

DYNASCOPE 8000 Series Central Monitor

DS-8900 System

Ver. 06

Maintenance Manual



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

This manual is for the DS-8900 System Version 06.



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

CAUTION

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

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

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Preface

Introduction

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

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

Important Notice

For Safe Operation of the Equipment

- (1) Before using this equipment, read this operation manual.
- (2) Fukuda Denshi cannot predict all the dangers which may be caused by misusage of this product or environmental condition.
- (3) For using this equipment, there are many items that "should be performed", "should not be performed", and "cannot be performed". It is not possible to cover all these items in this manual or warning labels. Therefore, it is necessary to also follow the general safety precaution other than the items described in this manual.
- (4) To prevent accidents, usage other than intended, or usage, cleaning, and maintenance not described in this manual should not be performed.
- (5) When using this equipment, follow the respective regulation to minimize the probability of accidents.

Intended Use of this Equipment

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

<Intended Use>

This equipment is intended for monitoring one or more patients in ICU or nurse station in the ward by acquiring data from the bedside monitor through the network. The patient data acquired on the central telemetry receiver can be also monitored through the network.

For specification of this equipment, refer to "Chapter 16 Specification" of this Operation Manual.

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

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

Copyright

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

Maintenance, Repair, Replacement

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

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

A full technical description of the DS-8900 system is available from your local Fukuda Denshi sales representative.

Contact

If you need more detailed information, please contact following.

(1) Fukuda Denshi Co., Ltd., Head Office

3-39-4 Hongo, Bunkyo-ku, Tokyo, Japan
Phone:+81-3-5684-1455 Fax:+81-3-3814-1222
E-mail: info@fukuda.co.jp
Home Page: <http://www.fukuda.com>

(2) Sales Representative

Write the name, address, phone, fax number of your local sales representative.

(Name of Sales Representative, Address, Phone/Fax)

About This Manual

Expression Used in This Manual

Meaning of the Symbols

Type of Precaution	Description
 DANGER	Failure to follow this message may cause immediate threat of death or serious injury.
 WARNING	Failure to follow this message may result in death or serious injury.
 CAUTION	Failure to follow this message may cause injury or failure to the equipment.
NOTE	"Note" is used to emphasize important information.
REFERENCE	"Reference" is used to provide useful information.
	Indicates the reference page for the procedure and precaution.
*	Used in a table which indicates that there is detailed explanation outside the table.

Indications for the Screens and Keys

The keys displayed on the monitor screen are indicated by [].
(Ex.: [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, wireless, TCON can be constructed with this equipment.

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.

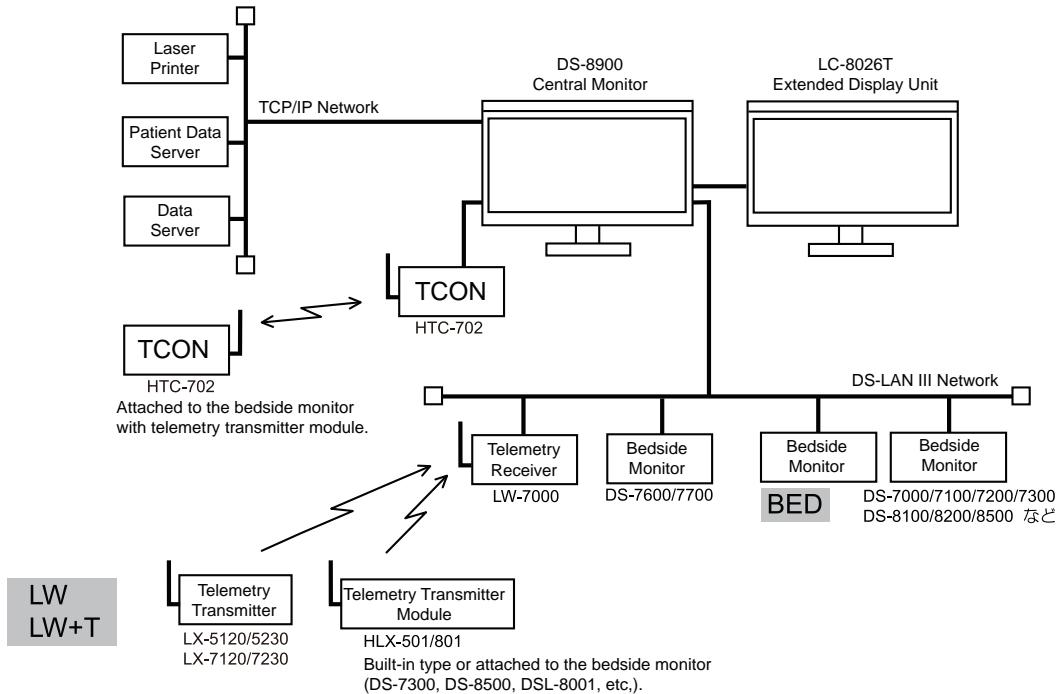
General Term	Expression	Description
Wired Network Bed	BED	Bedside monitor connected to the wired network The monitoring data is transmitted to this equipment through the wired network (DS-LAN III).
	LW Bed	Telemetry Bed The monitoring data is transmitted to the telemetry receiver which is then transmitted to this equipment through the wired network (DS-LANIII). Monitoring control is not possible on this equipment.
	LW+T Bed	Telemetry+TCON Network Bed The monitoring data is transmitted to the telemetry receiver which is then transmitted to this equipment through the wired network (DS-LANIII). Monitoring control such as NIBP measurement from this equipment is possible through the TCON network.

NOTE

- When both telemetry and TCON network are used, the numeric data from the telemetry will be displayed. Even when the telemetry condition is poor, numeric data from TCON will not

be displayed.

- Maximum of 16 beds can use the telemeter and TCON simultaneously.



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. Printing	Printing functions on the printers
12. Menu Items	Settings of the display configuration, tone/volume, color, etc.
13. Troubleshooting	Maintenance and troubleshooting
14. Setup Item/Default Value	Setup item and default value
15. Accessories	List of accessories and optional accessories
16. Specification	Specification and performance of the equipment

The maintenance manual is composed of the following chapters.

Chapter Title	Description
Preface	Outline and purpose of this manual (Important Notice, About This Manual)
Safety	Warning, Precautions for Safety, 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 CF Card	Procedure to use the CF card, to transfer data
4. EMR Link Function	Procedure to use the EMR link function
5. Nurse Call System	Connection and setting procedure of PHS nurse call system
6. Initial Settings	Settings necessary before monitoring
7. Setup Item/Default Value	Default and backup of setup items
8. Replacing/Disposing the Parts	Precautions about the periodic replacement parts
9. Cleaning/Disinfecting/Storing	Procedure to handle, clean, store this equipment
10. Maintenance Check	Daily and periodic checks, maintenance, LAN information, software version, etc.

System Construction and Installation

WARNING

- ♦ The installation of this equipment should be performed by our service representative. The users should not attempt it.
 - ♦ The system construction and network setup of this equipment 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" P6-1)
-

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Safety

About the Safety Precautions

The Meaning of Each Safety Precaution

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

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

Type of Precaution	Description
DANGER	Failure to follow this message may cause immediate threat of death or serious injury.
WARNING	Failure to follow this message may result in death or serious injury.
CAUTION	Failure to follow this message may cause injury or failure to the equipment.

Warning Labels Attached to the Equipment

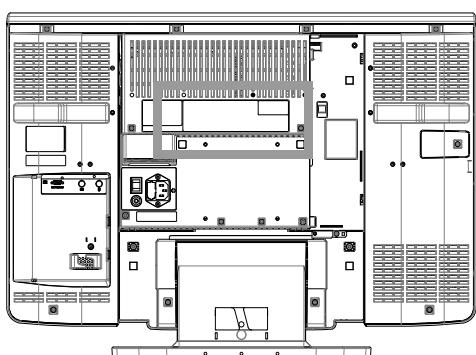
Make sure to read the warning label attached to the equipment and comply with the requirements while operating the equipment.



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

DS-8900 Main Unit

The warning label is attached to the rear side of the equipment.



Risk of explosion if used in the presence of flammable anesthetics.



Before connecting, read instruction manual.



To reduce the risk of electric shock, do not remove cover.
Refer servicing to qualified service personnel.

Graphic Symbols

□ Symbols Indicated on the Power Supply Part

Graphic Symbols	Description
	Potential Equalization Terminal Indicates the terminal to equalize the potential difference when interconnecting the devices.
	Protective Earth Indicates the protective earth inside the equipment.
	Alternating Current (Main Power Input Indicator)
	Power ON Indicates that the main power switch is in the ON position.
	Power OFF Indicates that the main power switch is in the OFF position.

□ Symbols Indicated on the Equipment

Graphic Symbols	Description
	Follow operating instructions (Warning); indicated in blue. Failure to follow operating instructions could place the patient or operator at risk.
	Follow operating instructions (Information); Indicates the need to refer to the related accompanying documents before operation.
	General precaution Indicates the need for cautious use.
	Electrostatic Sensitive Part Directly touching this connector part with hands should be avoided.
	TCP/IP Network Connector Connects to TCP/IP network.
	Home Key Displays the home display.
	Alarm Silence Key Silences the alarm for all beds.
	Video Output Connector Connects to external monitor.

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 Electrical Equipment

CAUTION

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

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

- ♦ Install or store in a place where the equipment will not be exposed to splashing water.
- ♦ Install or store in a place where the equipment will not be adversely affected by atmospheric pressure, temperature, humidity, ventilation, sunlight, dust or atmosphere containing salt or sulfur.
- ♦ Place the equipment on a stable surface where there is no inclination, vibration, or shock (including during transportation).
- ♦ Do not install or store in an area where chemicals are stored or gasses are evolved.
- ♦ Verify the power frequency, voltage and allowable current (or power consumption).
- ♦ Ensure the grounding is proper by connecting the accompanying power cable to the hospital grade outlet.
- ♦ Do not install the equipment in a location where it is difficult to unplug the power cable.

□ Precautions Before Using the Equipment

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

□ Precautions During Using the Equipment

- ♦ Always observe the equipment and patient to ensure safe operation of the equipment.
- ♦ If any abnormality is found on the equipment or patient, take appropriate measures such as ceasing operation of the equipment in the safest way for the patient.
- ♦ Do not allow the patient to come in contact with the equipment. Also, the operator should not contact the patient and the equipment at the same time.
- ♦ Do not assess the patient's condition only by the information from this equipment. A clinical judgment based on the information from this equipment should be made by a physician who fully understands functions of the equipment, in a comprehensive manner combined with clinical findings and other test results.
- ♦ On start-up of the system, verify that the start-up tone generates and alarm indicator lights.

□ Precautions After Using the Equipment

- ♦ When unplugging the cables, make sure to pull from the connector part of the cable and avoid applying excessive force.
- ♦ Clean the accessories and cables, and keep them together in one place.

- ♦ Keep the equipment clean to ensure proper operation for the next use.

□ Precaution when Equipment Failure Occurs

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

□ Precaution about Disassembling/Remodeling the Equipment

- ♦ Do not disassemble or remodel the equipment.

□ Precautions about Maintenance Check

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

Maintenance

⚠ WARNING

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

⚠ CAUTION

Precautions about Safety Check

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

Precautions about the Network System

Medical Telemetry

⚠ CAUTION

Precautions about the Installation

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

- Based on the above examination result, the Institution should place each receiver antenna as required.

⚠ CAUTION Precautions about the Management

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

Bidirectional Wireless Communications Module (TCON)

⚠ CAUTION Precautions about the Installation

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

⚠ CAUTION Precautions about the Management

- The Institution should appoint a person (hereinafter referred as the "Overall Manager" to manage the wireless devices for the whole facility.
- When installing TCON, the Overall Manager has to receive an explanation of the precautions for use of the TCON from the manufacturer or sales representative.
- The Overall Manager is responsible for the maintenance and storage of the equipment.

- ♦ The Overall Manager should create a management log (hereinafter referred to as the "log"), which contains a list of the management status of the wireless channels for the whole Institution. When changing a wireless channel, register it in the log and give proper instructions to the Zone Manager or to the user.
- ♦ The user needs to verify the transmitting/receiving operation before use.
- ♦ If interference or breakdown occurs in the communication, the TCON user is required to stop using the TCON and to inform the Overall Manager of the problem. The Overall Manager is to deal with the problem properly and/or contact the nearest Fukuda Denshi representative for service.



Precautions for Operation

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

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

- ♦ When the patient's data become mixed with a different patient's data due to interference.
- ♦ When there are multiple TCON communication devices set to the same TCON ID and channel (group).
- ♦ When symptoms such as being unable to communicate, unstable communication, or poor reception occur.
- ♦ When the radio communication is bad because there are metal, concrete, or other such obstacles between the Bidirectional Wireless Communications Modules (TCON).
- ♦ When a different wireless device is using the same frequency (channel).
- ♦ When there are other TCON devices nearby using different channels (groups).
- ♦ When a cell telephone or other wireless device is being used nearby.
- ♦ When citizens broadcast bands such as amateur radio or truck radios are used in the vicinity of the TCON operating area.
- ♦ When a computer or word processor, or electrical device that has an internal computer, is used near the TCON device antenna.
- ♦ When the TCON device is installed or moved to a location that is outside the radio communication range.
- ♦ If a nearby different group is set with a TCON channel frequency that is too close to the channel frequency set for the current TCON group.

Precautions when Using with Other Equipment

Pacemaker



WARNING

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

Reference

"Minute Ventilation Rate-Adaptive Pacemakers"

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

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

Non-Explosion Proof

⚠ DANGER

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

Defibrillator

⚠ WARNING

- ♦ When defibrillating, keep away from the electrodes or medicament applied to the patient chest. If this is not possible, remove the electrodes or medicament before defibrillating.
If the defibrillator paddles are directly in contact with the electrodes or medicament, an electrical shock may result by the discharged energy.
- ♦ When defibrillating, make sure that the electrodes, sensor cables, or relay cables are firmly connected to the device.
Contacting the metal part of the disconnected cable may result in electrical shock from the discharged energy.
- ♦ When defibrillating, do not touch the patient and the metal part of the device or cables.
Electric shock may result from the discharged energy.

MRI (Magnetic Resonance Imaging)

⚠ WARNING

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

Precautions for Using the Equipment

This System

WARNING

- ♦ Do not connect any equipment or cable not authorized by Fukuda Denshi to any I/O connector.
Also, do not connect any damaged equipment or cable. If done so by mistake, not only that the equipment cannot deliver its maximum performance, the equipment may be damaged and safety cannot be ensured.
- ♦ For the connector with "  " mark, only the peripheral devices specified by Fukuda Denshi should be connected with the given procedure explained 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 equipment is used under an environment not fulfilling the specified condition, not only that the equipment cannot deliver its maximum performance, the equipment may be damaged and safety cannot be ensured.
- ♦ When using multiple ME equipment simultaneously, perform equipotential grounding to prevent potential difference between the equipments.
Even a small potential difference may result in electric shock to the patient and the operator.
- ♦ 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 AC 100-240V. 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 equipment 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 use selection influences the precision of the QRS detection and arrhythmia analysis. Make sure the correct selection is made.
- ♦ The patient classification selection influences the precision of the QRS detection and NIBP measurement range. Make sure the correct selection is made.
- ♦ When [Suspend] is selected for "Setup at Discharge" ("Initial Settings" > "User I/F"), the suspend condition on this equipment 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 HR or asystole alarms may not generate due to incorrect HR measurement. Select [OFF] only if you are sure that pacing failure will not occur, or when the patient can be constantly monitored.

- ♦ During TCON connection, make sure to set the channel ID before setting the ID. Miscommunication with a wrong group may occur.
- ♦ The operation cannot be guaranteed if connected to improper TCP/IP network. When changing the network setting, contact 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 the DS-8900 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 used.
- ♦ 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 equipment 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 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 the alarm will not generate for that parameter. Make sure that the connectors are securely connected.
- ♦ If the parameter is not selected for the "HR/PR Alarm Source" (ECG/SpO₂/BP) on wired bedside monitor, the alarm for that parameter will be set to OFF on this equipment.
- ♦ When "Chk TLM Receive" or "Chk DS-LAN Comm" is displayed, alarm will not function.
- ♦ If the "Alarm Judgment" for "During Lead OFF" is set to OFF, HR alarm and arrhythmia alarm will not be generated 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 for the bedside monitor, telemetry transmitter, and central monitor depending on the communication specification (wired or wireless). Read the operation manual thoroughly before setting the alarm.
- ♦ Do not assess the patient's condition only by the alarm generated on this equipment. 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 spare parts specified for this equipment. Otherwise, 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 may occur.
- ♦ Do not use the touch panel with the film attached. Malfunction of the touch panel or damage may result.
- ♦ 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 or a touch panel pen. Do not touch with a pen-point or other hard-edged instruments. It may cause malfunction. In addition, do not apply pressure to whole or part of the panel for a prolonged time.
- ♦ Do not press the touch panel with strength or twist your finger on the panel. It may cause malfunction or damage the touch panel.
- ♦ Due to its material characteristic, the touch panel expands/contracts depending on the temperature/humidity.
- ♦ The LCD of this equipment utilizes LED for the backlight. Since this LED deteriorates by the life cycle, the display may become dark, scintillate, or may not light by the long term use. In such case, contact your nearest service representative.

CAUTION Precautions about the System

- ♦ The time will be synchronized with the following priority.
 - 1 Administrating monitor, if wired network is constructed.
 - 2 TCON base station, if TCON system is used.
 - 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].
- ♦ Verify that the correct date/time is set on the "Initial Settings" ("System" [Other]) before monitoring. If the date/time is changed during monitoring, error may be caused to 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). These settings will not be displayed on other central monitors.
- ♦ Canceling the bed registration will clear all data for that bed.
- ♦ The "Drift Filter" setting on the "Initial Settings" ("Measurement" [Other]) 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" ("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 CF Card, Data Transfer

- ♦ Do not use unspecified CF card.
- ♦ Use only the CF card formatted on this equipment.
- ♦ When removing the CF card, make sure that the CF card indicator is not lit.
- ♦ Check that the CF card indicator is not lit in red when turning OFF the power.
- ♦ The data transfer using the CF card is possible only between the DS-8900 system central monitors. The data cannot be transferred to other central monitors or to bedside monitors.
- ♦ If the software version of the two DS-8900 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

- ♦ If monitoring of a new patient is started without discharging the previous patient, data of the new patient will be added to the data of the previous patient which will result in inaccuracy.
When a patient is discharged, make sure to perform the discharge procedure.

- ♦ If monitoring is suspended on the bedside monitor, the data for that patient will not be transmitted to the central monitor. When monitoring is resumed on the bedside monitor, the data transmission to the central monitor will also resume.
- ♦ To display the pacemaker pulse, select [Used] for "Pacemaker" on the "Admit/Discharge" menu, and select [ON] or [Distinct Color] for "Pacemaker Pulse". ("Parameter" > "ECG" > "Detail Setup") It is also necessary to select [Used] for "Pacemaker" on the bedside 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.
- ♦ The monitor suspend operation will not be synchronized between the central monitor and the bedside monitor.
- ♦ 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 monitor will be initialized.
- ♦ Bed transfer/exchange of monitoring data is not possible among different central monitors.
- ♦ Depending on the bedside monitor type and software version, the discharge procedure for the TCON bed can not be performed on this equipment. Even if the TCON bed patient is discharged on this equipment, the patient will not be discharged on the bedside monitor, and vice versa.
For details of the bedside monitor type and software version, refer to your nearest service representative.
- ♦ When the discharge process is performed on the bedside monitor or other central monitors, the monitoring on this equipment will not be suspended even if [Suspend] is selected for "Setup at Discharge" ("Initial Settings" > [Display/Print] "User I/F").
- ♦ 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 the patient information and monitoring data, but will not initialize the alarm settings on the central monitor. To initialize these data, it is necessary to perform discharge process on the central monitor.



Precautions about the Parameter Monitoring

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



Precautions about the Alarm Setup

- ♦ The adjustable alarm limit increment is different between the DS-7000 series and the DS-8000 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 according to the priority.
- ♦ For the same alarm priority, the alarm message for the newer alarm will be displayed.
- ♦ The alarm message for the arrhythmia alarm (except Tachy, Brady) will continue to be displayed for 30 seconds even after the alarm condition dissolves.
- ♦ Even during "LEARN" status, alarm for HR, Asystole, VF, Tachy, Brady, Pause will be generated.
- ♦ Even during "Cannot analyze" status, alarm for HR, Asystole, VF, Tachy, Brady will be generated.
- ♦ If "Suspend Arrhy. Analysis during Noise Interference" ("Initial Settings" > [Alarm Setup]) is set to [ON], 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 equipments with different alarm settings are used in the same facility or same department, pay attention not to misjudge the alarms.

⚠ CAUTION Precautions about the PHS Nurse Call System

- ♦ When connecting multiple central monitors to one nurse call system, LAN adapter is required. When using the LAN adapter, contact Fukuda Denshi 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

- ♦ A special coating is applied to the surface of the touch panel. Do not wipe the surface with a cloth or gauze with coarse texture. Wipe the surface with an eyeglass cleaning cloth.
- ♦ If stains cannot be removed from the touch panel surface, wipe softly with a dry or ethanol dampened cleaning cloth. Never use strong-acidic cleaning solution.
- ♦ Clean the equipment frequently so stains can be removed easily.
- ♦ To prevent injury, it is recommended to wear gloves when cleaning the equipment.
- ♦ When sterilizing the entire room using a spray solution, pay close attention not to have liquids get into the equipment or connectors.
- ♦ Use only ethanol for disinfection or neutral detergent to clean the housing. Otherwise, the surface resin coating may be damaged, resulting in discoloration, scratches, and other problems.
Example of items that cannot be used are 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.
- ♦ Replace the periodic replacement parts periodically as specified.

Wired Network System

⚠ WARNING

- ♦ Do not connect unspecified equipment to the wired network.
- ♦ This equipment 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 using medical telemetry, make sure the patient data is properly received at the central monitor. Pay special attention when the channel ID at the bedside monitor is changed.

WARNING

- 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.
- 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.

CAUTION

- When using the wireless system and TCON at the same time, the registered channel ID will be automatically assigned for the TCON bed. Therefore, if the same channel ID is registered for another bed, malfunction may occur. Make sure to set a unique channel ID for each bed.
- When using the wireless system and TCON at the same time, the numeric data from the telemeter will be displayed. Even when the telemetry condition is poor, numeric data from TCON will not be displayed.
- On a wireless network system, the alarm generated on the bedside monitor will be transmitted to the central monitor with maximum of 13 seconds delay for the NIBP alarm and maximum of 7 seconds delay for other alarms.

TCON System

CAUTION

- The date/time setting of the TCON remote station synchronizes with the TCON base station. However, if the TCON remote station is connected to the wired network, the date/time setting synchronizes with the network administrating monitor (central ID: 001).
- The TCON installation and setup should be performed by our service representative. The users should not attempt them.
- Follow the instructions of the Overall Manager for the wireless channel when setting the TCON ID or channel (group) to prevent interference within the same institution.
- The same TCON channel (group) should be set for the central monitors and bedside monitors within the same TCON group.

RTC and Data Backup

CAUTION

- This equipment is equipped with a built-in clock. When the power of this equipment is turned OFF, this clock is backed up by a lithium battery. If incorrect time is displayed when turning ON the power, a low battery may be the cause. In such case, contact Fukuda Denshi service representative for replacing the battery.

- ♦ To protect the data during voltage dip, short interruptions and voltage variations on power supply input lines or during short duration of power turned OFF, this equipment performs 5-minute (approx.) data backup using the secondary battery. If the power is turned OFF for more than 5 minutes, the data will not be protected. The data may not be protected if the power is turned OFF within 30 minutes from power ON. The data that may not be protected are NIBP list data, alarm history, and the data just before turning OFF the power for trend data, recall data, full disclosure waveform data.
- ♦ The set alarm limits on this equipment 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 about the Peripheral Device, Accessories, Optional Accessories

Connection to Peripheral Device

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

When connecting peripheral devices to this equipment, it is the user's responsibility to verify that the overall system complies with ES 60601-1 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. Use of an unspecified device may cause electric shock to the patient and/or operator due to excessive leakage current.

Fuse

DANGER

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

Accessories and Optional 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 Equipment, Accessories, or Components



CAUTION

- When disposing of this equipment, accessories, or components, use an industrial waste distributor. Do not dispose of as ordinary waste.
- When disposing of the battery, separate it from other wastes and contact your nearest service representative.

Precautions about Transportation



CAUTION

- When transporting the DS-8900 system, pack it with specified packing materials. Also, transport it under appropriate environment condition. (☞ "Specification" P16-1)

Electromagnetic Compatibility

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

Precautions for Safe Operation under Electromagnetic Influence

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

The following are examples of the common cause and countermeasures.



DANGER

Static Electricity

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

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

- ♦ Humidify the room.

⚠ WARNING Cellular Phone

- ♦ The radio wave may cause malfunction to the device.

Cellular phones and radio sets should be turned off in the room (building) where medical device is located.

⚠ WARNING Lightning

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

- ♦ Use the uninterruptible power supply system.

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

- ♦ Check where the noise is originated and remove it using filtering device, etc.

- ♦ Stop using the device that is originating the noise.

- ♦ Use other power outlet.

EMC Guidance

This equipment complies with IEC 60601-1-2: 2007. However, if portable transmitter or wireless LAN equipment is used extremely nearby, the electromagnetic influence may largely exceed the compliance level and may cause unexpected phenomenon such as noise interference on the waveform, etc.

This equipment should be used in a location specified by each medical institution.

If any unexpected noise interference on the waveform or failure to the peripheral device occurs, stop using the equipment and follow the instruction of the technical engineer.

The following is the information relating to EMC (Electromagnetic Compatibility).

(When using this equipment, verify that it is used within the environment specified below.)

Compliance to the Electromagnetic Emissions

The DS-8900 system is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-8900 system should assure that it is used in such an environment.

Guidance and Manufacturer's Declaration - Electromagnetic Emissions		
Emissions Test	Compliance	Electromagnetic Environment - Guidance
RF Emissions CISPR 11	Group 1	The DS-8900 system uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF Emissions CISPR 11	Class A	
Harmonic Emissions IEC 61000-3-2	Class A	The DS-8900 system is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network which supplies buildings used for domestic purposes.
Voltage Fluctuations/ Flicker Emissions IEC 61000-3-3	Complies	

Compliance to the Electromagnetic Immunity (1)

The DS-8900 system is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-8900 system should assure that it is used in such an environment.

Guidance and Manufacturer's Declaration - Electromagnetic Immunity			
Immunity Test	IEC 60601-1-2 Test Level	Compliance Level	Electromagnetic Environment - Guidance
Electrostatic Discharge (ESD) IEC 61000-4-2	±6kV: contact ±8kV: air	±6kV: contact ±8kV: air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2kV: power supply lines ±1kV: input/output lines	±2kV: power supply lines ±1kV: input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1kV: differential mode ±2kV: common mode	±1kV: differential mode ±2kV: common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines. IEC 61000-4-11	<5% U_T^* (>95% dip in U_T) for 0.5 cycles 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 sec.	<5% U_T (>95% dip in U_T) for 0.5 cycles 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 sec.	Mains power quality should be that of a typical commercial or hospital environment. If it is required to continuously operate the DS-8900 system during power failure, it is recommended to operate on an uninterrupted power supply.
Power Frequency (50/60Hz) Magnetic Field IEC 61000-4-8	3A/m	3A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

*: U_T is the AC mains voltage prior to application of the test level.

Compliance to the Electromagnetic Immunity (2)

The DS-8900 system is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-8900 system should assure that it is used in such an environment.

Guidance and Manufacturer's Declaration - Electromagnetic Immunity			
Immunity Test	IEC 60601-1-2 Test Level	Compliance Level	Electromagnetic Environment - Guidance
Conducted RF IEC 61000-4-6	3Vrms 150kHz to 80MHz	3Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the DS-8900 system, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended Separation Distance $d = 1.2 \sqrt{P}$
Radiated RF IEC 61000-4-3	3V/m 80MHz to 2.5GHz	3V/m	Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey ^{*1} , should be less than the compliance level in each frequency range ^{*2} . Interference may occur in the vicinity of equipment marked with the following symbol: 
<p>Note 1: At 80MHz and 800MHz, the separation distance for the higher frequency range applies.</p> <p>Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p> <p>*1: Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast can not be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the DS-8900 system is used exceeds the applicable RF compliance level above, the DS-8900 system should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the DS-8900 system.</p> <p>*2: Over the frequency range 150kHz to 80MHz, field strength should be less than 3V/m.</p>			

Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the DS-8900 system

The customer or the user of the DS-8900 system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the DS-8900 system as recommended below, according to the maximum output power of the communications equipment.

Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the DS-8900 system			
Rated Maximum Output Power of Transmitter (W)	Separation Distance according to Frequency of Transmitter (m)		
	150kHz to 80MHz $d = 1.2 \sqrt{P}$	80MHz to 800MHz $d = 1.2 \sqrt{P}$	800MHz to 2.5GHz $d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

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

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

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

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-8900

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

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Chapter 1 Installation of the Unit

Precautions for Installing the Equipment

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 equipment should be performed by our service representative or system administrator of your institution.

Operating Environment

- ♦ The following environmental conditions should be observed when operating the equipment.
 - ♦ Surrounding Temperature : 10 to 40°C
 - ♦ Relative Humidity: 30 to 85% (non-condensing)
 - ♦ Atmospheric Pressure: 800 to 1060hPa
- ♦ This equipment 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 3-way outlet.
 - ♦ Verify power voltage and frequency before connecting to an AC power source.
 - ♦ Use the power source that can provide adequate power to the device.
Refer to  "Operation Manual "Specification" P16-1 for power voltage, frequency, and power consumption.
- ♦ Pay attention when installing or storing the equipment. Do not install or store in the following locations.
 - ♦ where chemicals are stored or gas may generate
 - ♦ where the equipment will be subject to splashing water or humidity from a nebulizer or vaporizer
 - ♦ where the equipment will be subject to direct sunlight
 - ♦ where the equipment will be subject to inclination, vibration, or shock.
- ♦ Ensure proper ventilation to cool the device.
 - ♦ A minimum space of 5 cm is required between vents on the rear side of the monitor and the wall. If the monitor is embedded in a wall or surrounded by a wall, a minimum space of 10 cm is required.

WARNING

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

Procedure to Start Monitoring

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

1 Start the DS-8900 System.

- 1 Connect the power cable.
- 2 Connect the extended display unit.
- 3 Connect the keyboard and mouse (optional).
- 4 Turn ON the power.

2 Prepare for network construction. (DS-LANIII, TCON)

- 1 Set the central ID.
- 2 Set the date/time.
- 3 Set the TCON on the serial communication port. (When using the TCON system.)

3 Construct the network system. (DS-LANIII, TCON)

- 1 Connect the LAN cable.
- 2 Connect the TCON system.

4 Set the monitoring beds.

- 1 Register the monitoring 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 CO₂ 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.

NOTE

- The short-term backup battery used on this equipment needs to be periodically replaced (every 3 years depending on the frequency of usage). On the supplied Parts Replacement Label, write down the replacement period and label it on the main unit for indication of replacement period.

Starting the System

WARNING

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

Connecting the Power Cable

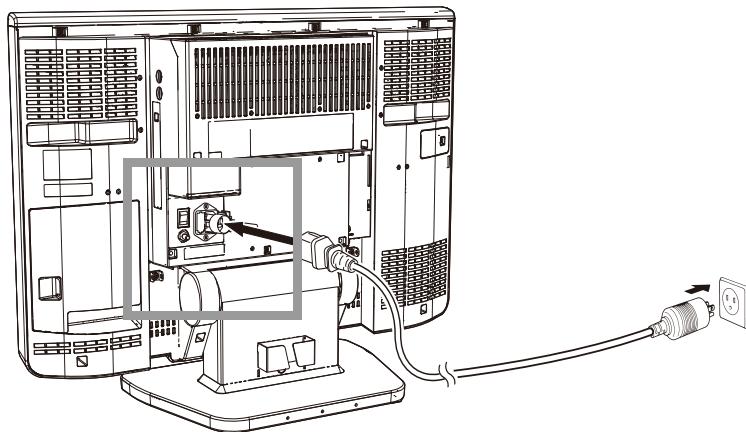
⚠️ WARNING

- 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 AC 100-240V. When connecting, do not use a multiple portable socket-outlet.
- When using multiple ME equipment simultaneously, perform equipotential grounding to prevent potential difference between the equipments. Even a small potential difference may result in electric shock to the patient and the operator.
- Refer to the following note regarding the equipotential grounding.

NOTE

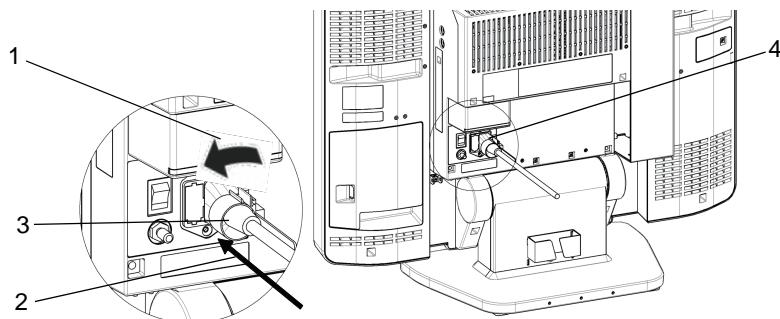
- Equipotential Grounding
When connecting multiple equipments, electrical potential difference may be generated between the equipments. This may result in electric shock to the patient connected to these equipments. Pay special attention for use in operating room, ICU, CCU, cardiac catheter laboratory,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

1 Connect the accessory power cable (CS-24) to the rear side of the main unit.



2 Fix the AC power cable with a clamp to prevent from disconnecting.

- 1 Fix on the clamp to the cable.
- 2 Tighten the clamp part toward the cable end.
- 3 Clamp attaching part
- 4 Cable Clamp



3 Connect the other end of the power cable to a 3-way outlet with ground terminal.

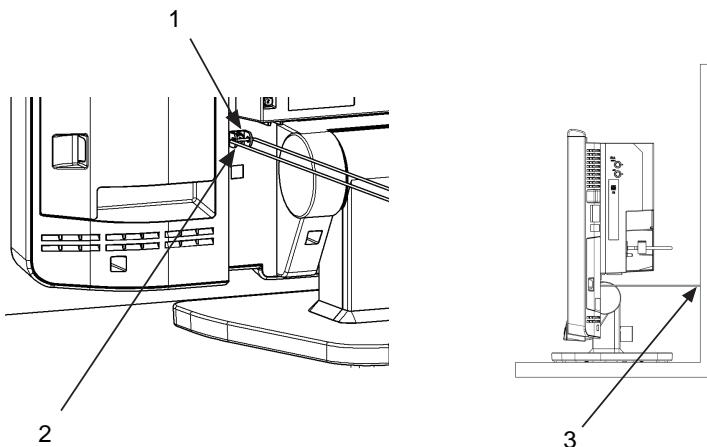
□ Usage of Fall-Prevention Brackets

Insert the wires through the fall-prevention brackets on the left and right of the rear side of the main unit 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 tilt the display.

1 Fall-Prevention Brackets (x2 at left and right)

2 Insert the wire.

3 Fix on to the wall, etc.



When fixing this equipment on a table, use the optional OAO-80A fixing bracket.

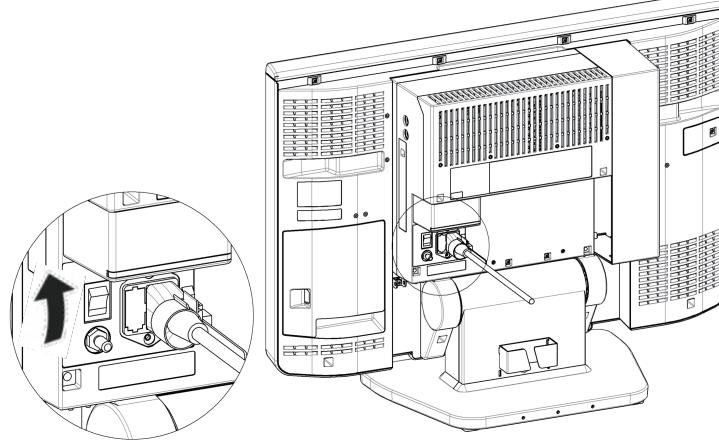
NOTE

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

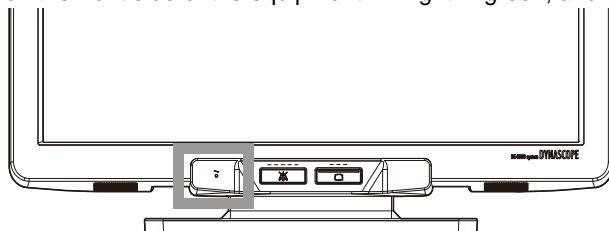
Turning the power ON

1

Turn ON the main power supply switch on the rear side of the equipment.



- ▶ The power supply LED on the front side of the equipment will light in green, and the display will turn ON.



- ▶ The display brightness can be adjusted for optimum view. (☞ Operation Manual "Brightness" P12-30)

Connecting the Mouse and Keyboard

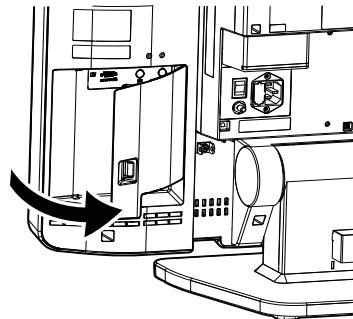
Connecting the Mouse and Keyboard

⚠️ WARNING

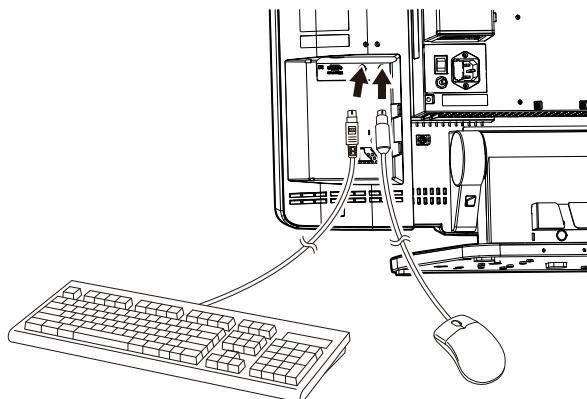
- Use the recommended PS/2 mouse, USB mouse, keyboard. Otherwise, it may cause malfunction or failure.

□ Connecting the PS/2 Mouse/Keyboard

- 1 Remove the cable cover located at the rear side.



- 2 Connect the keyboard (mouse) to the keyboard connector (mouse connector) at the rear side.
Connect them according to each label.

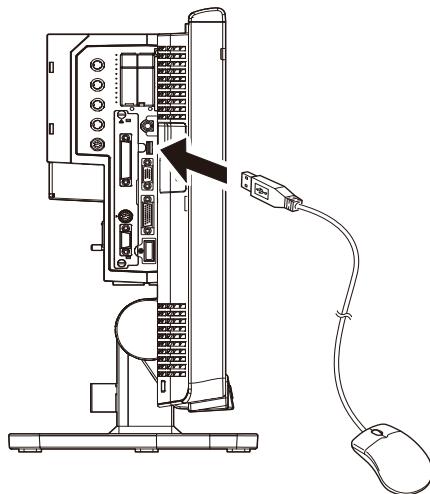


- 3 After connecting the keyboard (mouse), attach the cable cover.

□ Connecting the USB Mouse

1

Connect the USB mouse to the I/O port located at the left side of the central monitor.



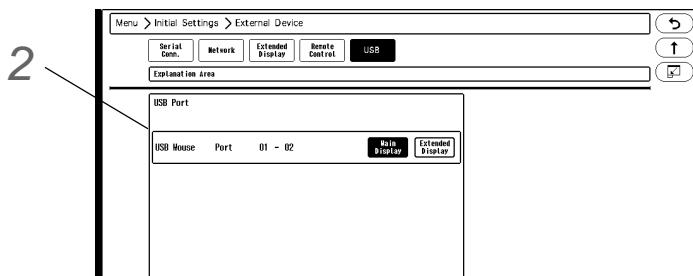
USB Mouse Setup

The display to control using the USB mouse can be selected from central monitor or extended display unit.

1

Press the [Menu], [Initial Settings], [USB] ("External Device") keys.

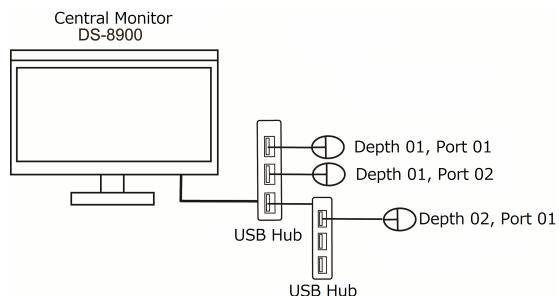
- ▶ The list of connected USB mouses will be displayed.



- ▶ For "Port", USB port depth - USB hub port number will be displayed. (shown on right)
- ▶ If more than one USB mouses are connected, the moved mouse on the list will be indicated by blue frame.

2

Select the display to control using the USB mouse from [Main Display] or [Extended Display].



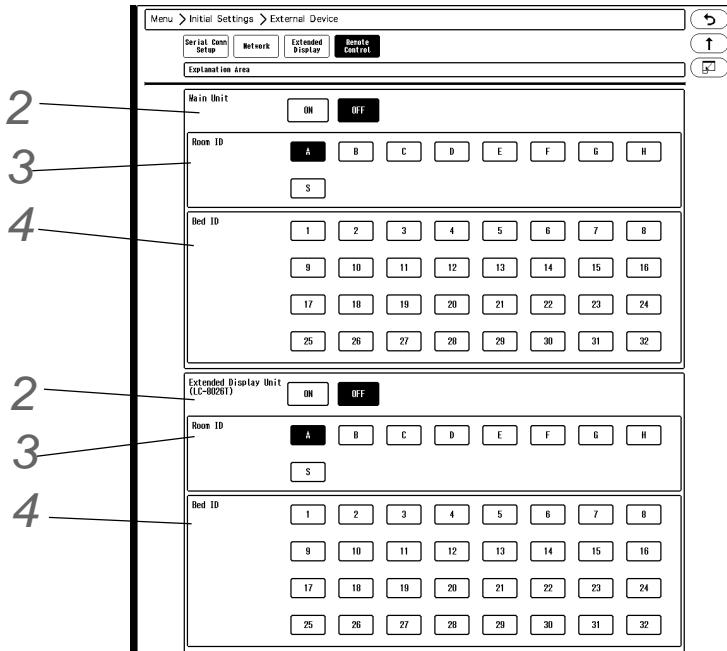
Remote Control Setup

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.

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



- 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.

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

- Select the "Bed ID".

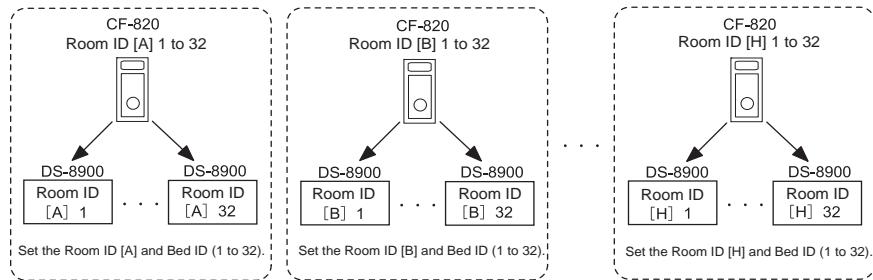
▶ If [S] is selected for "Room ID", central ID setting will be applied for the "Bed ID", and this setting is not necessary.

NOTE

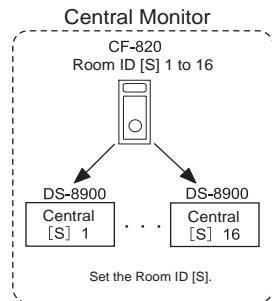
- For the CF-820 IR Remote Control Unit, if [S] is set for Room ID, central ID used on the DS-LAN (displayed on the lower right of the home display) will be set as the remote control ID. If [A] to [H] is set, a different ID for the remote control unit can be set.
- One remote control unit can control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

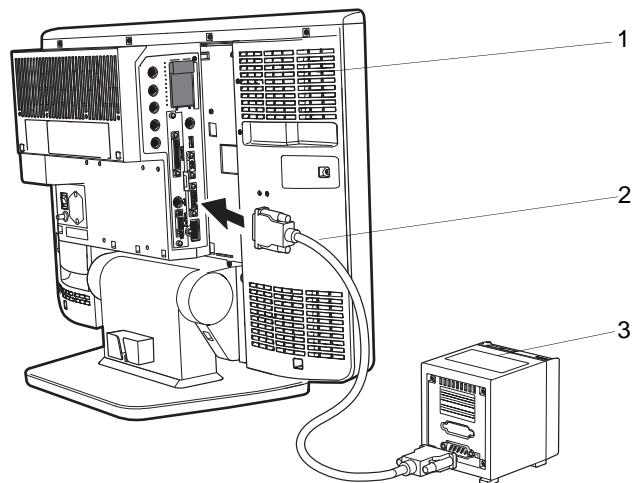
1

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

1 DS-8900 Central Monitor

2 Unit Connection Cable (CJO-09SSxx)

3 HR-800



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

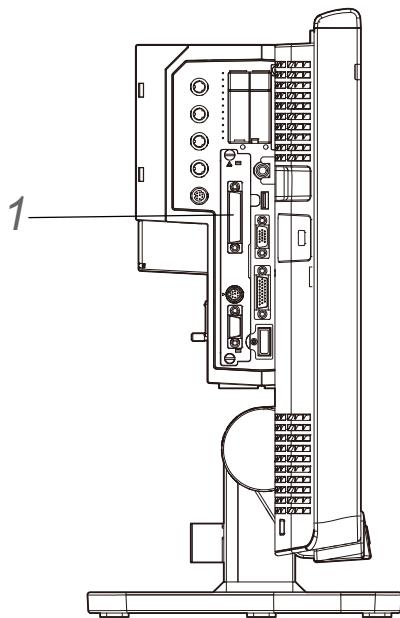
Using the Extended Display Unit

The main unit is equipped with DVI-I connector for extended display unit output which allows connection of extended display unit (LC-7019 series).

On the extended display unit, the multimode display or full disclosure waveform can be displayed.

Connection Procedure

When connecting, contact our service representative.



- 1** Connect the LC-8026T and DS-8900 using the display unit connection cable (CJ-731B).

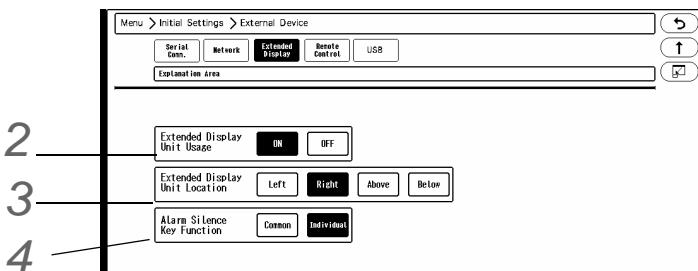
 **CAUTION**

- ♦ Use only the specified extended display unit.

Setup

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

► The extended display unit setup menu will be displayed.



- 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.

WARNING

- ◆ Although each of the DS-8900 and LC-8026T is equipped with a speaker, they use the same sound source.
- If the [Alarm Silence] key is pressed with [Individual] selected, the alarm may continue to generate from both display units if the alarm is generated for the bed monitored on the display unit which the [Alarm Silence] key was not pressed.

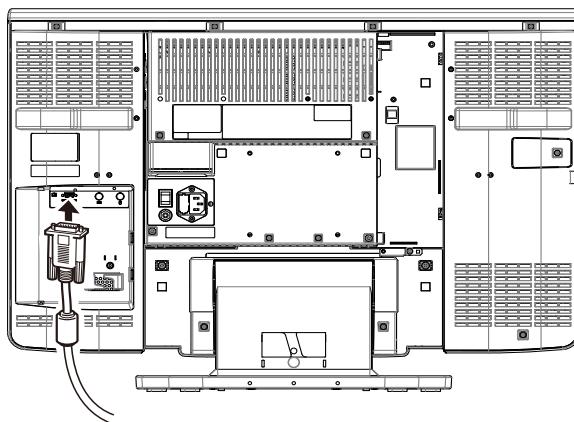
Using the Slave Monitor

On the slave monitor, the same display with the main unit or extended unit can be displayed.

Connection Procedure

NOTE

- ◆ When connecting, contact our service representative.



Slave Monitor Specification

A monitor with analog RGB input which satisfies the following condition should be used.

Resolution Full HD (1920dot x 1080dot)

Horizontal Frequency 67.5kHz

Vertical Frequency 60Hz

CAUTION

- ◆ 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.

Chapter 2 System Construction

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Chapter 2 System Construction

General Description

For the DS-8900 System Central Monitor, the following network system can be constructed.

1 Wired Network (DS-LANIII)

Bedside monitors and central monitors are connected by LAN cable.

The telemetry beds (LW beds) with LW-7000 Telemetry Receiver can be also connected to the central monitor by wired network. The LW beds receive the monitoring data from the bedside monitor with HLX-501 or HLX-801 or LX-7120, LX-7230 Telemetry Transmitter.

Maximum of 100 beds can be connected within 1 network segment.

A network administrating monitor (Central ID: 001) is required.

2 TCON System

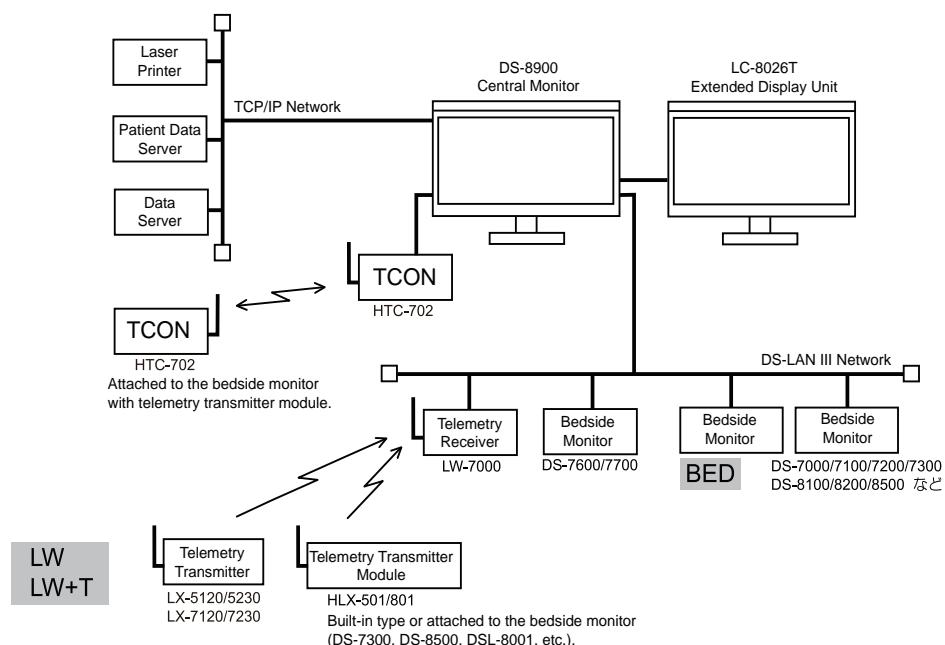
By using the TCON system, the central monitor can receive the numeric data and alarm settings from the bedside monitor with HTC-702 Bidirectional Wireless Communication Module.

When using more than one central monitors, one of the monitors should be set as the TCON base station (TCON ID: C1).

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" P2-11)



Wired Network System

A wired network system can be constructed using the LAN cable. Maximum of 100 beds can be connected to the wired network system.

CAUTION

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

Model Types that can be connected to the Wired Network

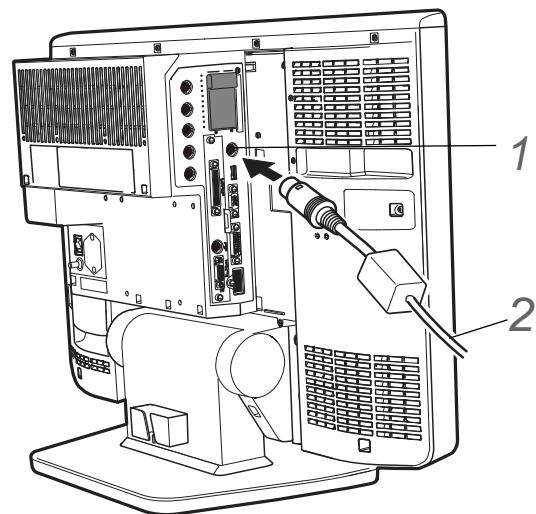
	DS-LANIII
DS-5000 Series Bedside Monitor DS-5100, DS-5300/5300W, DS-5400	No
DS-5000 Series Central Monitor DS-5700, DS-5800N/NX/NX ^{MB}	No
Central Telemetry Receiver LW-5500N	No
8ch Recorder AU-5500N	No
DS-7000 Series Bedside Monitor DS-7000, DS-7100*, DS-7300, DS-7200	Yes
DS-7000 Series Central Monitor DS-7600/7600W, DS-7700/7700W	Yes
Central Telemetry Receiver LW-7000	Yes
DS-8000 Series Bedside Monitor DS-8100, DS-8200, DS-8500	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 left side of this equipment.

2 Connect the other side of the cable to the HUB or LW-7000.

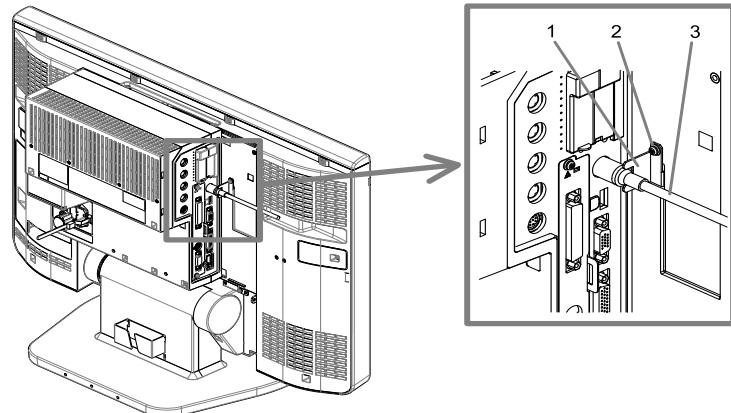


3 Secure the DS-LAN cable retainer using the accessory screw (Double Washer Sems M3x8) as shown in the illustration.

1 DS-LAN Cable Retainer

2 Screw (Double Washer Sems M3x8)

3 DS-LAN Cable



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

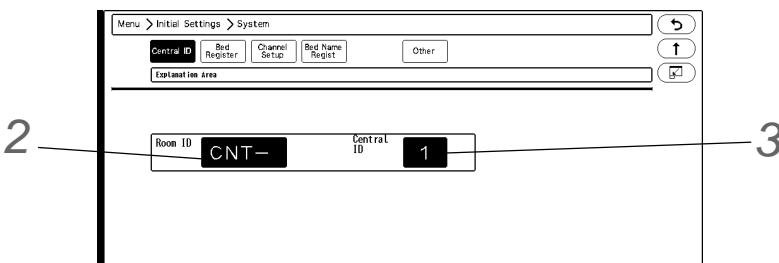
- Make sure that "DS-LANIII" is set for DS-LAN setup for all the monitors connected to the wired network.
- To construct a DS-LANIII network, it is necessary that software version for all the monitors are compatible with the DS-LANIII.

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 LW-7000 Central Telemetry Receiver, which receives the data via wireless network, 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

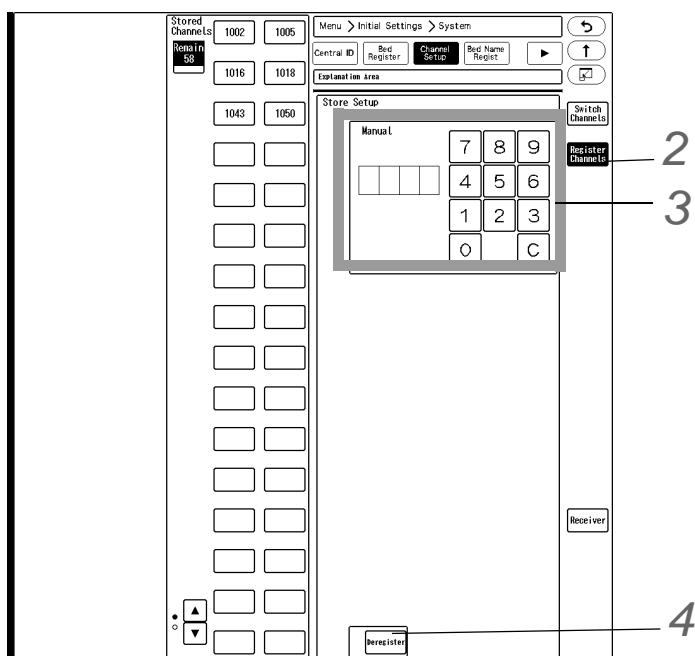
- Only the medical telemetry channel ID can be set.

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.

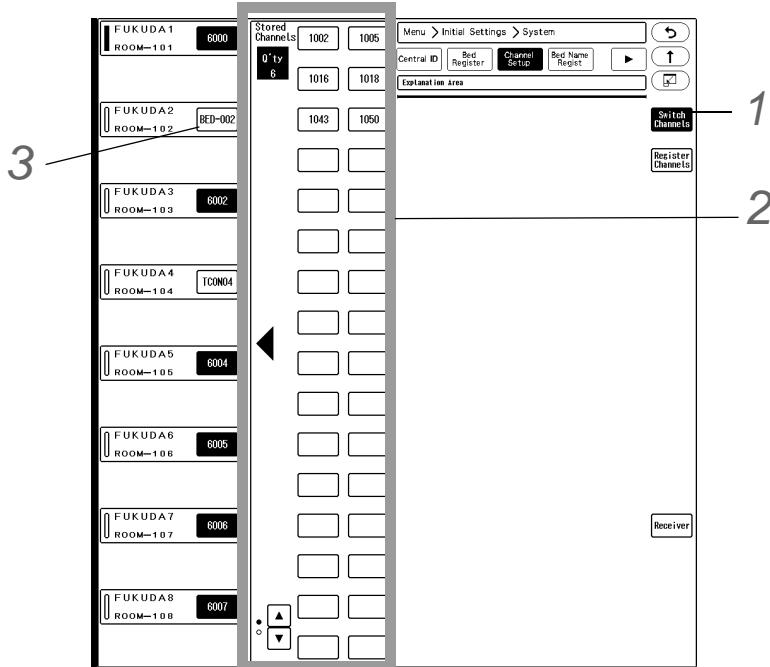
- ▶ The keys for the currently used channel ID are displayed in blue. These cannot be deregistered.

□ Setting the Channel ID

Set the channel ID.

1

Press the [Switch Channels] key.



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

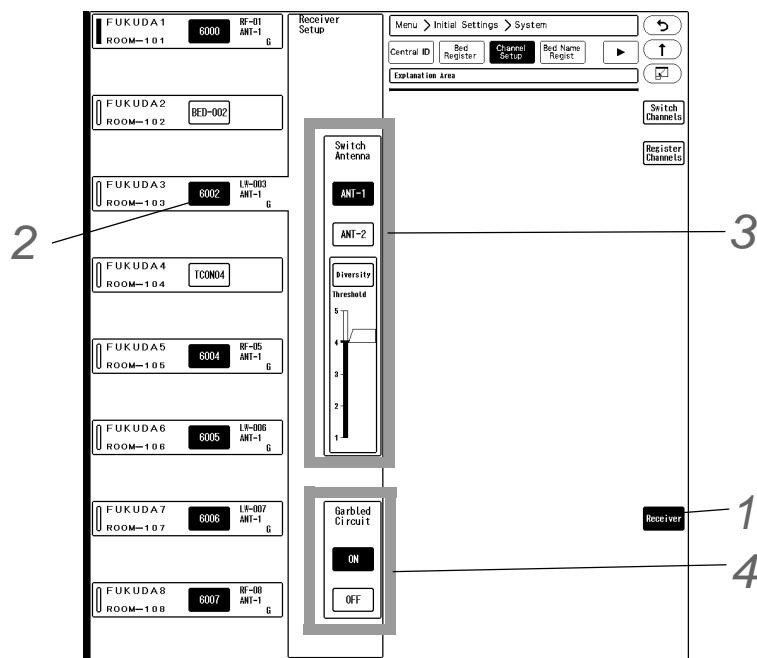
- ◆ The channel ID can be set only for the displayed beds.

□ Setting the Receiver

Receiving antenna selection and ON/OFF setting of "Garbled Circuit" can be performed.

1 Press the [Receiver] key.

► The "Receiver Setup" window 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".

TCON System

By using the Bidirectional Wireless Communication Module (TCON), patient information and alarm settings can be synchronized with the bedside monitor constructing a wireless network.

Maximum of two (2) central monitors can be used as the TCON station.

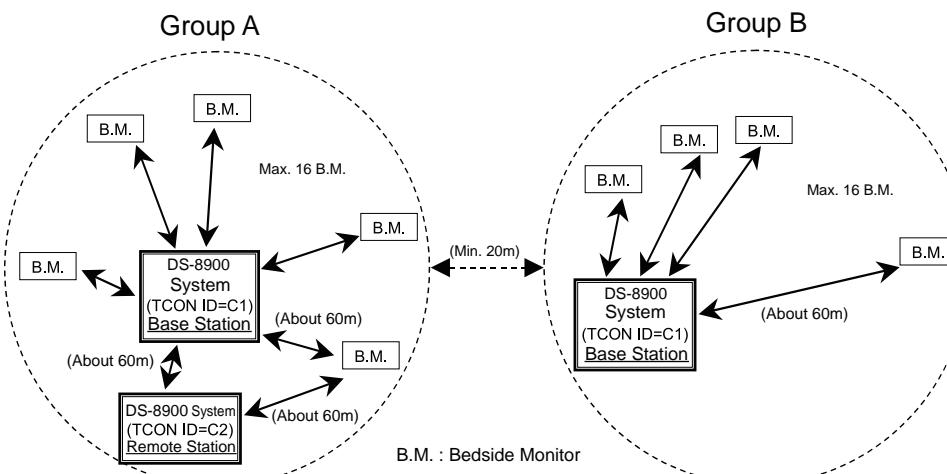
The monitor with TCON ID "C1" will be the base station , and the monitor with TCON ID "C2" will be the remote station.

The same TCON channel (group) should be set for the central monitors and bedside monitors within the same TCON group.

NOTE

- Maximum of 16 beds can use the telemeter and TCON simultaneously.

The channel ID of the base station will be automatically assigned as the group number.

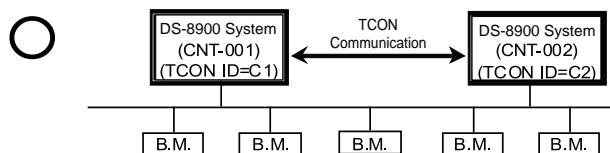
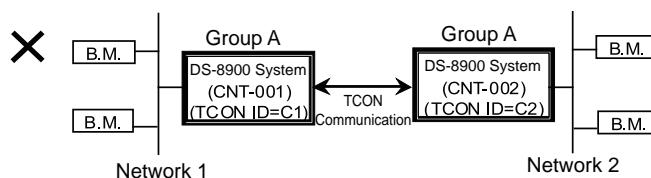


NOTE

- The communication distance may largely differ depending on the structure material of the medical institution and the TCON installation condition. The indication for the maximum distance is about 60 meters. If the communication condition is unstable, check the installation condition.

CAUTION

- When using the TCON system, make sure to connect the TCON base station and remote station on the same network.



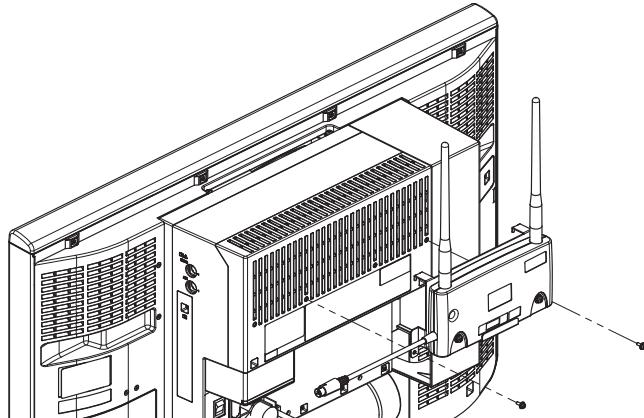
- The date/time setting of the TCON remote station synchronizes with the TCON base station. However, if the TCON remote station is connected to the wired network, the date/time setting synchronizes with the network administrating monitor (central ID: 001).
- When using the wireless system and TCON at the same time, the numeric data from the telemeter will be displayed. Even when the telemetry condition is poor, numeric data from TCON will not be displayed.
- Even if this equipment is installed within the range of radio communication, the communication may not be possible due to noise or multi-path phasing etc.
- If the TCON is installed in a line-of-sight distance where there are no obstacles or on the upper floors, unexpected long distance transmission may occur which may cause interference with nearby medical institution. Before using the TCON system, test the reception to make sure that it does not interfere with other channels. If the channel is used by other medical institution, change the channel ID.

Connection Procedure

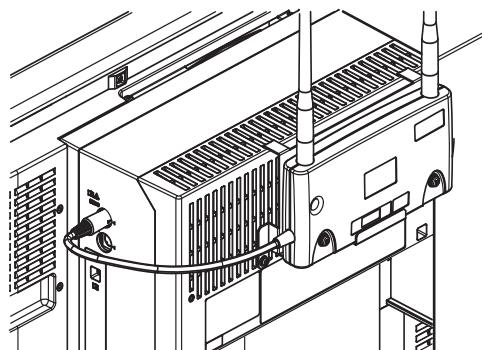
To connect the Bidirectional Wireless Communications Module (HTC-702) to this equipment, use the OAO-79A HTC Holder (optional).

For details of connection procedure, refer to the OAO-79A Assembly Instruction.

- 1** Fix on the assembled OAO-79A to the DS-8900 system using the accessory screws.



- 2** Connect the cable of the HTC-702 to the COM5 connector on the DS-8900 system.

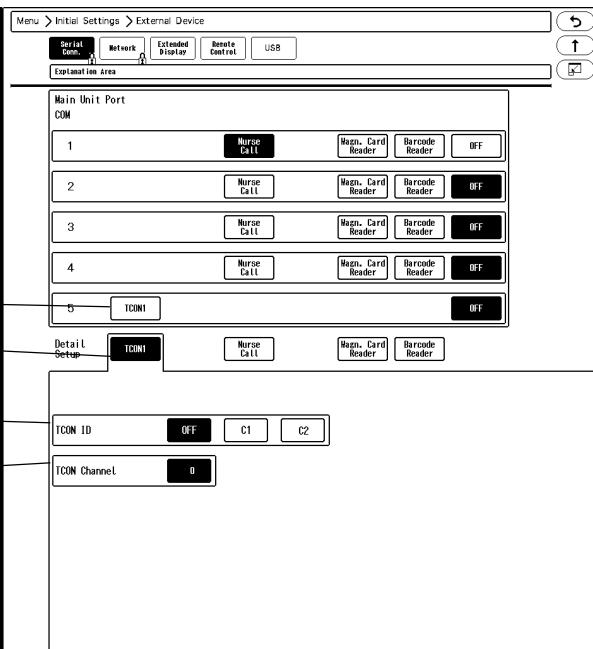


Serial Communication Setup (TCON)

CAUTION

- The TCON installation and setup should be performed by our service representative. The users should not attempt them.
- Follow the instructions of the Overall Manager for the wireless channel when setting the TCON ID or channel (group) to prevent interference within the same institution.
- The same TCON channel (group) should be set for the central monitors and bedside monitors within the same TCON group.

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



2 Select [TCON1] for the port which TCON is connected.

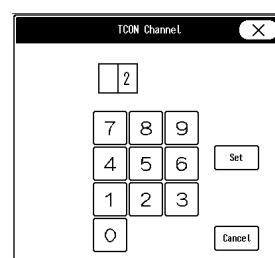
3 Press the [TCON1] key for "Detail Setup" to set the details for TCON.

4 Select [ON] if using the TCON, and [OFF] if not using the TCON.

5 Set the TCON ID.

- ▶ [C1]: Sets this equipment as the TCON base station.
- ▶ [C2]: Sets this equipment as the TCON remote station.
- ▶ [OFF]: Disables the TCON function.

6 Set the channel ID in the range from [1] to [60]. (shown on right)



NOTE

- The same TCON channel (group) should be set for the central monitors and bedside monitors within the same TCON group.
- When using other TCON system with different TCON channel (group), the two (2) channel IDs should be at least 5 channels apart.

⚠ WARNING

- During TCON connection, make sure to set the channel ID before setting the ID.
Miscommunication with a wrong group may occur.

TCP/IP Network

By connecting the DS-8900 system to the TCP/IP network, the following function using the laser printer or server can be performed.

- 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 setting the SNTP server ON, the time can be synchronized to the SNTP 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.

⚠ WARNING

- The operation cannot be guaranteed if connected to improper network. When changing the network setting, contact 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-8900 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 used.

NOTE

- Before using the laser printer and server, network setup for this equipment, laser printer, and server should be performed.

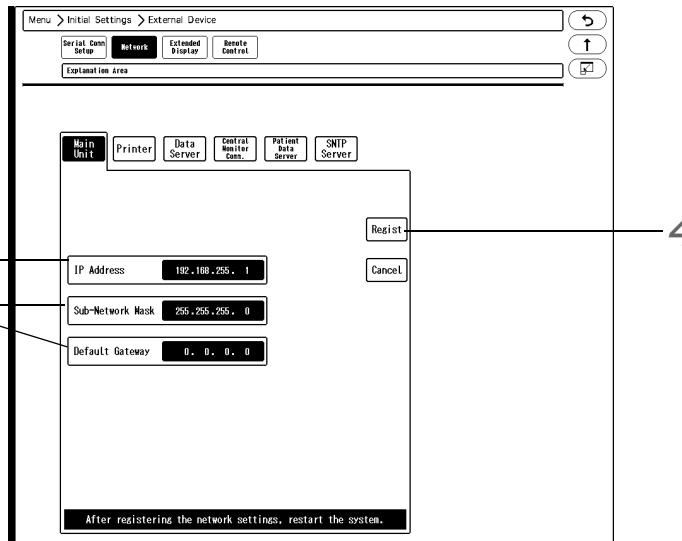
Setup for this Equipment

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

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 equipment.

► 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)

Caution

You must turn OFF power and back ON again to resume monitoring.

! WARNING

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

- 5** Turn OFF the power.

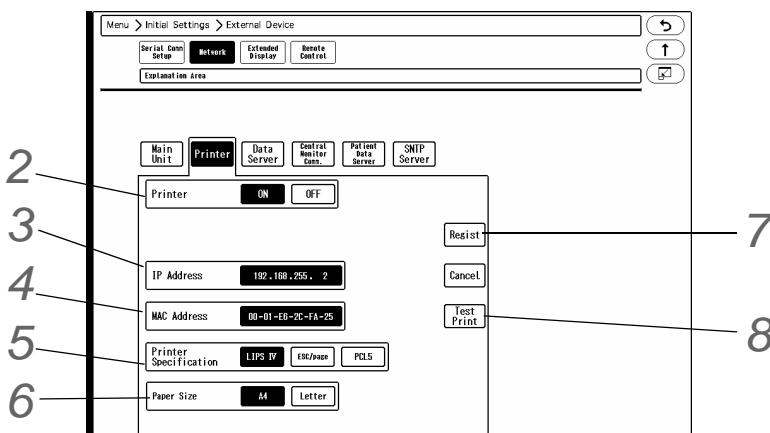
- 6** Connect the CJO-17SS2.5 LAN Cable (Cross) to this equipment.

Laser Printer

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

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

► The "Network Configuration (Printer)" screen will be displayed.



- 2 Select [ON]/ [OFF] of the printer usage.

- 3 Enter the IP address of the printer.

- 4 Enter the MAC address of the printer.

REFERENCE

- MAC (Media Access Control) address is an address assigned for the network equipment. Refer to the operation manual of the printer network board or printer.

- 5 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.

- 6 Select the paper size from [A4]/ [Letter].

- 7 Press the [Regist] key to finalize the setup.

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

CAUTION

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

- 8 Press the [Test Print] key.

► Check that the printing is properly performed.

NOTE

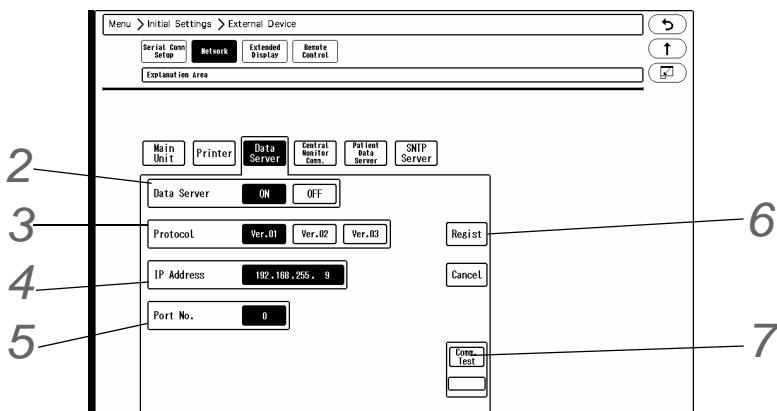
- For printing the review data, set the output printer.
(☞ "Output Printer Setup for Review Data Printing" P11-9)

Data Server

By using the data server, the monitored waveform data 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.

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



- Select [ON]/ [OFF] for the data server usage.

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

NOTE

- Use the protocol recommended for the used data server.
For details of protocol, refer to "Chapter 7 Setup Item/Default Value".

- Input the IP address of the data server.

- Enter the port number.

NOTE

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

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

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

- 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.

- Select the waveform to output to the data server.

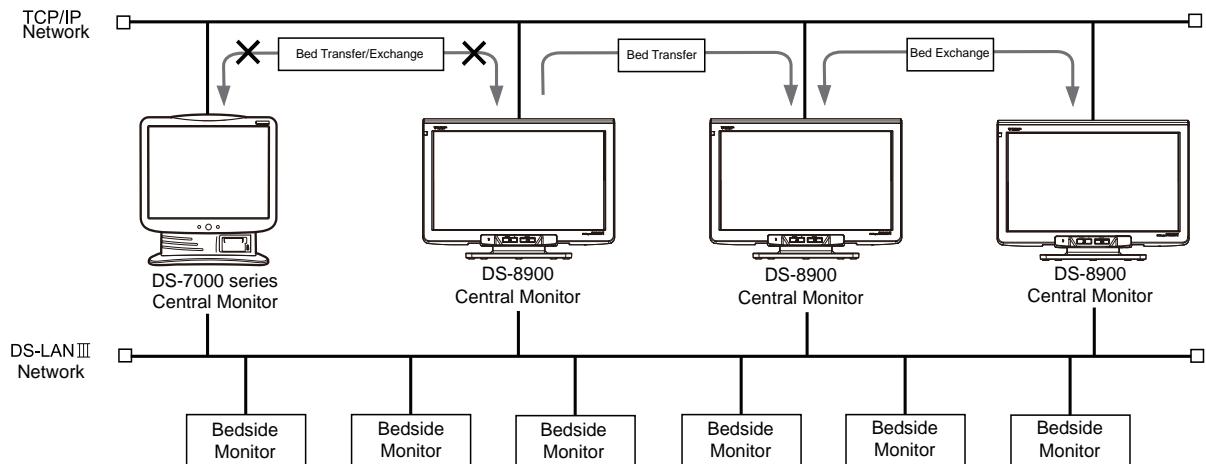
(☞ Operation Manual "Data Server Output Waveform Setup" P12-19)

Central Monitor Communication

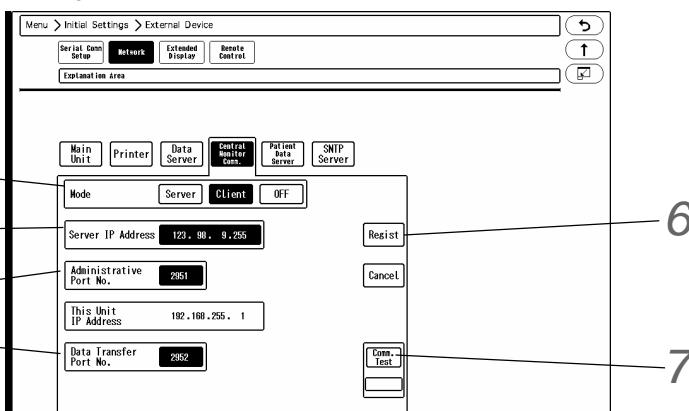
By performing central monitor communication setup, transfer/exchange of patient information and alarm settings among several central monitors can be performed through the TCP/IP network.

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 series central monitors.



- 1** Press the [Menu], [Initial Settings], [Network] ("External Device"), [Central Monitor Comm.] keys.



- 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** Enter the "Administrative Port No.".

- 5** Enter the "Data Transfer Port No.".

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

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

7 Press the [Comm. Test] key 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. In such case, check the network setting, and perform the setup again.

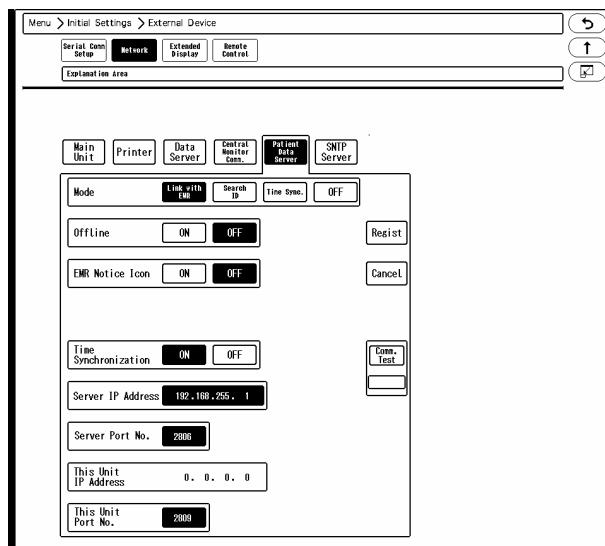
Patient Data Server

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

□ To Display the Patient Data Server Setup Screen

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

- ▶ The Patient Data Server setup screen 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 equipment.

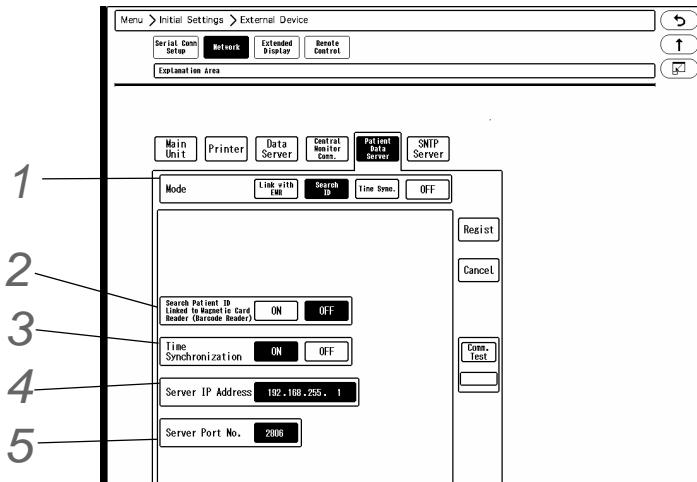
- ♦ When a patient is admitted on EMR, the same patient will be admitted on the DS-8900 system.
- ♦ When a patient is discharged on EMR, this patient's information on the DS-8900 system will be initialized.
- ♦ When a patient information is changed on the EMR, the patient information on the DS-8900 system will also change.

For details, refer to "EMR Link Function" (page 4-1).

□ Search ID Function

[Search ID] will display the [Search Patient] key on the "Admit/Discharge" screen, and allows to automatically acquire patient information from the entered ID.

1 Select [Search ID] for "Mode" on the Patient Data Server setup screen.



2 Set the "Search Patient ID Linked with 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), [Search ID] key needs to be pressed to acquire patient information.

3 Set the "Time Synchronization".

Time synchronization with the patient data server will be performed. Communication with the patient data server will be performed every minute to synchronize the time. However, if higher priority time synchronization is present, this setting will be invalid.

The time will be synchronized with the following priority.

- 1 Administrating monitor
- 2 TCON base station, if TCON system is used. (When DS-LAN is disconnected)
- 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].

- ▶ [ON]: Synchronizes the time with patient data server by communicating with the server every minute.
- ▶ [OFF]: 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 the [Regist] key to finalize the setup.

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

7 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.

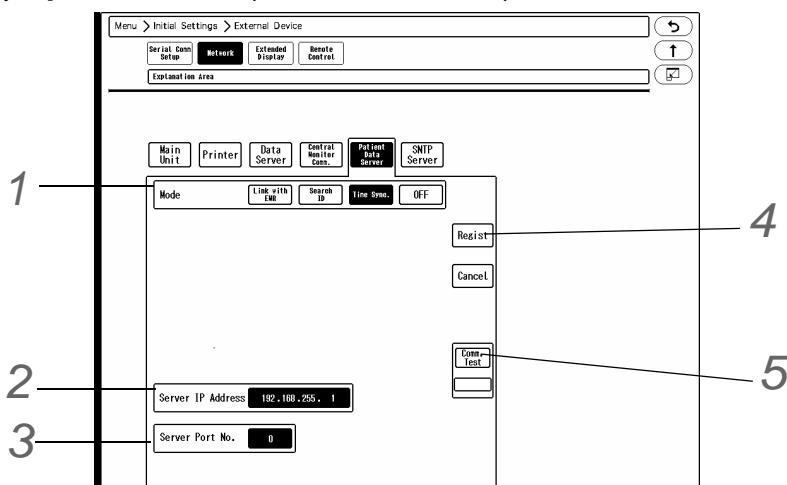
□ Time Synchronization Function

Time synchronization with the patient data server will be performed. Communication with the patient data server will be performed every minute to synchronize the time. However, if higher priority time synchronization is present, this setting will be invalid.

The time will be synchronized with the following priority.

- 1 Administrating monitor
- 2 TCON base station, if TCON system is used. (When DS-LAN is disconnected)
- 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 Select [Time Sync.] for "Mode" on the patient data server setup screen.



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 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.

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.

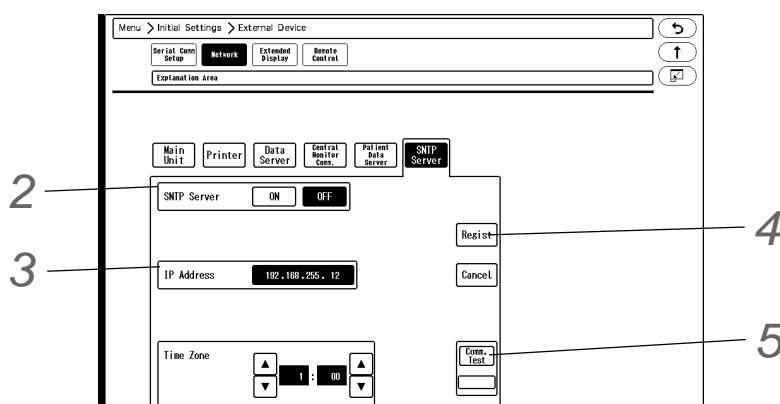
NOTE

- Priority of the Time Synchronization

The time will be synchronized with the following priority.

- 1 Administrating monitor
- 2 TCON base station, if TCON system is used.
- 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.

Chapter 3 Using the CF Card

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Formatting the CF Card.....	3-1
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Writing/Reading the Setup Data	3-2
Writing/Reading the Patient Data	3-3
Data that can be Backed Up/Copied	3-4

Chapter 3 Using the CF Card

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

Inserting the Card

CAUTION

- Make sure that the power of the main unit is turned ON before inserting the CF card into the CF card slot.

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

Formatting the CF Card

- 1 Press the [Menu], [Maintenance], enter password, [CF Card] keys.

▶ The CF card menu will be displayed.

- 2 Press the [Format] key for more than 2 seconds.

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

▶ The format process will take about 1 minute. During the process, do not remove the CF card or turn OFF the power.

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

Backup/Copy of the Data

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

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

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

For details of the setup data/patient data which can be backed up, refer to "☞ "Data that can be Backed Up/Copied" P3-4".

CAUTION

- Turn ON the power of the main unit before inserting the CF card into the CF card slot.
- Use only the specified CF card.
- During access to the CF card, all keys will become inoperative until the process is complete.

NOTE

- If the card is unformatted, it is necessary to first format the CF card.

- Cancel the write-protect function before using the CF card.
- If read/write is incorrectly selected, the data on the CF card may be unintentionally overwritten with the data on the patient monitor. Make sure to check that the selection is correct before pressing the [Yes] key.

Writing/Reading the Setup Data

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

- 1** Press the [Menu], [Maintenance], enter password, [CF Card] keys.

► The CF card menu will be displayed.

- 2** Writing the Setup Data

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

- 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 CF card.

- 3** Reading the Setup Data

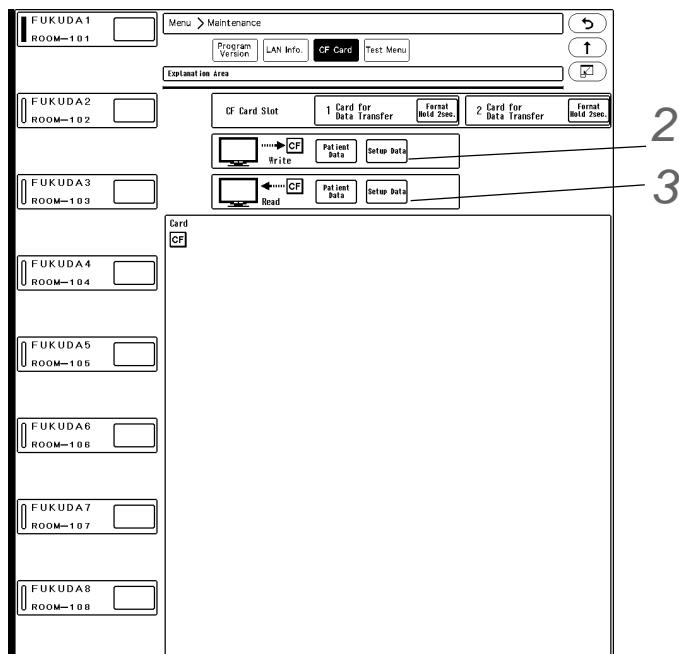
- 1** Verify the CF card is inserted in the CF card slot.

- 2** Press the [Setup Data] key for "Read".

A confirmation message will be displayed.

- 3** Press the [Yes] key if OK to read the data from the CF card.

- 4** When the data reading procedure is complete, the display will return to the home display.



Writing/Reading the Patient Data

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

- 1** Press the [Menu], [Maintenance], enter password, [CF Card] keys.

► The CF card menu will be displayed.

2 Writing the Patient Data

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

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

- 3** On the patient list displayed at the left, press the [Write] key for the patient to write the data.

- 4** Select the data from the displayed list in the "Card **CF**" area.
A confirmation message will be displayed.

► In this area, patient data stored in the CF card will be displayed.

- 5** Press the [Yes] key if OK to write the data to the CF card.

3 Reading the Patient Data

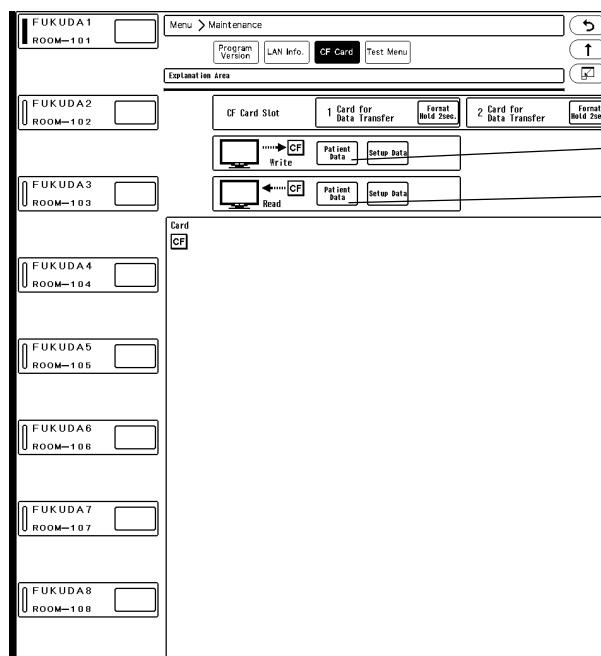
- 1** Verify the CF card is inserted in the CF card slot.

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

- 3** Select the data from the displayed list in the "Card **CF**" area.

- 4** On the patient list displayed at the left, press the [Read] key for the patient to read the data. A confirmation message will be displayed..

- 5** Press the [Yes] key if OK to read the data from the CF card.



CAUTION

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

Data that can be Backed Up/Copied

The data that can be backed up/copied using the CF card are listed below.

Patient Data

Admit/Discharge

Setup Item		Data Transfer by CF Card
Patient Information	ID	Yes
	Patient Name	Yes
	Birth Date/Age	Yes
	Height/Weight/BSA	Yes
	Admit Date	Yes
	Bed Name	No
	Patient Classification	Yes
	Sex	Yes
	Nurse Team	No
	Pacemaker	Yes
Monitor Suspend	Monitor Suspend Condition	No

Alarm

Setup Item		Data Transfer by CF Card
Alarm Suspend	Alarm Suspend Condition	No
Alarm	All Arrhythmia Alarms	Yes
	HR	Yes
	ST1/ST2	Yes
	BP1 to 8 (mmHg/kPa)	Yes
	CVP (cmH ₂ O)	Yes
	PR-IBP	Yes
	NIBP (mmHg/kPa)	Yes
	RR	Yes
	APNEA	Yes
	EtCO ₂ /InspCO ₂ (mmHg/kPa/%)	Yes
	Exp O ₂ /InspO ₂	Yes
	Exp N ₂ O/Insp N ₂ O	Yes
	Exp Agent/Insp Agent	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
	SpMet, SpMet-2	Yes

Alarm

Setup Item	Data Transfer by CF Card
SpCO, SpCO-2	Yes
SpHb, SpHb-2	Yes
T1 to 8 (°C/°F)	Yes
Tb (°C/°F)	Yes
12-Lead ST	Yes

Setup Item	Data Transfer by CF Card
ECG	Lead
	Waveform Size
	Filter
	Synchronized Mark/Tone
	Pacemaker
	Pacemaker Pulse
	Pace Pulse Mask Time
	Drift Filter*
	AC Filter*
	Automatic Lead Switch
RESP	ST/VPC/Arrhy. Alarm Display
	Waveform Size
	RR Synchronization Mark
	RR/APNEA Alarm Source
SpO ₂	CVA Detect
	Waveform Size
NIBP	Synchronized Mark/Tone
	NIBP Periodic Measurement
	Measurement Interval
	Timer
	Patient Classification
	PR
	MAP
BP1 to BP8	Time Display
	Label
	Scale
	Synchronized Mark/Tone
TEMP	Display Type
	Label
CO ₂	No
	Yes
Ventilator	Scale
Multigas	GAS_CO ₂ /GAS_O ₂ /GAS_AGT Scale
	AWP/AWF/AWV Scale

Setup Item	Data Transfer by CF Card	
Wave Clip	No	

*Data transfer is possible only for the LX bed.

Data Review

Setup Item	Data Transfer by CF Card	
Graphic Trend	Trend A to D	Yes
	Time	No
	Display Selection	Yes
	Scale, Display Selection	Yes
	Alarm Display Selection	Yes
Tabular Trend	Display Time Interval	No
	Group	Yes
	Fixed Parameters	Yes
	List Selection	Yes
	Filtering (Sampling Interval)	Yes
Recall	Waveform	Yes
	Display Selection	No
	Recall Factor	Yes
Alarm History	Display Selection	No
	Alarm Type	No

Waveform Review

Setup Item	Data Transfer by CF Card	
Full Disclosure Waveform	Compressed Waveform Quantity	No
	Compressed Waveform Parameter	No
	Enlarged Waveform Quantity	No
	Enlarged Waveform Parameter	No
	Time per Line	No
	Slide Show Interval	No
	Enlarged Waveform Scroll Interval	No
	Trend Display	No
	Size of ECG1, ECG2, ECG (I) to (V6)	No
	BP Scale	No
	SpO ₂ Size	No
	RESP Size	No
	CO ₂ Scale	No
	O ₂ Scale	No
	Agent Scale	No
	AWP Scale	No
	AWF Scale	No

Each Bed

Setup Item		Data Transfer by CF Card
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
	Full Disc. Compressed Wave	Yes
	Full Disc. Zoom Wave	Yes
Color Setup	Palette	No
	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	No
Data Server Waveform	Waveform	No
Parameter ON/OFF	ECG1, BP1 to BP8, NIBP, SpO ₂ -1, SpO ₂ -2, RESP, CO ₂ , T1 to 8, SvO ₂ /CCO, GAS, BIS, INVOS, SPIRO, VENT	Yes

Basic Setup

Setup Item		Data Transfer by CF Card
Display Layout	Display Pattern	Yes
	Numeric Data Box	Yes
	Numeric Data	Yes
	Waveform	Yes
	User Key	Yes
Detail Setup	Alarm Limit Display	No
	At Alarm Occurrence	No
	Grid	No
	Scale	No
	Thickness	No
	Clip	No
	Fill CO ₂ Waveform	No
	Fill O ₂ Waveform	No
	Fill Agent Waveform	No
	BP Overlap	No
	RR Overlap	No
	12-Lead ST Wave	No
Block Cascade	ST/VPC/Arrhy. Alarm Display	No
	Waveform Quantity	No
	Waveform	No

Setup Data

Basic Setup

Setup Item		Data Transfer by CF Card
Display Layout	Display Pattern	No
	Numeric Data Box	No
	Numeric Data	No
	Waveform	No
	User Key	No
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
	Waveform	Yes

Common Setup > Display Config.

Setup Item		Data Transfer by CF Card
All Beds	Layout Selection	No
	Layout Change	No
	Bed Selection	No
Other Setup	Numeric Data Box	No
	Meas Zoom	No
	Layout Registration	Yes
Each Bed	Numeric Data	No
	Waveform	No
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
Waveform	Display Priority	Yes
	Circulatory, Respiratory [mm/s]	Yes
	Grid	Yes

Common Setup > Display Config.

Setup Item	Data Transfer by CF Card
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

Common Setup

Setup Item	Data Transfer by CF Card
Vital Alarm	No
Urgent, Caution	Yes
Status	Yes
Ventilator Alarm	Yes
Status Alarm (Urgent, Caution, Status)	Yes
Sync. Tone	Yes
Key Sound	Yes
Other Setup	Yes
Boot/Shutdown Sound	Yes
Brightness	Yes
Monitor Suspend	Yes
Nurse Team ON/OFF Name: 14 characters Color: 8 colors	Yes

Alarm

Setup Item	Data Transfer by CF Card
Alarm	Yes
Alarm System	Yes
Basic Alarm Parameter	Yes
Alarm Silence Time	Yes
Alarm Suspend Time	Yes
Asystole, VF, VT Alarm	Yes
Suspend Arrhy. Analysis during Noise Interference	Yes
Vital Alarm (Urgent, Caution, Status)	Yes
Ventilator Alarm	Yes

Alarm

Setup Item		Data Transfer by CF Card
	Status Alarm (Urgent, Caution, Status)	Yes
	Level S, H, M, L	Yes
	Enable/Disable	Yes
	Synchronize with HR/RR	Yes
Alarm Level	All Parameters	Yes
Alarm Level: Arrhythmia	All Arrhythmia	Yes
Alarm Level: Technical	Ventilator	Yes
Too Far Alarm	Setup	Yes
	Time	Yes
Chk TLM Battery Alarm		Yes
During Lead OFF	Alarm Judgement	Yes
	Alarm Printing	Yes
	Lead OFF Message	Yes
	Lead OFF Alarm Interval	Yes
SpO ₂ Sensor	Alarm Judgement	Yes
During Check SpO ₂ Sensor	Message	Yes
	Alarm Sound	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 Suspend		Yes

Measurement

Setup Item		Data Transfer by CF Card
Unit	ST	Yes
	BP	Yes
	TEMP	Yes
	CO ₂ Atmospheric Pressure	Yes
	Unit	Yes
Other Setup	Disregard Artifact Ch. at QRS Detect	Yes
	Display measurement error on NIBP list	Yes
	Drift Filter	Yes

User I/F

Setup Item		Data Transfer by CF Card
Display/Print	Date Format	Yes
	BP Alarm Increment	Yes
	Trend Clip	Yes
	Built-in Printer Message Display	Yes
	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
Admit:	Dim All Data Other than Numeric	Yes
	Message Icon	Yes
Parameter ON/OFF	ECG1, BP1 to BP8, NIBP, SpO ₂ -1, SpO ₂ -2, RESP, CO ₂ , T1 to 8, SvO ₂ /CCO, GAS, BIS, INVOS, SPIRO, VENT	Yes
Admit:	All Arrhythmia Alarms	Yes
Alarm	All Parameters	Yes
Admit:	Nurse Call ON	Yes
Nurse Call	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

External Device > Serial Communication

Setup Item		Data Transfer by CF Card
Serial Communication	COM1 to COM5	No
Nurse Call	Monitor ID	No
	Higher Priority (than others)	Yes
	Nurse Call during Alarm Silence	Yes
	Alarm Factor Length	Yes
	Re-notify Nurse Call	Yes
	Duration until re-notification	Yes
	Night Use	Yes
	Night Start/End Notice	Yes
	Night Start/End Time Setup	Yes

External Device > Serial Communication

Setup Item		Data Transfer by CF Card
Magnetic Card Reader	Starting Digit / Ending Digit Patient ID	Yes
	Patient Name	Yes
	Age	Yes
	Sex	Yes
	Comment	Yes
	Birth Year	Yes
	Birth Month	Yes
	Birth Day	Yes
	Height	Yes
	Weight	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
	Baud Rate	Yes
	No. of Retransmission	Yes
Barcode Reader Starting Digit / Ending Digit	Data Type	Yes
	Maximum Data Size	Yes
	Patient ID	Yes
	Patient Name	Yes
	Age	Yes
	Sex	Yes
	Comment	Yes
	Birth Year	Yes
	Birth Month	Yes
	Birth Day	Yes
	Height	Yes
	Weight	Yes
	Birth Date	Yes
	Sex (Character String for Male)	Yes
	Exclude "-" from Patient ID	Yes

External Device > Network

Setup Item		Data Transfer by CF Card
Main Unit	IP Address	No
	Sub-Network Mask	No
	Default Gateway	No

External Device > Network

Setup Item		Data Transfer by CF Card
Printer	Function	No
	IP Address	Yes
	MAC Address	Yes
	Printer Spec.	Yes
Data Server	Data Server	No
	Protocol	Yes
	IP Address	Yes
	Port No.	Yes
Central Monitor Communication	Mode	No
	Client IP Address	Yes
	Data Transfer Port No.	Yes
	Administrative Port No.	Yes
(Link with EMR)	Mode	No
	Offline	No
	EMR Notice Icon	Yes
	Display Data Before Discharging	Yes
	Time Synchronization	Yes
	Client IP Address	Yes
	Server Port No.	Yes
	This Unit Port No.	Yes
	Search Patient ID Linked to Magnetic Card Reader (Barcode Reader)	Yes
	Time Synchronization	Yes
(Search ID)	Client IP Address	Yes
	Server Port No.	Yes
	Client IP Address	Yes
	Server Port No.	Yes
(Time Synchronization)	SNTP Server	No
	IP Address	Yes

External Device (other settings)

Setup Item		Data Transfer by CF Card
Extended Display Unit	Installation	No
	Function	No
Remote Control	Main Unit	No
	Bed ID	No
	Room ID	No
	Extended Display Unit	No
	Bed ID	No
	Room ID	No
USB	Main Unit USB Port	No

System

Setup Item		Data Transfer by CF Card
Central ID	Room ID	No
	Central ID	No
Bed Register		No
Receiver Setup	Stored Channel No.	Yes
	Switch Antenna	No
	Diversity Threshold	No
	Garbled Circuit	No
Bed Name	Bed Name Registration	Yes
Other Setup	AC Frequency	Yes
	Synchronized Tone	Yes
	Synchronized Mark	Yes

Administrator Setup

Setup Item		Data Transfer by CF Card
Lock	Central Monitor Display	Yes
	Individual Bed Display	Yes
Password	Password Setup	Yes

The following items will not be backed up/copied.

- ♦ Time/Date
(If the setting is duplicated, proper TCON communication will not be performed.)
- ♦ Room ID/Bed ID
(If the Bed ID is duplicated, wired network connection will not be possible.)
- ♦ External Device Connection Main Unit Port Setup
(After reading the setup data, make sure to restart the monitor and check the equipment configuration.)
- ♦ Network Setup for the External Device Connection
(If the setting of IP address, sub-network mask, default gateway are not unique, TCP/IP connected laser printer will not function.)
- ♦ Room ID/Bed ID on the Remote Control Setup
(If the Room ID/Bed ID is not unique, incorrect remote control signal transmission may occur.)

Chapter 4 EMR Link Function

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Chapter 4 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-8900 system.
- When a patient is discharged on EMR, this patient's information on the DS-8900 system will be initialized.
- When a patient information is changed on the EMR, the patient information on the DS-8900 system will also change.

Restrictions of EMR Link Function

These are the 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
CF Card 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
DS-LAN, TCON 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.

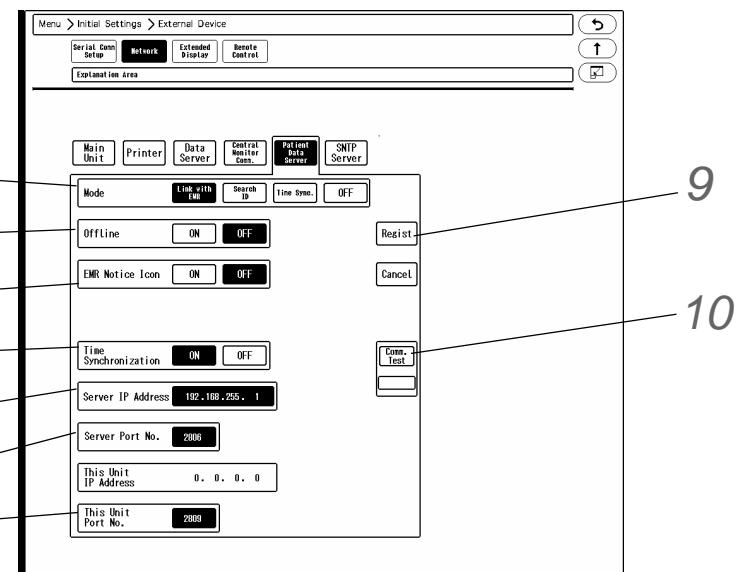
"No": Cannot display, edit, and change settings.

Patient Data Server Setup

1

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

► The "Network Configuration (Patient Data Server)" screen will be displayed.

**2**

Select [Link with EMR] for "Mode".

3

Offline

► Select ON/OFF for "Offline". (☞ "Suspending the Function" P4-3)

4

EMR Notice Icon

► [ON]: Displays the EMR notice icon (☞) 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-8900 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 TCON base station, if TCON system is used.
 - 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].

► [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 for DS-8900 System Main Unit

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

9 Press the [Regist] key to finalize the setup.**10** Communication Test

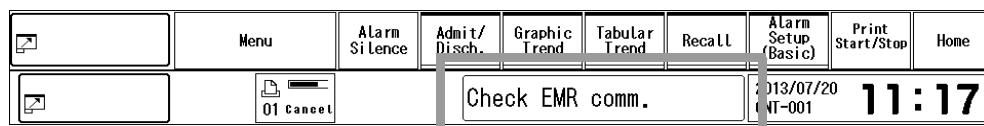
- ▶ If properly communicating, <Pass> will be displayed.
- ▶ If any failure occurs to the communication, <Fail> will be displayed. In such case, check the network setting, and perform the setup again.

Admit/Discharge on the EMR

The patient admit/discharge process linked to the electronic medical record (EMR) can be performed.
 (☞ Operation Manual "EMR Link Function" P6-7)

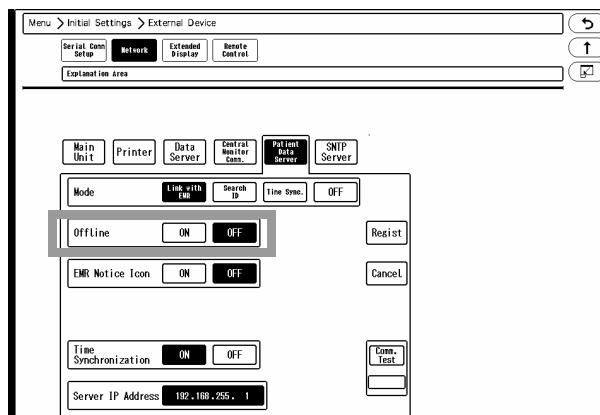
Suspending the Function

When there is a communication failure between the DS-8900 system and the patient data server, <Check EMR comm.> message will be displayed.

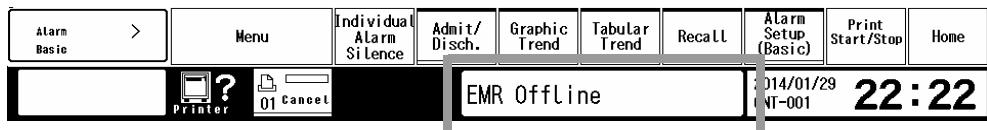


In such case, suspending the EMR link function will allow to perform the standard patient admit/discharge operation (admit/discharge, edit patient ID, bed transfer/exchange) on the central monitor.

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

1 Select [ON] for "Offline" under "Patient Data Server" (Initial Settings > Network).

- During the offline condition, <EMR Offline> message will be displayed on the message area.



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

Chapter 5 Nurse Call System

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Chapter 5 Nurse Call System

PHS nurse call system can be connected to the DS-8900 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 factors.

REFERENCE

- The alarm factor length to be displayed on the PHS (7 or 4 characters) can be set on the nurse call detail setup menu. (Initial Settings > External Devices > Serial Comm.) (☞ "Nurse Call Detail Setup" P5-5)

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
	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 -1	SpO2	SpO2	
	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	
	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	
Arrhythmia Alarm	Asystole	ASYSTOL	ASYS	
	VF	VF	VF	
	VT	VT	VT	
	Slow VT	SlowVT	SLVT	
	Run	Run	Run	
	Pause	Pause	PAUS	
	Couplet	Couplet	CPLT	
	Bigeminy	BIGEMIN	BIGM	
	Trigeminy	TRIGEMI	TRGM	
	Frequent	FREQUEN	FREQ	
	Tachy	Tachy	TACH	
	Brady	Brady	BRAD	

Alarm Type	Alarm Factor	PHS Display		Note
		7 characters	4 characters	
Ventilator Alarm	Airway Pressure	V_AWP	VENT	
	Minute Ventilation Volume	V_MV	VENT	
	Apnea Alarm	V_APN	VENT	
	Continuous High Pressure	V_CHP	VENT	
	Oxygen Concentration Upper Limit	V_FiO2	VENT	
	Oxygen Concentration Lower Limit	V_FiO2	VENT	
	CO ₂ Upper Limit	V_CO2	VENT	
	CO ₂ Lower Limit	V_CO2	VENT	
	Upper RR	V_RR	VENT	
	Lower RR	V_RR	VENT	
	PEEP Low	V_PEEP	VENT	
	Check Connection	V_COMM	VENT	
Measurement Status	Urgent	V_URGT	VENT	
	Ventilator	VENT	VENT	(no detailed factor)
Other	Too Far	Telemeter	TELE	
	Lead OFF	LEAD	LEAD	

NOTE

- The priority level of the nurse call alarm factors are the same with that of the alarms unless the "Higher Priority (than others)" is set to ON under nurse call detail setup menu. (Initial Settings > External Devices > Serial Comm.)

Connecting the Nurse Call System

CAUTION

- The cable to connect the nurse call system and the DS-8900 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 Fukuda Denshi service representative.

1

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

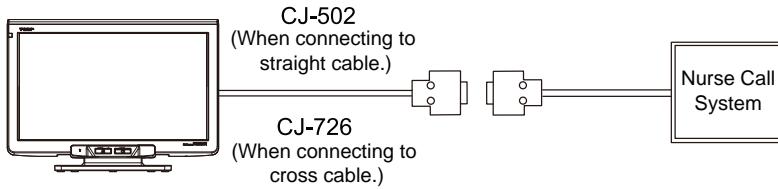
2

Connect the cable.

<Connection of Carecom Nurse Call System to One DS-8900 System>

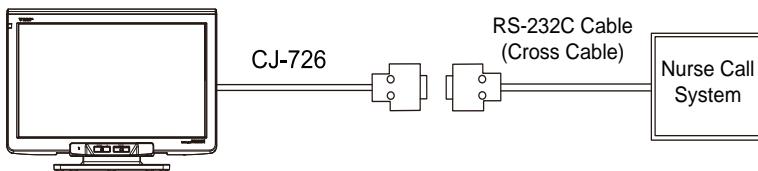
- Use the CJ-502 connection cable (cross) or CJ-726 relay cable (straight) to connect the nurse call system

to the serial connector on this equipment.



<Connection of Aiphone Nurse Call System to One DS-8900 System>

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



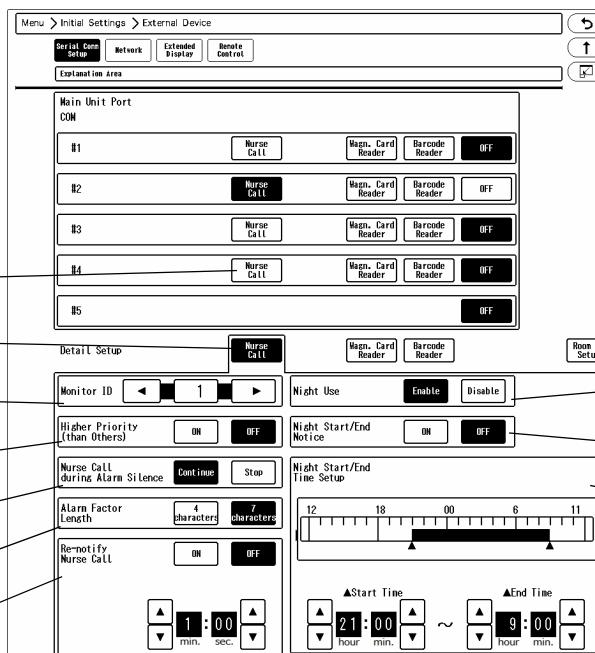
- 3** Turn ON the power.

Nurse Call Detail Setup

1

Press the [Menu], [Initial Settings], [Serial Comm.] ("External Device") keys.

- ▶ The serial communication setup menu will be displayed.

**2**

2 For COM1 to 4, 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. (Menu > Each Bed > Nurse Call Setup) The nurse call factor with [ON (Priority)] set will be notified with higher priority.
- ▶ [OFF]: Higher priority notification selection will not be possible. Only [ON] / [OFF] keys will be displayed on each nurse call factor setup window. (Menu > Each Bed > Nurse Call Setup)

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 the 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.

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

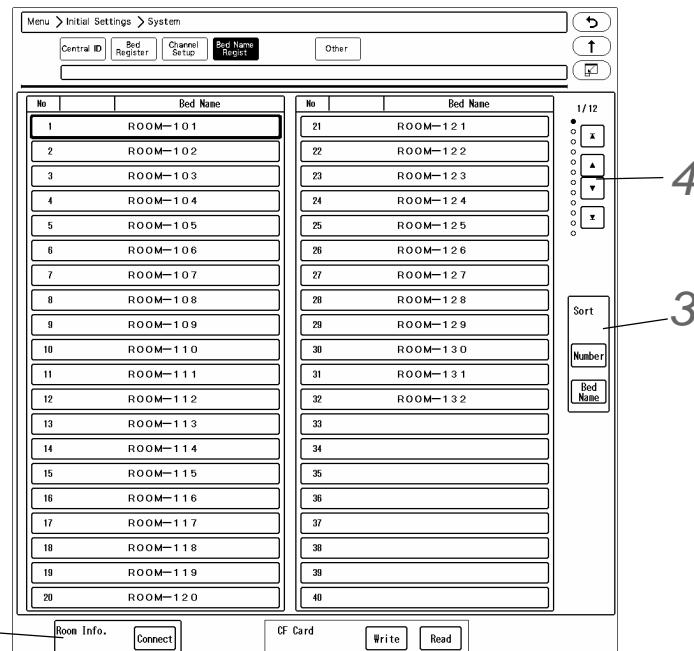
- ◆ When using the Carecom PHS nurse call system, the bed name cannot be edited/changed on this equipment as the bed name registered on the nurse call system will be used.

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 "No" and "Bed Name" information will be acquired.

3 Press the [No]/[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)

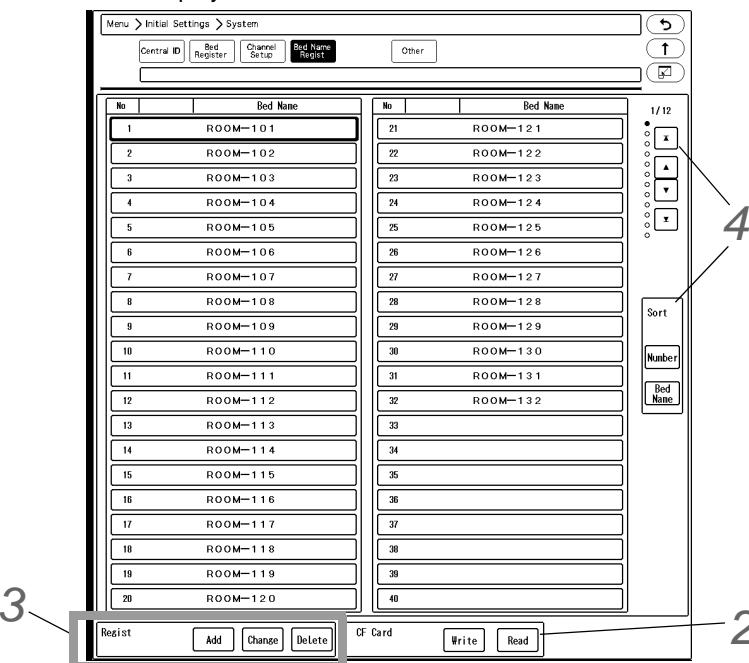
The bed name will be used for the PHS nurse call notification and can be also displayed on the home display. In this section, the procedure for the bed name registration is explained when using the Aiphone PHS nurse call system. Maximum of 480 bed names can be registered.

⚠ 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 CF card. Adding, changing, deleting of data can be performed.

NOTE

- When the bed name data is read from the CF card, the previously registered bed name data on this equipment will be overwritten with the read data.

- 1 Insert the CF card with the bed name data to the CF card slot.
- 2 Press the [Read] key for "CF Card".
 - The bed name file list on the CF card 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 card 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.

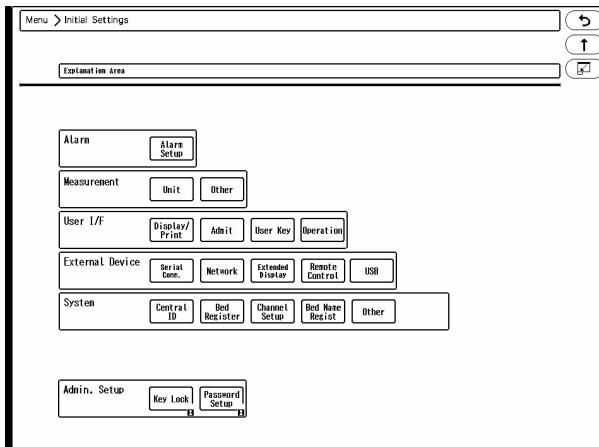
Chapter 6 Initial Settings

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Chapter 6 Initial Settings

This section explains about the "Initial Settings" menu.

The initial settings menu can be displayed by pressing the [Menu], [Initial Settings] keys.



The initial settings menu consists of 6 groups.

If using more than one DS-8900 system central monitor, using the CF card will enable same setups for all monitors.

Category	Subcategory	Description
Alarm	Alarm	Alarm-related settings, alarm indicator settings, etc.
Measurement	Unit	Measurement unit settings for BP, TEMP, ST, CO ₂ atmospheric pressure
	Other Setup	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	Selection of keyboard type.
External Device	Serial Communication	Settings of equipment connected to the serial connector
	Network	Network settings for laser printer, server, etc.
	Extended Display Unit	Settings for the extended display unit connection
	Remote Control	Settings of Room ID/Bed ID for the remote control
	USB	Settings for the USB mouse
System	Central ID	Settings of central ID
	Bed Register	Registration of beds to be monitored on this equipment
	Channel	Settings for the telemetry channel
	Bed Name	Registration/deletion of bed name
	Time/Date	Settings of time/date
	Other Setup	Settings of AC frequency, synchronized tone, synchronized mark
Administrator Setup	Key Lock	Settings of key lock level for display and setting
	Password Setup	Settings for password and administrator



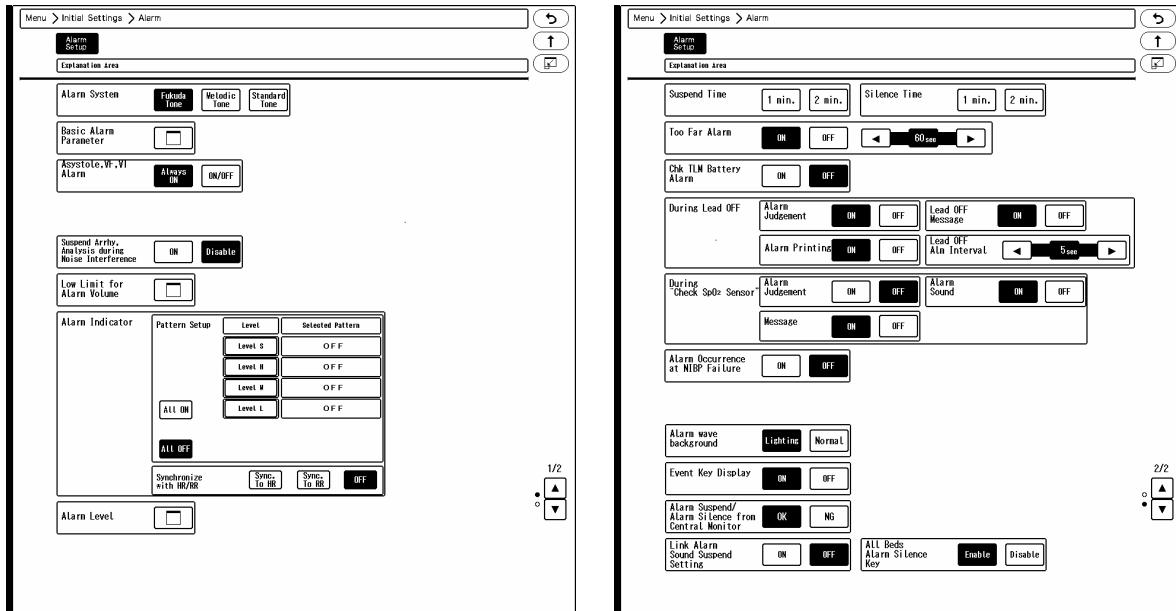
CAUTION

- 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" P16-5)

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 Asystole, VF, VT Alarm

- ▶ [Always ON]: The alarms for asystole, VF, VT, Slow_VT will be always ON and cannot be turned OFF.
- ▶ [ON/OFF]: The alarms for asystole, VF, VT, Slow_VT can be turned ON or OFF.

CAUTION

- ◆ The same settings should be performed for all central monitors in the same TCON

network. Proper operation will not be performed if the setting is different among the central monitors.

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

NOTE

- When the patient classification is neonate, [Always ON] setting will be applied to asystole alarm only. [ON]/[OFF] setting for VF, VT, Slow_VT can be performed on the arrhythmia alarm menu.

4 Suspend Arrhy. 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 (5sec.) when a noise is continuously interfering.
- [OFF]: Arrhythmia analysis will not be suspended even when a noise is continuously interfering.

CAUTION

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

NOTE

- This setting is effective only for the LW beds monitored by the 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 low limit of alarm volume for "Vital Alarm", "Ventilator Alarm", "Status Alarm".

- The lower limit of adjustable alarm volume range on the "Tone/Volume" setup screen will be set. The lower limit level can be set according to the alarm level priority, Urgent>Caution>Status.
- [Test]: The test sound will be generated with the set volume.

NOTE

- The sound test cannot be performed when the vital alarm and equipment 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" P7-1)
- ▶ Only the displayed alarm level can be selected.

8 Alarm Suspend Time

- ▶ Select from [1 min.]/[2 min.].

9 Alarm Silence Time

- ▶ Select from [1 min.]/[2 min.].

10 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 to 60 sec..

11 Check Telemetry Battery Alarm

- ▶ [ON]: When the remaining battery of the telemetry transmitter becomes low, it will be notified by alarm sound, message, and low battery mark.
- ▶ [OFF]: When the remaining battery of the telemetry transmitter becomes low, it will be notified by alarm message and low battery mark. Alarm sound will not generate.

12 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 Judgement" will not generate the ECG related alarm during lead-off condition.
(Operation Manual "ECG Alarm at Lead-Off Condition" P7-16)

1 Alarm Judgement

- ▶ [ON]: Alarm judgement will be performed even during lead-off condition. HR and other ECG related alarms will generate.
- ▶ [OFF]: Alarm judgement will not be performed during lead-off condition.
When [OFF] is set for "Alarm Judgement", 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. It 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 Judgement", "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, SpO₂, etc.) generates during lead-off condition.

3 Lead OFF Message

- ▶ [ON]: <Lead OFF> message will be displayed. When [OFF] is set for "Alarm Judgement", "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.

13 "During "Check SpO₂ 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.

1 Alarm Judgement

- ▶ [ON]: SpO₂ alarm will generate when the SpO₂ value exceeds the alarm limit during <Check SpO₂ Sensor> condition.
- ▶ [OFF]: SpO₂ alarm of Level M will generate when the SpO₂ value becomes 0% during <Check SpO₂ Sensor> condition.

NOTE

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

2 Message

- ▶ [ON]: <Check SpO₂ Sensor> message will be displayed. When [OFF] is set for "Alarm Judgement", "Message" will be automatically set to [ON].
- ▶ [OFF]: The message will not be displayed.

3 Alarm Sound

- ▶ [ON]: Alarm sound will generate during "Check SpO₂ Sensor" status. When [OFF] is set for "Alarm Judgement", "Alarm Sound" will be automatically set to [ON].
- ▶ [OFF]: Alarm sound will not generate.

14

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.

15

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.

16

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.

17

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.

18

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.

19

Alarm Silence Key

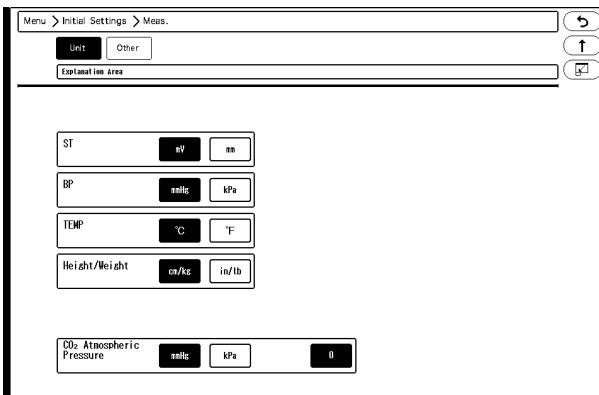
- ▶ [Enable]: [Alarm Silence] key for the fixed key, user key, remote control unit will be enabled.
- ▶ [Disable]: [Alarm Silence] key for the fixed key, user key, remote control unit will be disabled. The [Alarm Silence] key assigned to the user key area will be grayed out.

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

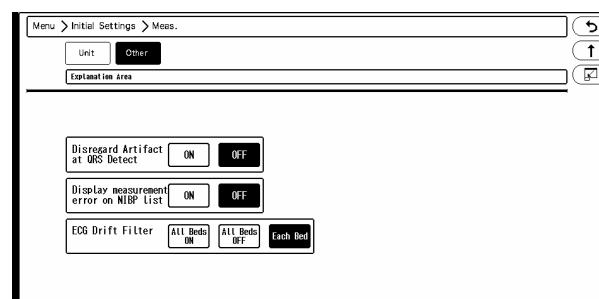
- When the BP unit is changed, the tabular/graphic trend data with the previous measurement unit will be deleted. Also, when a measurement unit is changed, make sure to set the alarm limits for the new measurement unit.

2 CO₂ 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 CO₂ atmospheric pressure.

Other

On the other settings menu, other measurement related settings can be performed.
Press the [Initial Settings], [Other] keys to display the other settings menu.



1 Disregard Artifact 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 is effective only for the LW beds monitored by the LW-7000.
- ♦ The settings 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 ECG 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 "ECG Drift Filter" setting on the "Initial Settings" ("Measurement" [Other]) should be the same for all central monitors. Proper operation will not be performed if the setting is different among the central monitors.

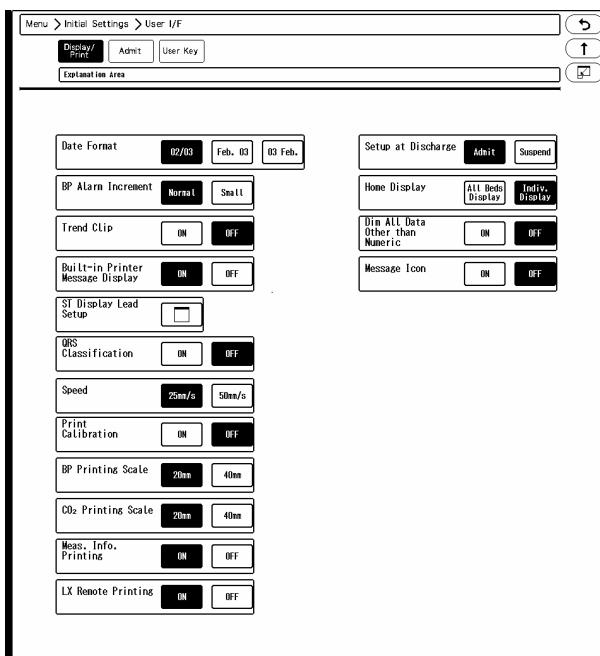
NOTE

- ♦ The drift filter setting can be performed only for the telemetry beds (RF, LW).

User I/F

Display/Print

On the display/print setup menu, initial settings for display/print can be performed.
Press the [Initial Settings], [Display/Print] keys to display the display/print setup menu.



1 Date Format

The selected format will be applied to display and printing.

2 BP Alarm Increment

[Normal]/[Small] can be selected.

	[Normal]	[Small]
0 to 50mmHg	2mmHg increment	1mmHg increment
55 to 300mmHg	5mmHg increment	
0 to 7.1kPa	0.2kPa increment	0.1kPa increment
7.5 to 40.0kPa	0.5kPa increment	

3 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.

4 Built-in Printer Message Display

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

5 ST Display Lead Setup

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

6 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" P11-2)

Symbol	Details
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

7 Printing Speed

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

8 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.

9 BP Printing Scale, CO₂ Printing Scale

The printing scale for BP and CO₂ waveform can be set.

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

10 Measurement Information Printing

- ▶ [ON]: The status information will be printed.
- ▶ [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.

11 LX Remote Printing

- ▶ [ON]: Remote printing from the telemetry transmitter (LX-5120, LX-5230, LX-7120, LX-7230) will be performed.

- ▶ [OFF]: Remote printing will not be performed.

12 Setup at Discharge

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

WARNING

- When [Suspend] is selected for "Setup at Discharge" , the suspend condition will continue until the [Resume] key is pressed on this equipment, even if the monitoring is performed on the bedside monitor.

CAUTION

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

13 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.

14 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.

15 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.

Admit

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

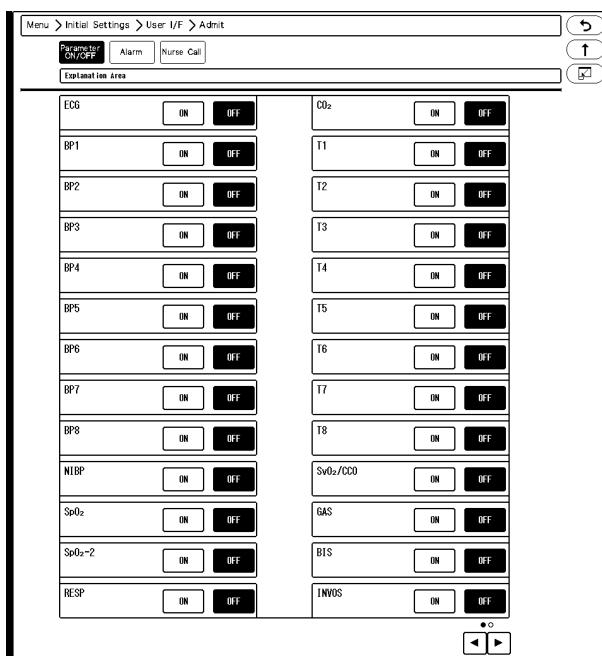
- ♦ Parameter ON/OFF
- ♦ Alarm
- ♦ Nurse Call Setup

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.

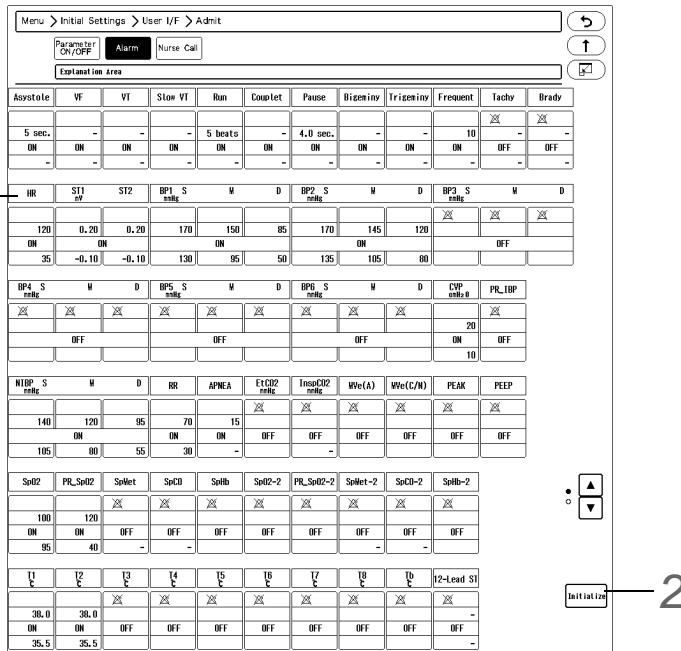


Select [ON]/ [OFF] for each parameter.

Alarm

The initial alarm settings at patient admittance can be set.

Press the [Alarm] key on the admit settings menu.



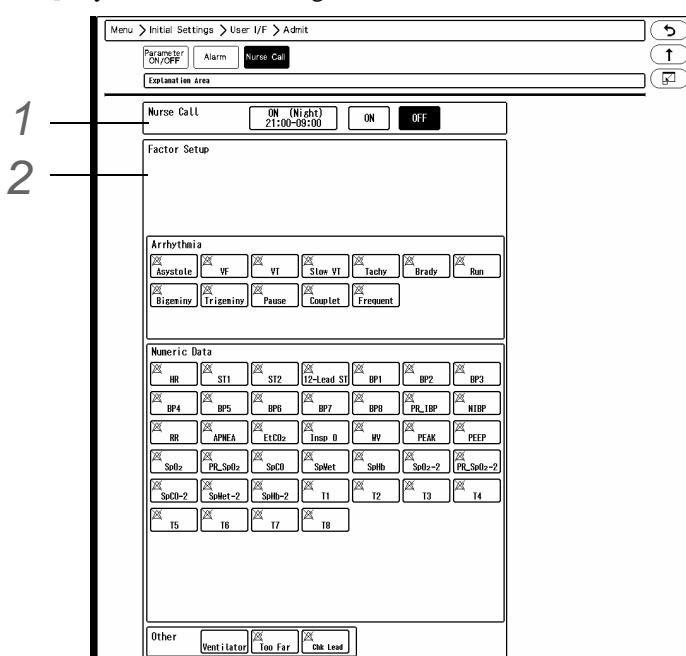
1 Pressing each parameter will display the setup window and allows to set ON/OFF of alarm and alarm limit.

2 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.



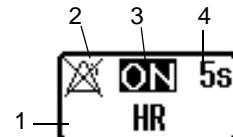
1 Nurse Call Mode Selection

- ▶ [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**

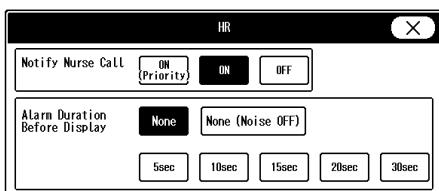
Select ON/OFF for each parameter. The information displayed inside each key is explained below.

- 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.

► The setup window will be displayed.



Example of [HR]

- 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, [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.

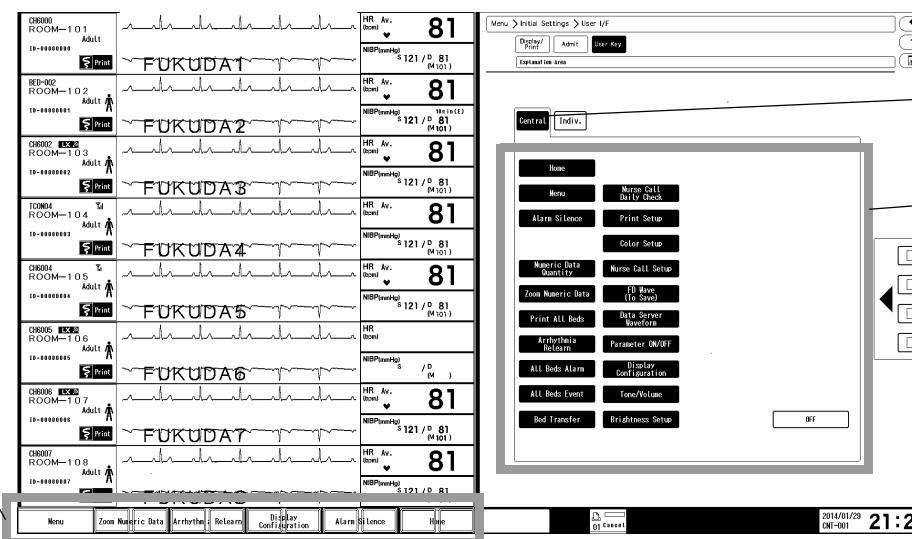
User Key

The frequently used keys can be assigned as user keys at the lower display area.
 By setting a user key, quick access to the frequently used menu can be attained.
 Press the [Initial Settings], [User Key] ("User I/F") keys to display the user key menu.
 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 the [Central] key.

- ▶ The display will change to user key selection mode.



1
2,3
2

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.

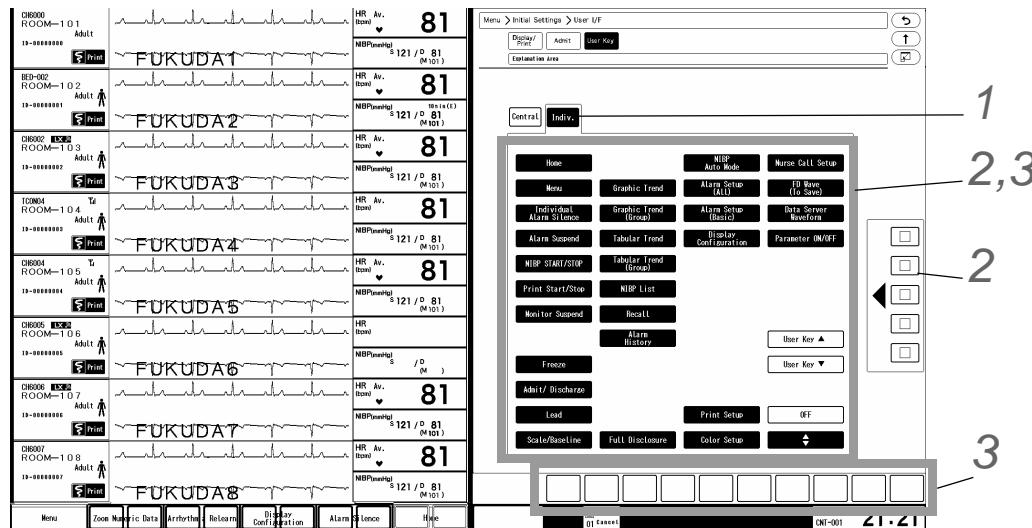
3 Assign the user key to the display area.

- 1 Select the area to change the user key.
 - ▶ By pressing the selected area again, the selection will be cancelled.
 - ▶ Adjust the size of the selected area which will be indicated in blue frame.
- 2 Select the function to assign to the user key.
 - ▶ [OFF] will not assign any user key.

□ Individual Bed User Key

1 Press the [Indiv.] key.

► 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.

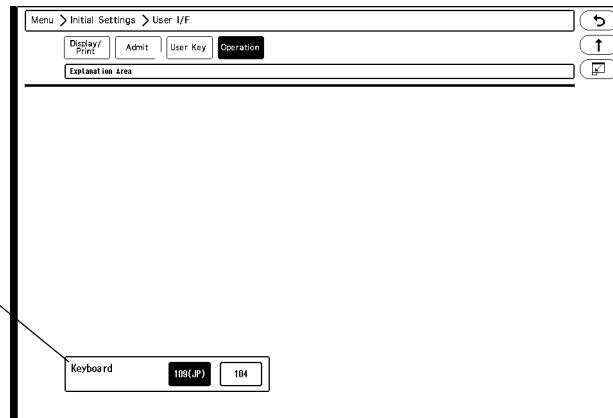
- 1 Select the area to change the user key.
 - By pressing the selected area again, the selection will be cancelled.
 - Adjust the size of the selected area which will be indicated in blue frame.
- 2 Select the function to assign to the user key.
 - By assigning the [▲▼] to the user key area, 2 pages of user keys can be registered, and pressing the [◀▶] allows to 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 [Page Up] key, and user keys on the second page can be set by pressing the [Page Down] key.
 - [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 setup screen will be displayed.



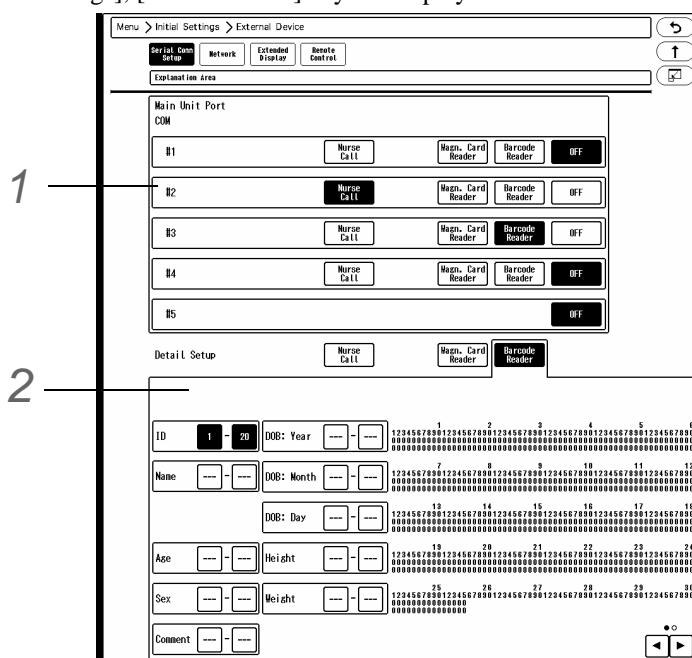
- 1 The keyboard type can be selected from [109(JP)] or [104].

External Device

Serial Communication

There are 5 serial connectors on this equipment for external device connection and allows to expand the function. When connecting the external device, settings on the serial communication menu needs to be performed.

Press the [Initial Settings], [Serial Comm.] keys to display the serial communication menu.



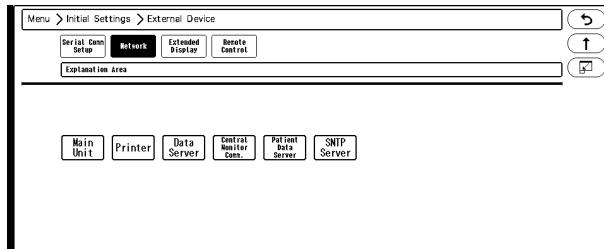
- 1 Select the device to connect to each COM port.

- 2 Set the details for each device. The above display is an example of detail setup for the Barcode Reader.

- ▶ The detail setup items differ depending on the device.
 (☞ "Serial Communication Setup (TCON)" P2-10)
 (☞ "Nurse Call Detail Setup" P5-5)

Network

By connecting the DS-8900 system to the TCP/IP network, laser printer or server can be used.
On the network menu under the initial settings menu, network setup can be performed.



For details of the setup procedure, refer to "TCP/IP Network" P2-11.

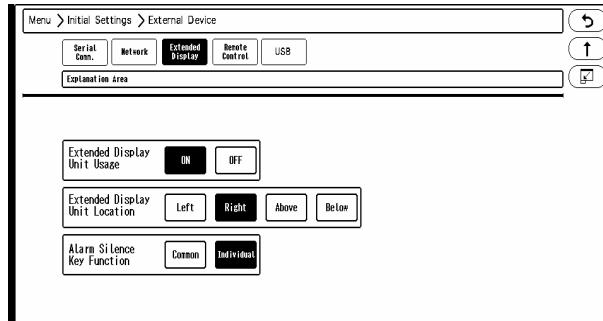
⚠ WARNING

- The operation cannot be guaranteed if connected to improper network. When changing the network setting, contact your nearest service representative.
- When connecting to an existing network, follow the instruction of the network administrator.

Extended Display Unit

The extended display unit (LC-8026T) can be connected to the DS-8900.
By using the extended display unit, multimode monitoring can be performed.

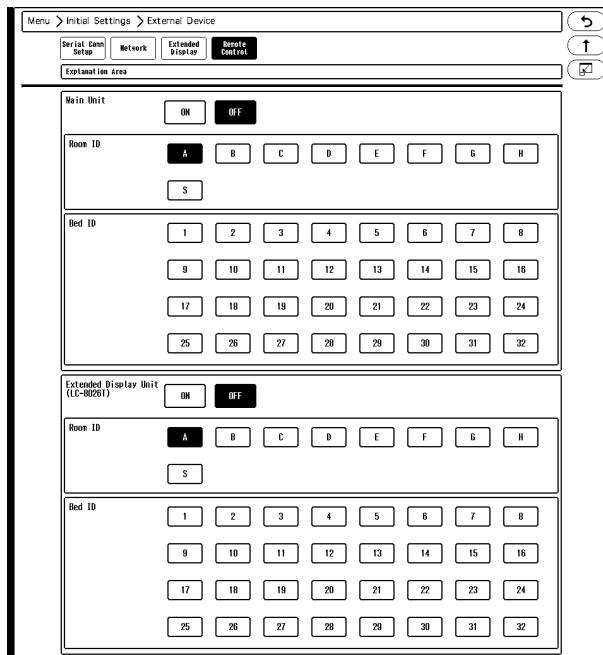
On the extended display menu under the initial settings menu, extended display setup can be performed.



For details of the setup procedure, refer to "Using the Extended Display Unit" P1-10.

Remote Control Setup

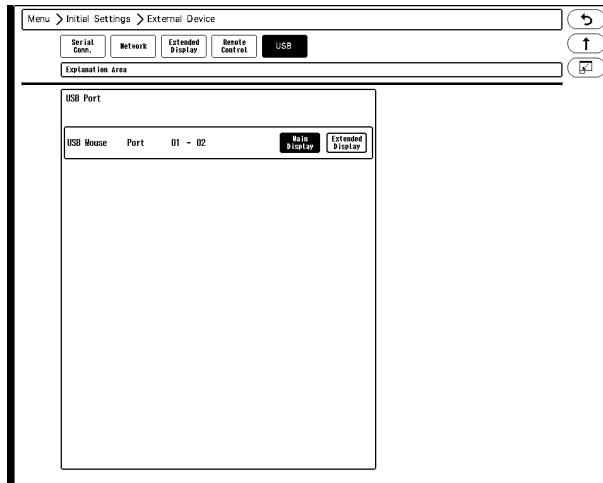
The alarm sound on the main unit or extended display unit can be silenced using the CF-820 Remote Control Unit. On the remote control menu under the initial settings menu, remote control setup can be performed.



For details of the setup procedure, refer to ["Remote Control Setup" P1-7.](#)

USB Setup

The operation control on the main unit or extended display unit can be performed using a mouse. On the USB setup menu under the initial settings menu, the display unit to control using a mouse can be selected.



For details of the setup procedure, refer to ["USB Mouse Setup" P1-6.](#)

System Setup

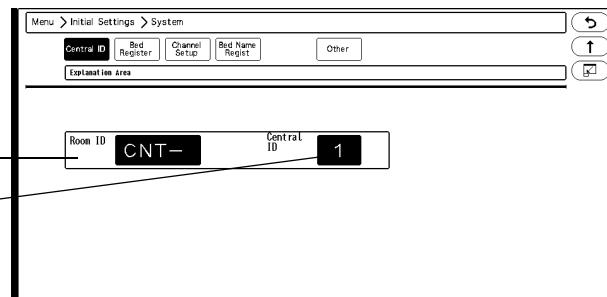
Central ID

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 monitor on this equipment can be registered. Maximum of 32 beds can be registered.

The registered beds can be selected on the display configuration menu.

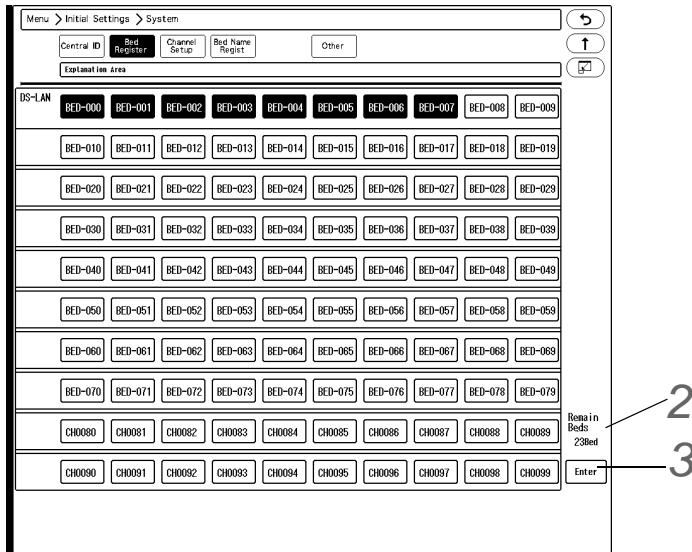
(☞ "Selecting the Displaying Bed" P12-23)

CAUTION

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

1 Press the [Bed Register] key on the initial settings menu.

- The bed register menu will be displayed.
- The registered beds are displayed in blue. To cancel the bed registration, select the bed displayed in blue, and press the [Enter] key.



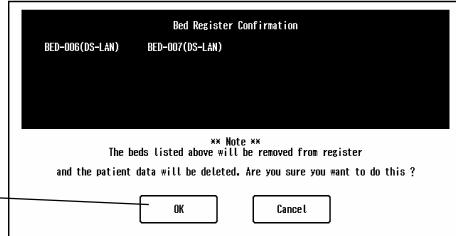
- ▶ [CHxxxx] indicates telemetry beds which construct the wired network system. (LW)
- ▶ [BED-xxx] indicates the beds which construct the wired network system. (BED)
- ▶ To set the bed as the TCON telemetry bed, set the same channel ID for the bed displayed in "DS-LAN" and the bed connected to the TCON network. By setting the same channel ID, the bed will function as the TCON telemetry bed.
- "TCON1" will be displayed at the upper right of the key.

2 Select the monitoring beds.

- ▶ "Remain Beds" will be displayed at the right side to indicate the remaining number of beds that can be selected.

3 Press the [Enter] key.

- ▶ The "Bed Register Confirmation" window will be displayed.



- NOTE**
- The setup will not be validated unless the [Enter] key is pressed. Make sure to press the [Enter] key.

4 Press the [OK] key.

Channel

When using a wireless system, it is necessary to set the channel ID and band of the receiving telemeter. For the telemetry beds with diversity function, antenna can be switched.

(☞ "Channel ID and Antenna Setup for the Receiver" P2-4)

Bed Name Registration

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

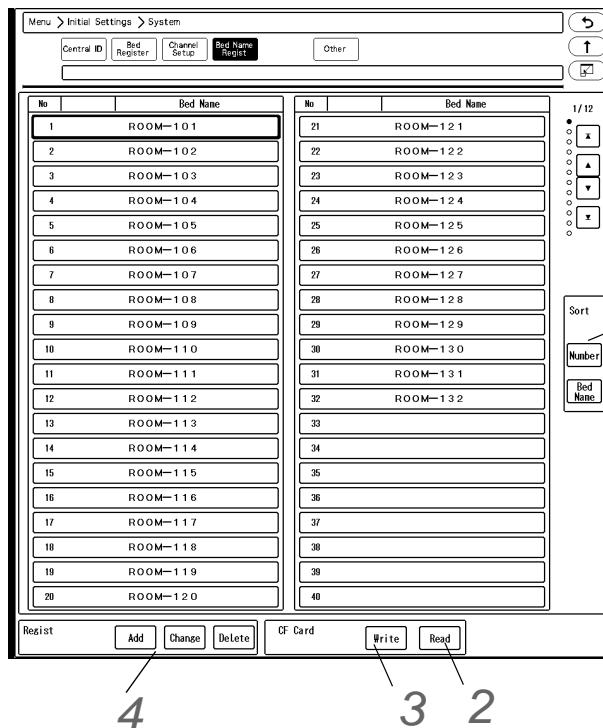
In this section, the procedure for the bed name registration when not using the nurse call system is explained. Maximum of 480 bed names can be registered.

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)" P5-6)
 (☞ "Bed Name Registration (When Aiphone PHS nurse call system is used)" P5-7)
- 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 [Initial Settings], [Bed Name Regist] keys to display the bed name registration menu.



2

Reading the Bed Name Data from the CF Card

1 Insert the CF card with the bed name data to the CF card slot.

2 Press the [Read] key.

▶ A confirmation message will be displayed.

3 Press the [OK] key.

NOTE

- All bed name data will be replaced with the data read from the CF card.
- Reading the bed name data from the card will erase the currently registered bed name data on this equipment.

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

- ▶ The bed name read from the card will be displayed.

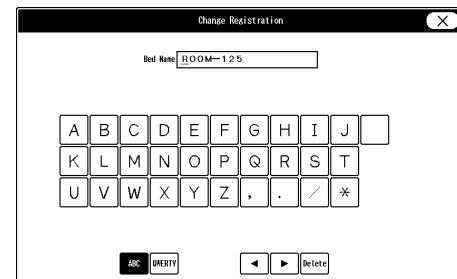
3 Writing the Bed Name Data to the CF Card

- 1 Insert the CF card formatted for data transfer to the CF card slot.
- 2 Press the [Write] key.
▶ A confirmation message will be displayed.
- 3 Press the [OK] key.
▶ When a beep tone generates, the writing process is complete.

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

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 TCON base station, if TCON system is used.
(The time/date can be set only on the TCON base station.)
- 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].

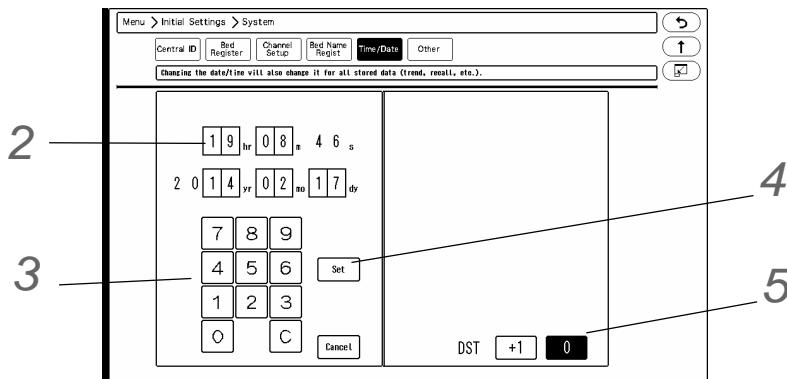
This section explains about the time/date setup procedure.

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.

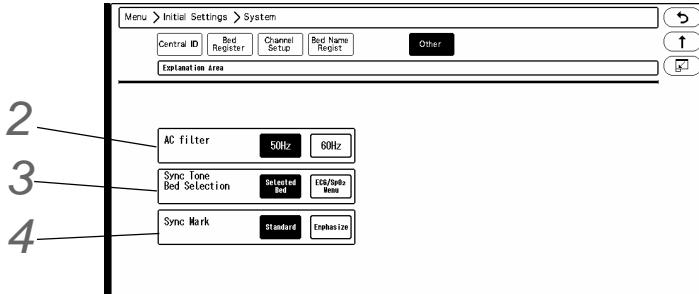
5 The daylight saving time (DST) can be set.

- ▶ To set the daylight saving time, select [+1].

Other Setup

The settings for AC frequency, HR synchronized tone can be set under [Initial Settings] > [Other] ("System").

1 Press the [Initial Settings], [Other] keys to display the other settings menu.



2 AC Frequency

- ▶ Select from [50Hz]/[60Hz].

3 Synchronized Tone

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/SpO₂ Menu]: The synchronized tone for the bed which "Synchronized Mark/Tone" selection is made on the ECG or SpO₂ menu will be generated.

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.
- If [ECG/SpO₂ Menu] is selected for "Sync Tone Bed Selection", [Emphasize] will be automatically selected.

Administrator Setup

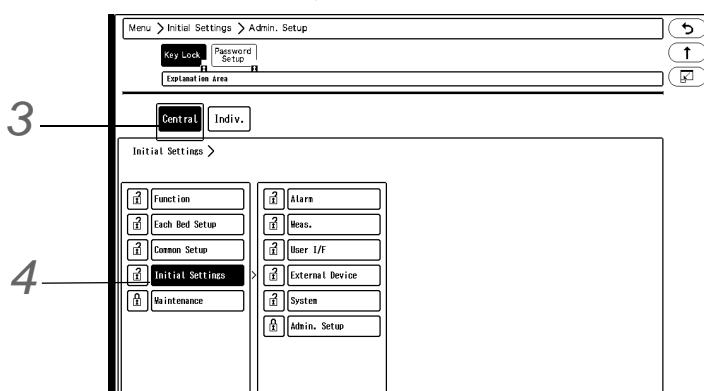
Key Lock

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

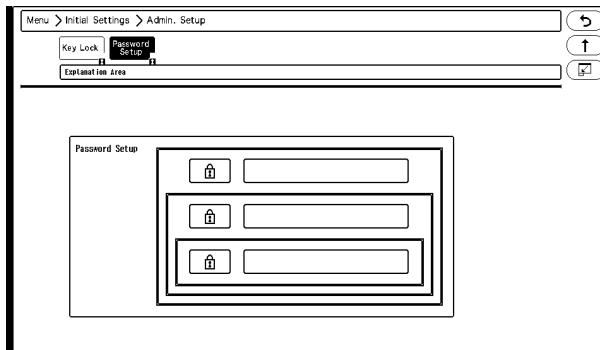
- ◆ The default passwords are set as follows.
Red Key: 11111111
Yellow Key: 22222222
Green Key: 33333333
- ◆ Before using the equipment, make sure to change the password.
- ◆ For details of the password, contact Fukuda Denshi service representative.

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

2 Enter the password.

3 Press the [Password] key.

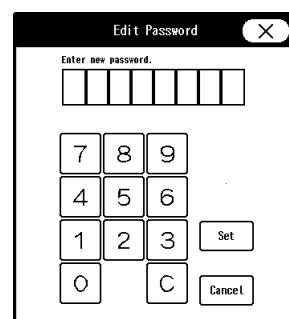
- ▶ The password setup window will be displayed.



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

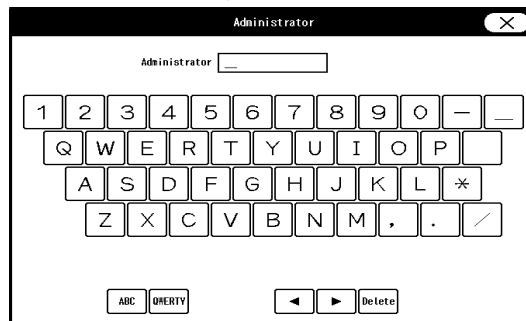
- There are 3 levels of password which are distinguished by the color of the icon.
The level is in the order of red>yellow>green and are distinguished by the entered password to display the administrator setup menu.

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 7 Setup Item/Default Value

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System.....	7-11
Administrator Setup.....	7-11

Chapter 7 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

Item	Detail		Default
Alarm System	Fukuda Tone, Melodic Tone, Standard Tone		Standard Tone
Basic Alarm Parameter	HR, SpO ₂ , PR_SpO ₂ , 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 ₂ O In, N ₂ O 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
Alarm Silence Time	1 min., 2 min.		2 min
Alarm Suspend Time	1 min., 2 min.		2 min
Asystole, VF, VT Alarm	Always ON, ON/OFF		Always ON
Suspend Arrhy. Analysis during Noise Interference	ON, Disable		Disable
Lower Limit for Alarm Volume Lower Limit	Vital 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		OFF
	Level L		OFF
	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	H
	ST	H, M	M
	BP1	H, M	H
	BP2 to BP8	H, M	M
	PR_IBP	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
	SpMet, SpMet-2	H, M, L	M

Item	Detail		Default
SpHb, SpHb-2 NIBP T1 to T8 Tb RR APNEA CO ₂ Et CO ₂ In O ₂ In O ₂ Exp N ₂ O In N ₂ O Exp Agent In Agent Exp MAC PEAK PEEP MV Exp	H, M, L		M
	H, M		H
	H, M, L		M
	H, M, L		M
	H, M		H
	S, H, M		H
	H, M		H
	H, M		M
	H, M		H
	H, M, L		M
	H, M, L		M
	H, M, L		M
Alarm Level: Arrhythmia	Asystole	S, H	H
	VF	S, H	H
	VT	S, H	H
	Slow VT	H	H
	Tachy	S, H, M	H
	Brady	S, H, M	H
	Run	H, M	H
	Bigeminy	H, M, L	M
	Trigeminy	H, M, L	M
	Pause	H, M	M
	Couplet	H, M, L	M
	Frequent	H, M, L	M
Alarm Level: Technical	Ventilator	S, H	H
Too Far Alarm	Setup	ON, OFF	OFF
	Time	5 to 60 sec.	7 sec.
Chk TLM Battery Alarm		ON, OFF	OFF
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	ON
	Message	ON, OFF	ON
	Alarm Sound	ON, OFF	ON
Alarm Occurrence at NIBP Failure		ON, OFF	ON

Item	Detail	Default
Alarm Wave Background	Lighting, Normal	Lighting
Event Display	ON, OFF	ON
Alarm Suspend/Alarm Silence from Central Monitor	OK, NG	OK
Link with Alarm Suspend	ON, OFF	OFF
All Beds Alarm Silence Key	Enable, Disable	Enable

Measurement

Unit

Item	Detail	Default
ST	mm, mV	mV
BP	mmHg, kPa	mmHg
TEMP	°C, °F	°C
Height/Weight	cm/kg, in/lb	in/lb
CO ₂ Atmospheric Pressure	Pressure	400 to 850
	Unit	mmHg, kPa

Other

Item	Detail	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

User I/F

Display/Print

Item	Detail	Default
Date Format	07/19, Jul.19, 19 Jul.	Jul. 19
BP Alarm Increment	Normal, Small	Normal
Trend Clip	ON, OFF	ON
Built-in Printer Message Display	ON, OFF	OFF
ST Display Lead Setup (A to C)	4 leads for each pattern of A to C I to V6, OFF	ST-A: I, II, III, aVR ST-B: aVL, aVF, V1, V2 ST-C: V3, V4, V5, V6
QRS Classification	ON, OFF	OFF
Speed	25mm/s, 50mm/s	25mm/s
Print Calibration	ON, OFF	OFF
BP Printing Scale	20, 40mm	40mm

Item	Detail	Default
CO ₂ Printing Scale	20, 40mm	40mm
Meas. Info. Printing	ON, OFF	OFF
LX Remote Printing	ON, OFF	OFF
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	OFF

Admit

Parameter ON/OFF

Item	Detail	Default
ECG1, BP1 to BP8, NIBP, SpO ₂ -1, SpO ₂ -2, RESP, CO ₂ , T1 to 8, SvO ₂ /CCO, GAS, BIS, INVOS, SPIRO, VENT	ON, OFF	All ON

Alarm

Arrhythmia

Item	Detail	Default
Asystole	ON, OFF 3-10 sec.	ON 5 sec.
VF	ON, OFF	ON
VT	ON, OFF	ON
Slow VT	ON, OFF	ON
Run	ON, OFF 2-8 beats	ON 3 beats
Couplet	ON, OFF	OFF
Pause	ON, OFF 1.5-5 sec.	OFF 3 sec.
Bigeminy	ON, OFF	OFF
Trigeminy	ON, OFF	OFF
Frequent	ON, OFF 1-50 beats / min.	OFF, 10 beats/min.
Tachy	ON, OFF	ON
Brady	ON, OFF	ON

Numeric Data

Item	Detail	Default
HR	ON, OFF 20 to 300bpm	ON 40-120
ST1/ST2	ON, OFF ST1 ±2.0mV/±20mm ST2 ±2.0mV/±20mm	OFF ±1.0mV / ±10mm
BP1 (mmHg)	ON, OFF 0 to 300mmHg	ON S: 80-180mmHg D: OFF-OFF M: OFF-OFF
BP1 (kPa)	ON, OFF 0 to 40.0kPa	ON S: 10.0-24.0kPa D: OFF-OFF M: OFF-OFF
BP2 to 8 (mmHg)	ON, OFF 0 to 300mmHg	OFF S: 80-180mmHg D: OFF-OFF M: OFF-OFF

Numeric Data

Item	Detail	Default
BP2 to 8 (kPa)	ON, OFF 0 to 40.0kPa S: 10.0-24.0kPa D: OFF-OFF M: OFF-OFF	OFF S: 10.0-24.0kPa D: OFF-OFF M: OFF-OFF
CVP (cmH ₂ O)	ON, OFF 0 to 40cmH ₂ O	OFF OFF to OFF
PR-IBP	ON , OFF 20 to 300bpm	OFF 40-120bpm
NIBP (mmHg)	ON, OFF 10 to 300mmHg	ON S: 80-180mmHg D: OFF-OFF M: OFF-OFF
NIBP (kPa)	ON, OFF 16 to 40.0kPa	ON S: 10.0-24.0kPa D: OFF-OFF M: OFF-OFF
RR	ON, OFF 5 to 150Bpm	OFF 5-30Bpm
APNEA	ON, OFF 10 to 60 sec.	ON 15 sec.
EtCO ₂ (mmHg)	ON, OFF 1 to 115mmHg	OFF 30-45mmHg
EtCO ₂ (kPa)	ON, OFF 0.1 to 15.0kPa	OFF 4.0-6.0kPa
EtCO ₂ (%)	ON, OFF 0.1 to 15.0%	OFF 4.0-6.0%
InspCO ₂ (mmHg)	ON, OFF 1 to 24mmHg	OFF 3mmHg
InspCO ₂ (kPa)	ON, OFF 0.1 to 3.0kPa	OFF 0.4kPa
InspCO ₂ (%)	ON, OFF 0.1 to 3.0%	OFF 0.4%
Exp O ₂	ON, OFF 18 to 100%	OFF OFF
Insp O ₂	ON, OFF 18 to 100%	OFF OFF
Exp N ₂ O	ON, OFF 0 to 100%	OFF OFF
Insp N ₂ O	ON/OFF 0 to 100%	OFF OFF
Exp Agent	ON, OFF [ISO] 0.5 to 6.0 % [HAL] 0.5 to 6.0 % [ENF] 0.5 to 6.0 % [SEV] 0.5 to 8.0 % [DES] 0.5 to 20.0 %	OFF OFF
Insp Agent	ON. OFF [ISO] 0.5 to 6.0 % [HAL] 0.5 to 6.0 % [ENF] 0.5 to 6.0 % [SEV] 0.5 to 8.0 % [DES] 0.5 to 20.0 %	OFF OFF
MAC	ON/OFF 0.1 to 9.9	OFF OFF
MV _e	Adult	ON, OFF 2 to 20L/min
	Child/Neonate	ON, OFF 0.5 to 5L/min
PEAK	ON, OFF 8 to 100cmH ₂ O	OFF 8-26cmH ₂ O
PEEP	ON, OFF 2 to 50cmH ₂ O	OFF 2-10cmH ₂ O
SpO ₂ , SpO ₂ -2	ON, OFF 50 to 100%	ON 90 to OFF
PR-SpO ₂ , PR-SpO ₂ -2	ON , OFF 20 to 300bpm	OFF 40-120bpm
SpMet, SpMet-2	ON , OFF 0 to 15%	OFF OFF
SpCO, SpCO-2	ON , OFF 0 to 40%	OFF OFF
SpHb, SpHb-2	ON , OFF 1 to 24.5g/dL	OFF OFF
T1 to 8 (°C)	ON, OFF 30 to 50°C	OFF 35-40°C
T1 to 8 (°F)	ON, OFF 86 to 122°F	OFF 95-104°F
Tb (°C)	ON, OFF 30 to 50°C	OFF OFF
Tb (°F)	ON, OFF 86 to 122°F	OFF OFF
12-Lead ST	ON, OFF ±2.0mV/±20mm	OFF±1.0mV / ±10mm

Nurse Call

Item		Detail	Default
Nurse Call		ON (Night), ON, OFF	OFF
Nurse Call Setup	Arrhythmia	Asystole, VF, VT, Slow VT, Run, Bigeminy, Trigeminy, Pause, Couplet, Tachy, Brady, Frequent	none
	Numeric Data	HR, ST1, ST2, 12-Lead ST, BP1 to 8, 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, T1 to 8	none
	Other	Ventilator, Too Far, Chk Lead	none

User Key

Item	Detail	Default
Central Monitor Display	OFF, Home, Menu, Alarm Silence, Numeric Data Qty, Zoom Numeric Data, Print All Beds, Arrhy. Relearn, Bed Transfer, Nurse Call Daily Check, Print Setup, Color Setup, Nurse Call Setup, Full Disc. Wave (To Save), Data Server Output Setup, Parameter ON/OFF, Display Config., Tone/Volume, Brightness Setup, All Beds Alarm, All Beds Event	Page 1 1: Menu 2: Menu 3: Zoom Numeric Data 4: Zoom Numeric Data 5: Arrhy. Relearn 6: Arrhy. Relearn 7: Display Config. 8: Display Config. 9: Alarm Silence 10: Alarm Silence 11: Home 12: Home
Color selection for central monitor display user key	Gray, Blue, Red, Yellow	Alarm Silence: Red Home: Blue Other Keys: Gray
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, Scale/ Baseline, Graphic Trend, Graphic Trend (Group), Tabular Trend, Tabular Trend (Group), NIBP List, Recall, Alarm History, Full Disc. Wave, NIBP Auto Mode, Alarm Setup (All), Alarm Setup (Basic), Display Config., Print Settings, Color, Nurse Call Setup, Full Disc. Wave (To Save), Data Server Output Setup, Parameter ON/OFF	Page 1 1: Menu 2: OFF 3: Admit/Discharge 4: Trend 5: Tabular Trend 6: Recall 7: Full Disc. Wave 8: Alarm Setup (Basic) 9: Print Start/Stop 10: Home Page 2 1: Menu 2 to 8: OFF 9: Print Start/Stop 10: Home
Color selection for individual bed display user key	Light Gray, Gray, Blue, Red, Green	Home: Blue Menu: Blue Alarm Suspend: Red NIBP Start/Stop: Blue Print Start/Stop: Green Other Keys: Light Gray

Operation

Item	Detail	Default
Keyboard	109 (JP), 104	104

External Device

Serial Communication

Main Unit Port

Item	Detail	Default
COM1 to COM4	Nurse Call, Magnetic Card Reader, Barcode Reader, OFF	OFF
COM5	TCON, OFF	OFF

TCON Setup

Item	Detail	Default
ID	OFF, C1, C2	OFF
Channel	1 to 60	60

Nurse Call Detail Setup

Item	Detail	Default
Nurse Call	Monitor ID	1 to 99
	Higher Priority (than others)	ON, OFF
	Nurse Call during Alarm Silence	Continue, Stop
	Alarm Factor Length	4 characters, 7 characters
	Re-notify Nurse Call	ON, OFF
	Duration until re-notification	0 min. 30 sec. to 5 min. 00 sec.
	Night Use	Enable, Disable
	Night Start/End Notice	ON, OFF
	Night Start/End Time Setup	0:00 to 23:50 Start Time: 21:00 End Time: 08:00

Magnetic Card Reader Detail Setup

Item	Detail	Default
Starting Digit / Ending Digit	Patient ID	Enter with numeric keys (1 to 255)
	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

Item	Detail	Default
Data Length	7, 8	7
Stop Bit Length	1, 2	1
Parity	None, Even, Odd	Even
Significant Bit Length	6, 7, 8	7
Baud Rate	1200, 2400, 4800, 9600, 19200	9600
No. of Retransmission	1 to 9	1
Data Type	TYPE0 (Fixed Length), TYPE1 (CR, LF), TYPE2 (STX-ETX), TYPE3 (STX-ETX, BCC)	TYPE3 (STX-ETX, BCC)
Maximum Data Size	1 to 256	74

Barcode Reader Detail Setup

Item	Detail	Default
Starting Digit / Ending Digit	Patient ID	Enter with numeric keys (1 to 255)
	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	Detail	Default
Main Unit	IP Address	Numeric (0 to 9)
	Sub-Network Mask	
	Default Gateway	
Printer	Function	ON, OFF
	IP Address	Numeric (0 to 9)
	MAC Address	Alphanumeric (0 to 9, A to F)
	Printer Specification	LIPS IV, ESC/page, PCL 5
	Paper Size	A4, Letter
Data Server	Data Server	Used, Not used
	Protocol	Ver.01, Ver.02, Ver.03
	IP Address	Numeric (0 to 9)
	Port No.	Numeric (0 to 9)
Central Monitor Communication	Mode	Server, Client, OFF
	Client IP Address	Numeric (0 to 9)
	Data Transfer Port No.	Numeric (0 to 9)
	Administrative Port No.	Numeric (0 to 9)
Patient Data Server	Mode	Link with EMR, Search ID, Time Sync., OFF
(Link with EMR)	Offline	ON, OFF
	EMR Notice Icon	ON, OFF
	Time Synchronization	ON, OFF
	Client IP Address	Numeric (0 to 9)
	Server Port No.	Numeric (0 to 9)
	This Unit Port No.	Numeric (0 to 9)
(Search ID)	Search Patient ID Linked to Magnetic Card Reader (Barcode Reader)	ON, OFF
	Time Synchronization	ON, OFF
	Client IP Address	Numeric (0 to 9)
	Server Port No.	Numeric (0 to 9)
(Time Synchronization)	Client IP Address	Numeric (0 to 9)
	Server Port No.	Numeric (0 to 9)
SNTP Server	SNTP Server	ON, OFF
	IP Address	Numeric (0 to 9)

Extended Display Unit

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

Remote Control Setup

Item		Detail	Default
Main Unit	Function	ON, OFF	OFF
	Room ID	A to H, S	A
	Bed ID	1 to 32	1
Extended Display Unit (LC-8026T)	Function	ON, OFF	OFF
	Room ID	A to H, S	A
	Bed ID	1 to 32	1

USB Setup

Item		Detail	Default
Main Unit USB Port	USB Mouse	Main Display, Extended Display	No selection
	USB Mouse	Main Display, Extended Display	No selection

* "USB Mouse" will be displayed only when a mouse is connected to the USB port.

System

Central ID

Item	Detail	Default
Room ID	Numeric, Alphabet, Symbol (4 characters)	CNT-
Central ID	1 to 16	1

Bed Register

Item	Detail	Default
Bed Register	DS-LAN: 100 beds	Not registered.

Channel Setup

Item	Detail	Default
Stored Channels	-	Not registered.

Bed Name

Item	Detail	Default
Bed Name Registration	480 Room ID, Bed Name Numeric, Alphabet, Symbol (16 characters)	Not registered.

Other

Item	Detail	Default
AC Frequency	50Hz, 60Hz	60Hz
Sync Tone Bed Selection	Selected Bed, ECG/SpO ₂ Menu	Selected Bed
Synchronized Mark	Standard, Emphasize	Standard

Administrator Setup

Key Lock

Item	Detail	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	Detail	Default
Password Setup	Administrator name: 8 characters each	Blank
	Password: 8 characters each	Red Key: 11111111 Yellow Key: 22222222 Green Key: 33333333

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Chapter 8 Replacing/Disposing the Parts

Periodic Replacement

To ensure reliability of safety, function, and performance of this equipment, the following parts must be replaced periodically. When replacing, contact your nearest service representative.

Short Term Backup Battery
(Installed in DS-8900 main unit)

Replacing Period: 3 years depending on the used frequency

CAUTION

- Replace the periodic replacement parts periodically as specified.
-

NOTE

- To protect the data during voltage dip, short interruptions and voltage variations on power supply input lines or during short duration of power turned OFF, this equipment performs 5-minute (approx.) data backup using the secondary battery. If the power is turned OFF for more than 5 minutes, the data will not be protected. The data may not be protected if the power is turned OFF within 30 minutes from power ON. The data that may not be protected are NIBP list data and the data just before turning OFF the power for trend data, recall data, full disclosure waveform data.
 - If the short-term backup battery is continuously used without replacement, the short-term backup time may become extremely short or backup may not be performed at all. However, this will not affect the normal monitoring.
-

Disposing the Equipment

CAUTION

- When disposing of this equipment, accessories, or components, use an industrial waste distributor. Do not dispose of as ordinary waste.
-

Chapter 9 Cleaning/Disinfecting/Storing

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Chapter 9 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 equipment, accessories, and cables, and keep them together in one place for next use.
- ♦ Always check for adequate supply of disposable accessories such as printing paper. If any shortage, contact our service representative and supply as necessary.

Display

- ♦ The LED used for 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 a few pixels which do not light or constantly light. However, this will not affect monitoring operation.
- ♦ Due to its material characteristic, the touch panel expands/contracts depending on the temperature/humidity.
- ♦ The surface of the touch panel is susceptible to scratches. Therefore do not scratch or rub it using a hard item.

Cleaning the Touch Panel and Housing

Touch Panel

Since the display panel of the DS-8900 system incorporates a touch panel, finger prints and other stains are likely to appear on the touch panel.

Wipe the touch panel using a cleaning cloth.



CAUTION

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

Housing

Cleaning

Wipe the housing and cables using a tightly squeezed cloth saturated with diluted neutral detergent.

□ Disinfection

Wipe the housing and cables using a tightly squeezed cloth saturated with alcohol. Then, wipe off with a soft cloth.

CAUTION

- ♦ Clean the equipment frequently so stains can be removed easily.
- ♦ To prevent injury, it is recommended to wear gloves when cleaning the equipment.
- ♦ When cleaning or disinfecting, do not allow chemical solution to enter the equipment or connectors.
- ♦ Do not use organic solvents, thinner, toluene or benzene to avoid damaging the resin case.
- ♦ Do not polish the housing with abrasive, chemical cleaner, alkaline or acidic detergent. Otherwise, the surface resin or paint coating may be damaged, resulting in discoloration, scratches, and other problems.

Storing the Equipment and Recording Paper

Equipment

- ♦ Store in a place where the device will not be exposed to splashing water.
- ♦ Store in a place where the equipment will not be affected by atmospheric pressure, temperature, humidity, ventilation, sunlight, dust or atmosphere containing salt or sulfur.
- ♦ Store in a level area where the equipment is not exposed to vibration and shock (including during transportation).
- ♦ The following environmental conditions should be observed when storing the equipment.
 - ♦ Storage Temperature: -10 to 60°C
 - ♦ Storage Humidity: 10 to 95% (at 60°C)(non-condensing)
 - ♦ Storage Atmospheric Pressure: 800 to 1060hPa

Recording Paper

The recording paper is thermal type. Storage over an extended period of time at a high temperature may change the quality of the printed content, and make it illegible. When storing, follow the precautions below.

- ♦ Store in a place where light is shut off and avoid direct sunlight.
- ♦ Do not leave the paper in a high temperature (50 °C/122 °F and above).
- ♦ Do not store the paper in a polyvinyl chloride bag.
- ♦ Do not expose the paper to alcohol, hydrochloric acid, or ester ketone.
- ♦ Avoid using adhesive agents other than water based glue.

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Chapter 10 Maintenance Check

Daily and Periodic Check

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

In this section, the maintenance check items that must be performed for this equipment are explained. To ensure safety, reliability, and high performance, a "Daily Check" and "Periodic Check" must be performed. Fukuda Denshi is not liable for any accidents arising from lack of maintenance.



CAUTION

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

Daily Check

Perform the daily check using the "Daily Check List".

(Maintenance Manual "Daily Check List")

Periodic Check

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

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

For more details, contact your nearest service representative.

Daily Check Items and Procedures

Perform the daily check using the "Daily Check List".

- The "Daily Check List" is on the last page of this manual.
- If there is an item with "NG" judgement, the overall judgement will be "NG". Make sure to take countermeasures for the NG item.
- Use the equipment only if the judgements 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.	<p>No abnormality should be found.</p> <p>No damage should be found on the cable. The cables should be firmly connected.</p>
02	Installation	<p>Check whether the equipment is installed on a level surface.</p> <p>Check whether the equipment is installed in a place susceptible to adverse environment.</p>	<p>The installation area must be level and free from vibration and shock.</p> <p>The environmental condition, such as temperature and humidity should be as specified. The equipment should not be subjected to splashing water or chemicals.</p>
2. Operation			
01	Function	Turn ON the power of the main unit, and check whether it operates normally.	<p>The alarm indicator should light when the power is turned ON.</p> <p>The home display should appear, and the power LED located at the lower left of the display unit should light.</p> <p>The date and time should be correct.</p> <p>The waveforms and measurement data should be properly received and displayed.</p> <p>Pressing the Print key  should start the printing.</p> <p>Full disclosure waveform should be properly displayed.</p> <p>The fixed keys (Home, Alarm Silence) should function.</p>
02	Telemeter Channel ID	Check if the channel ID is as specified by the telemetry channel administrator.	The channel ID should be as specified by the administrator.
03	TCON	Operate under normal operating conditions, and check the communication function and operation.	The communication of alarm settings, patient settings should be properly performed.
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 Unit (Optional Unit: HR-800)	Visually check the installed condition of the paper.	<p>The paper should be correctly installed.</p> <p>Neither damage nor discoloration should be found.</p>
		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. Others			
01	Periodic Replacement	Check the last replaced date of the short-term backup battery.	Should be within 3 years.
02	Periodic Check	Check the date of the previous periodic inspection.	Should be within 1 year.

No.	Check Items	Check Procedure	Criteria
03	Operation Manual	Check that accompanying documents such as Operational Manual 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.
- The "Periodic Check List" is on the last page of this manual.
- If there is an item with "NG" judgement, the overall judgement will be "NG". Make sure to take countermeasures for the NG item.
- Use the equipment only if the judgements for all the items are "OK".
- Check all cables, equipments, accessories, earth impedance, leakage current, and accuracy.



CAUTION

- Before the check procedure, back up the setup data and patient data on a CF card.

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 Unit: HR-800)	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 such as Operational Manual are stored in specified location.	Should be stored in specified location.

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

No	Check Items	Check Procedure	Criteria
3. Display/Operation/Print			
01	Label	Visually check the Rating Label and Caution Label of this equipment.	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	Check that the home display is displayed on the LCD.	Characters and waveform should be clear. The display should be clearly displayed with sufficient brightness.
04	Alarm Indicator	Check if the alarm indicator lights when the power is turned ON.	All segments on the alarm indicator should light when the power is turned ON.

No	Check Items	Check Procedure	Criteria
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.
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 Unit: HR-800)	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 Unit: HR-800)	Perform test printing on the Maintenance menu. Check by measuring the length of printed grid.	Error should be within ±5% for 25mm/sec and 50mm/sec waveform traces.
09	Remote Control (Optional)	Check the alarm silence function of the remote control.	Alarm should be silenced.
10	Receiving Condition (Wireless Network System)	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	Check the full disclosure waveform on the review display.	It should be properly displayed.
12	CF Card	Check the data saving function of the CF card.	The data should be properly saved on the CF card.
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 Equipment	Connect the external equipment, 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
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4. Periodic Replacement Parts

01	Short-Term Backup Battery	Check the last replaced date.	It should be replaced within the expiration date.
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No	Check Items	Check Procedure	Criteria
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5. Electrical Safety

01	Earth Leakage Current (NC)	Measure normal earth leakage current using a leak measurement safety tester. Test according to the test method of IEC60601-1 8.7.4.	Earth Leakage Current (NC) It should be 0.5mA or less.
02	Earth Leakage Current (SFC)	Measure single failure earth leakage current using a leak measurement safety tester. Test according to the test method of IEC60601-1 8.7.4.	Earth Leakage Current (SFC) It should be 1.0mA or less.
03	Protective Earth Resistance	Measure using the AC resistance tester. (Test Current 25A) Test according to the test method of IEC60601-1 8.6.	Should be 0.1 Ω 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.

04	Withstand Voltage	Apply AC1500V for 1 minute between mains part and accessible metal part which is protectively earthed. Test according to the test method of IEC60601-1 8.8.3.	Should resist the applied voltage.
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Maintenance

On the maintenance menu, alarm history review, touch panel adjustment, maintenance test, etc. can be performed.

CAUTION

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

LAN Information

Information such as the connection status of the equipment 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.

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Daily Check Report (Central Monitor)

Report No. :

Product Name	Serial No.	Administration No.	Location	Facility Name					
No.	Check Item	Judgment	Judgment	Judgment	Judgment	Judgment	Judgment	Judgment	Judgment
1 External Appearance									
01	Appearance	•No scratches, cracks, deformation, or rust should be found. •No damage should be found on the cable. The cables should be firmly connected.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
02	Installation	•The installation area must be level and free from vibration and shock. •The environmental condition, such as temperature and humidity should be as specified. The equipment should not be subjected to splashing water or chemicals.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
2 Operation									
01	Function	•The alarm indicator should light when the power is turned ON. •The home display should appear, and the power LED located at the lower left of the display unit should light. The date and time should be correct.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
		The waveforms and measurement data should be properly received and displayed.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
		Pressing the [Print] key should start the printing.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
		Full disclosure waveform should be displayed correctly.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
		The fixed keys (Home, Alarm Silence) should function.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
02	Telemeter Channel ID	The channel ID should be as specified by the telemetry administrator.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
03	TCON	Proper data communication such as alarm settings, patient information should be performed.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
04	Alarm Sound	Pressing the [Test] key on the "Tone/Volume" menu should generate the alarm sound.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
05	Nurse Call	Nurse call from each bed should be properly notified to the nurse call system.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
06	Recorder Unit (HR-800)	•The paper should be correctly installed. •Neither damage nor discoloration should be found on the paper. The operation should be smooth and no abnormal sound should occur.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
3 Others									
01	Periodic Replacement	The short-term backup battery should be within the expiring period.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
02	Periodic Check	It should be within 1 year from the previous periodic inspection date.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
03	Operation Manual	The accompanying documents such as operation manual should be stored in specified location.	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
		Overall Judgment	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG	OK / NG
		Checked Date							
		Checked Time							
		Inspected by							
		Approved by							
		Comment							

*Check "OK" or "NG" on the list. (Draw a diagonal line for unnecessary item.)

Periodic Check Report (Central Monitor)

Maintenance Contract * : Yes [General, Standard] (month), No

Report No.* :

Facility Name*		Product Name*		Periodic Check Date*	Acceptance Date*
Location*		Model Type or Model No.*		Next Check Date*	Signature
Administration No.	Distributor Name*	Serial No.*		Purchased Date*	

No.	Check Item	Judge	Check*
Cleaning Condition Check / Pre-cleaning			
01	Cleaning Condition Check (Take measures if necessary.)	Done	
02	Pre-cleaning (Should be performed if any stain is found.)	Done	
1 External Appearance / Accessories			
*Judgment criteria should be based on safety and function.			
01	External Appearance (No scratches, cracks, deformation, or rust should be found.)	OK / NG	
02	Cables (No damage or wire break should be found.)	OK / NG	
03	Recording Paper (Should be correctly installed. Neither damage nor discoloration should be found.)	OK / NG	
04	Operation Manual (Should be stored in specified location.)	OK / NG	
2 Power Supply			
01	Main Power Switch (Main power supply indicator should light and home display should appear.)	OK / NG	
02	Fuse (The specified fuse must be used.)	OK / NG	
3 Performance / Display / Control / Print			
01	Labels (Should be clean, clear and firmly attached.)	OK / NG	
02	Control / Switch (Should operate correctly.)	OK / NG	
03	LCD Display (Should be clearly displayed.)	OK / NG	
04	Alarm Indicator (All segments should light.)	OK / NG	
05	Alarm / Control Sound (The set volume should generate.)	OK / NG	
06	Date / Time (The displayed date/time should be correct.)	OK / NG	
07	Printing Status (Should be clearly printed.)	OK / NG	
08	Printing Speed (Error should be within ±5% for 25mm/sec and 50mm/sec waveform traces.)	OK / NG	
09	Remote Control (Alarm silence should function.)	OK / NG	
10	Receiving Condition (Correct data should be displayed with stable communication.)	OK / NG	

No.	Check Item	Judge	Check*
3 Performance / Display / Control / Print (continued)			
11	Full Disclosure Waveform (Should be properly displayed on the review screen.)	OK / NG	
12	CF Card (The data should be properly saved on the CF card.)	OK / NG	
13	DS-LAN Network (The data should be properly displayed with stable communication.)	OK / NG	
14	Output to the Slave Monitor/Extended Display Unit (The data should be properly displayed.)	OK / NG	
15	Communication with the External Equipment (Proper communication should be performed.)	OK / NG	
16	Keyboard Operation (Key input should properly function.)	OK / NG	
17	Mouse Operation (Cursor movement, click operation should properly function.)	OK / NG	
18	TCP/IP network communication (Proper communication should be performed.)	OK / NG	
4 Periodic Replacement Parts			
01	Short-Term Backup Battery (Should be within the expiring period)	OK / NG	
5 Electrical Safety			
01	Earth Leakage Current (NC) [] mA	OK / NG	
02	Earth Leakage Current (SFC) [] mA	OK / NG	
03	Protective Earth Resistance Main Unit (0.1Ω or less) [] Ω	OK / NG	
	Power Cable (0.1Ω or less) [] Ω	OK / NG	
04	Withstand Voltage (AC1500V for 1 minute)	OK / NG	

* Check "Done", "OK", or "NG" on the list. (Draw a diagonal line for unnecessary item.)

* If any abnormality is found on safety and functional items, or an error message is displayed, stop using the equipment and contact Fukuda Denshi.

Description of Symbols	* Use the following symbols for the check box.										
✓	Check	RP	Replace	/	Not Applicable	A	Calibrate/Adjust	C	Clean	R	Repair

The check result is as follows:	[Replacement Parts]*	Maintenance Contractor*
Overall Judgment*		
<input type="checkbox"/> No abnormality is found. <input type="checkbox"/> Needs to be repaired. <input type="checkbox"/> Needs to be immediately repaired. Stop using the equipment.		Checked by*
[About failure, repair details, or other information.]*		Approved by*
	Type	<input type="checkbox"/> On-Site <input type="checkbox"/> Pick-Up <input type="checkbox"/> Holiday <input type="checkbox"/> Night

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