable should be 0.1Ω or less.
06	Withstand Voltage	Apply AC 1500 V for 1 minute between mains part and protective earth terminal. Test according to the test method of IEC 60601-1 8.8.3.	It should withstand the applied voltage.

Maintenance Menu

From the "Maintenance" menu, Test menu, LAN information, version information can be displayed.

❑Test Menu

On the "Test Menu" , alarm history review, touch panel adjustment, maintenance test, etc. can be performed.

⚠ CAUTION

- The test menu operation will be performed by our service representative. Users should not perform this procedure as malfunction of the device may occur.

❑LAN Information

Information such as the connection status of the device connected to the network system will be displayed.

❑Software Version Information

The software version of the main unit, display unit, recorder unit, etc. can be verified.

Chapter 10 Software Information

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[This is the first released version of the library GPL. It is numbered 2 because it goes with version 2 of the ordinary GPL.]

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