

DynaScope 7000 Series
Central Monitor

DS-7700 System

Ver.08

Operation Manual



- Before using this device, read this operation manual thoroughly.
- Keep this manual near the device for future reference.

This manual is for the DS-7700 System Ver. 08.

⚠ CAUTION

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

CAUTION:

- The company and product names used in this manual are trademarks or registered trademarks.
- If this manual has pages missing or out of order, contact Fukuda Denshi for replacement.
- Only physician or persons instructed by physicians are allowed to use the equipment.
- The information contained in this document is subject to change without notice due to improvement in the equipment.

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Preface

Introduction

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 system is intended for continuously monitoring patient's medical condition in ward, CCU, ICU, and surgery room by acquiring vital information such as ECG, respiration, BP, NIBP, SpO₂ (arterial oxygen saturation), temperature, CO₂ through wired or wireless network.

For specification of this equipment, refer to "Specification" P14-1 of the 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
- ♦ 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-7700 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.

Model Types

The following are model types for the DS-7700 system.

In this operation manual, DS-7780, DS-7700L are referred to as "DS-7700 series", and DS-7780W, DS-7700WL are referred to as "DS-7700W series".

The extended display unit, LC-7019FT is referred to as LC-7019 series.

	Display Unit Size	Telemeter No. of Receiving Beds	Max. Monitoring Beds
DS-7700 Series			
DS-7780	15 inch	8 Beds	16 Beds
DS-7700L		0 Beds	
DS-7700W Series			
DS-7780W	19 inch	8 Beds	16 Beds
DS-7700WL		0 Beds	

The Description of the Display

Although the display layout (key size, arrangement, etc.) for the DS-7700 series and DS-7700W series slightly differs, the display example for the DS-7700 series will be mainly used in this operation manual.

If the display layout of DS-7700 series and DS-7700W series largely differs, both display examples will be used for explanation.

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: "Pacemaker", "Type",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

It is possible to construct a wired, wireless and TCON network system with this unit.

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

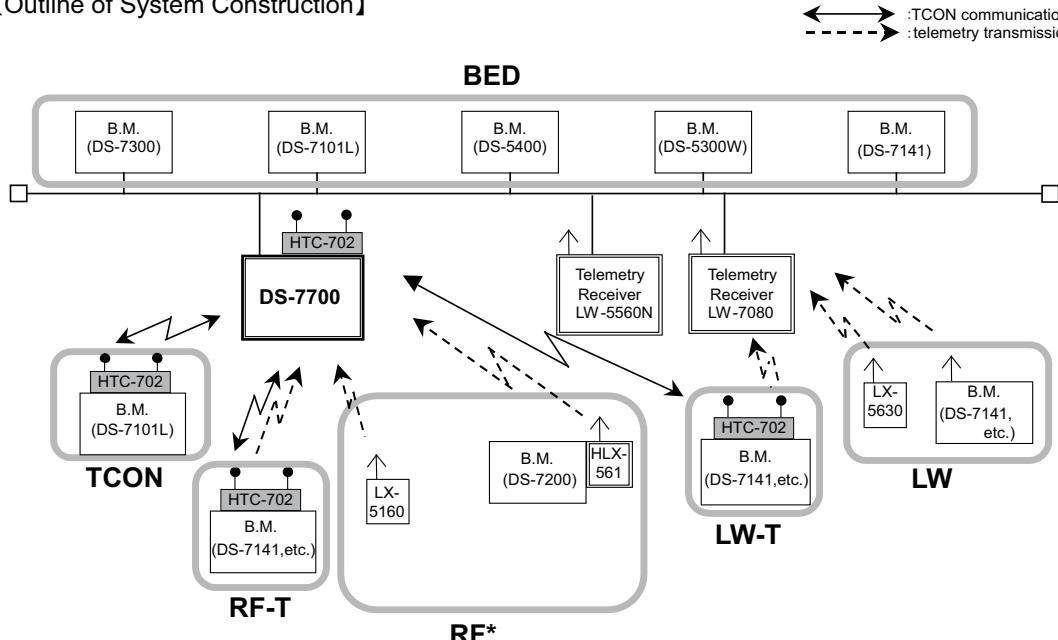
To explain these restrictions in a easy way to understand, the following expressions are used in this operation manual.

General Term	Expression	Description
Wireless Network Bed*	RF	The monitoring data is transmitted to the built-in telemetry module incorporated in this unit via wireless network. Waveforms and numeric data can be displayed on this unit. Monitoring control is not possible on this unit.
	RF+T	The monitoring data is transmitted to the built-in telemetry module incorporated in this unit, and TCON is also used. Waveforms and numeric data can be displayed on this unit. Monitoring control such as NIBP measurement from this unit is possible.
Wired Network Bed	BED	The monitoring data is transmitted to this unit via wired network. Waveforms and numeric data can be displayed on this unit.
	LW	Telemetry bed. The monitoring data is transmitted to the telemetry receiver which is then transmitted to this unit via wired network. Monitoring control is not possible on this unit.
	LW+T	Telemetry bed which TCON is also used. Waveforms and numeric data can be displayed on this unit. Monitoring control such as NIBP measurement from this unit is possible.
TCON Network Bed	TCON	The monitoring data is transmitted to this unit using only TCON system. Only numeric data will be displayed. Monitoring control such as NIBP measurement from this unit is possible.

NOTE

- When both wireless and TCON system are used, the numeric data from the telemeter will be displayed. Even when the telemetry condition is not good, numeric data from TCON will not be displayed.

【Outline of System Construction】



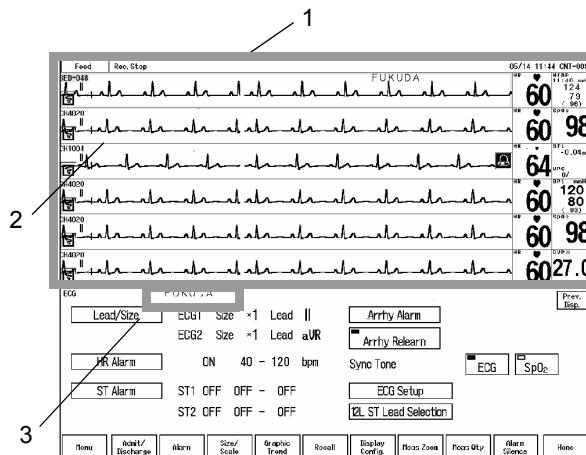
RF*

* The DS-7700L/DS-7700WL cannot be installed with a wireless network system (RF).

□ How to View the Illustration

Numbers or alphabets are used to explain the illustration. These are explained in the text below the illustration.

Example:



1 Bed Selection Area

2 Blue Frame

3 Current Patient Name

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, Warning, Precautions for Safety, EMC, About This Manual)
1. General Description	Features, External Appearance, Product Lineup and Network Performance, Operation Flow
2. Names of Parts and Their Functions	Name and function of each part
3. Operation Procedure and Screen Examples	Operation procedure, home display, operation flow, menu functions, procedure to return the display
4. Preparation	Installing the Recording Paper, Power ON/OFF, Time/Date, Daily Checks
5. Admit / Discharge	Entering patient information (name, age, etc.) at admittance, discharge, monitor suspend, bed transfer, etc.
6. Alarm Function	General description of alarm function, alarm-related setups
7. Monitoring	Measurement condition setup of the monitoring parameters, size/scale setup, etc.
8. Review Function	Trend, recall, NIBP list, ST measurement, 12-lead waveform, full disclosure waveform
9. Recording	Recording functions on the built-in recorder and laser printer.
10. Setup	Display configuration, tone/volume, color setups.
11. Troubleshooting	Maintenance and troubleshooting of this unit
12. Setup Item/Default Value	Setup Item/Default Value
13. Accessories	List of accessories and optional accessories of this unit
14. Specification	Specification and performance, connector pin assignments of this unit

The maintenance manual is composed of the following chapters.

Chapter Title	Description
Preface	Outline and purpose of this manual (Important Notice, Warning, Precautions for Safety, EMC, About This Manual)
1. Before Installing the Equipment	Precaution about the operating environment, procedure to start monitoring
2. Installation of the Unit	Starting the system, keyboard/mouse setup, slave monitor
3. System Construction	Network restrictions, network connection and setup
4. Using the PC/CF Card	Procedure to use the PC/CF Card
5. EMR Link Function	EMR Link Function
6. Pre-Set Menu	Password to enter the Pre-Set menu, setup for each Pre-Set item
7. Setup Item/Default Value	Default and backup of setup items, data that can be transferred by PC/CF card
8. Replacement Parts	Precautions about the periodic replacement parts
9. Cleaning/Disinfecting/Storing	Procedure to handle, clean, storing this unit
10. Maintenance Check	Daily and periodic checks, maintenance, LAN information, software version, etc.

System Construction and Installation

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 unit should be performed by our service representative or system administrator of your institution.
( Maintenance Manual "System Construction" P3-1)
 - ◆ Verify that the items that needs to be set before monitoring are correctly set before starting monitoring.
( Operation Manual "Preparation" P4-1)
-

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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.

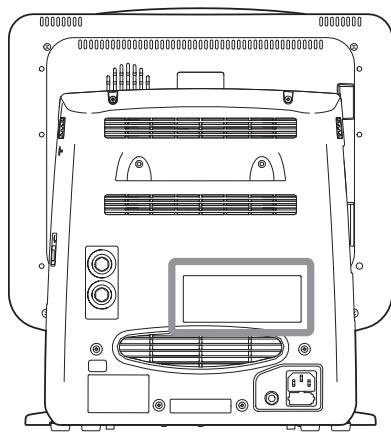
Warning Labels Attached to the Unit

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



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

DS-7700 System Main Unit



Warning Labels Attached to the Unit

**DANGER**

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

**CAUTION**

Before connecting, read instruction manual.

**CAUTION**

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

Warning Label



**Risk of fire,
replace fuse as marked.**

Warning Label

Graphic Symbols

□ Symbols Indicated on the Power Supply Part

Symbol	Description
	Potential Equalization Terminal Indicates the terminal to equalize the potential difference when interconnecting the devices.

□ Symbols Indicated on the Equipment

Symbol	Description
	Inhibition Indicates that the operation is inhibited. Refer to the instruction stated near the symbol.
	Caution, refer to accompanying documents Indicates the need to refer to the related accompanying documents before operation.
	Antenna Terminal Indicates the terminal to connect the antenna.
	Electrostatic Sensitive Part Directly touching this connector part with hands should be avoided.
	TCP/IP Network Connector Connects to TCP/IP network.
	Eject Indicates the switch to remove the recorder paper cassette.
	Signal Input Part Indicates that the connector is signal input terminal.
	Year of Manufacture Indicates the manufactured year.
	WEEE (Waste Electrical and Electronics Equipment) Indicates a separate collection for electrical and electronic equipment.

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



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

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

- ♦ Do not install or store in an area where the unit will be subject to splashing water.
- ♦ Do not install or store in an area where the environmental conditions, such as atmospheric pressure, temperature, humidity, ventilation, sunlight, dust, sodium, sulfur, will adversely affect the equipment.
- ♦ Place the equipment on a stable surface where there is no inclination, vibration, or shock (including during transportation).
- ♦ Do not install or store in an area where chemicals are stored or 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 unit.
- ♦ Make sure the power system has adequate earth ground.
- ♦ Ensure that all cables are firmly and safely connected.
- ♦ Pay special attention when the device is used in conjunction with other equipment as it may cause erroneous judgment and danger.

□ Precautions During Using the Equipment

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

□ Precautions After Using the Equipment

- ♦ Unplug all the cables from the patient before turning off the power.
- ♦ When unplugging the cables, do not apply excessive force by pulling on the cable. Pull from the connector part of the cable.
- ♦ Clean the accessories and cables, and keep them together in one place.
- ♦ Keep the equipment clean to ensure proper operation for the next use.

□ Precaution when Equipment Failure Occurs

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

□ Precaution about Disassembling/Remodeling the Equipment

- ♦ Do not disassemble or remodel the equipment.
- ♦ Danger such as electric shock may result to the patient and operator.

□ Precautions about Maintenance Check

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

□ Precautions when Using with Other Equipment

- ♦ To prevent patient from burn injury, verify proper attachment of patient ground plate, ECG electrode type when using the electrosurgical knife, and verify paste volume, output energy when using the defibrillator. Also, verify that proper ground is selected.

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 device 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 this device 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 facility. When assigning or changing wireless channels, register it in the log, and give proper instructions to the TCON user.
- ♦ The user needs to verify the transmitting/receiving operation before use.
- ♦ If interference or breakdown occurs in the communication, the TCON user is required to stop using the TCON and to inform the Overall Manager of the problem. The Overall Manager is to deal with the problem properly and/or contact the nearest Fukuda Denshi representative for service.

⚠ CAUTION Precautions for Operation

The Bidirectional Wireless Communications Module (TCON) uses radio waves to transmit data. Therefore, necessary precautions need to be taken for the characteristics and difficulties of using the device that emits radio waves. The TCON user should fully understand these precautions beforehand, and use the TCON device safely. 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 may 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 may 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.
- ♦ This equipment will return to standard operating mode within 10 seconds after defibrillating. The stored data will not be affected. The measurement accuracy will temporarily decrease during defibrillation, but it will not

compromise the safety of patient and the equipment.

- ♦ The QRS synchronized signal is not intended to be used as synchronized signal for defibrillator.

Electrosurgical Instrument

⚠️ WARNING

- ♦ The monitoring system contains protection against interference generated by electrosurgical instruments. However, operating conditions, surgery site with respect to the location of ECG electrodes, or the type of instrument used, may cause noise on the ECG. The noise is generated at the tip of the electrical knife and is difficult to completely eliminate because of the frequency components of the ECG. To reduce electrosurgical interference, take the following precautions:

Location:

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

Power Supply:

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

Electrode Placement

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

Ground Plate

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

- ♦ The stored data will not be affected. The measurement accuracy will temporarily decrease during electrosurgery, but it will not compromise the safety of patient and the equipment.
- ♦ When using the electrosurgery-proof type ECG relay cable, the impedance respiration cannot be measured, and its numeric data and waveform will not be displayed. When measuring in an environment where electrosurgery is not performed, make sure to use the standard ECG relay cable.

MRI (Magnetic Resonance Imaging)

⚠️ WARNING

- ♦ 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

DANGER

- 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.

WARNING

- Do not connect any equipment or cable not authorized by Fukuda Denshi to any I/O connector.
- 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.
- Use only the supplied 3-way AC power cable. Use of other cables may result in electric shock to the patient and the operator.
- The power cable must be connected to a hospital grade outlet. When connecting, do not use a multiple portable socket-outlet.
- 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. Make sure the correct selection is made.
- When [Suspend] is selected for "Setup at Discharge", the suspend condition on this unit will continue until the [Resume] key is pressed, even if the monitoring is performed on the bedside monitor.
- Depending on the software version of the bedside monitor, NIBP periodic measurement interval will not synchronize between the central monitor and bedside monitor.
(For details of the software version, contact our service representative.) If performing NIBP periodic measurement from the central monitor in such case, do not set the NIBP periodic measurement on the bedside monitor.
- The ventilator alarm on this unit should be used as supplementary function. Check the patient's condition, ventilator alarm sound and message occasionally.
- If the upper/lower alarm limit of the individual parameter is set to OFF, or if arrhythmia alarm is set to OFF, alarm will not generate even if the individual parameter alarm is set to ON. Pay attention when setting them OFF.
- When the alarm is suspended, all alarm will not generate even if the individual parameter alarm is set to ON. Also, the alarm event will not be stored as recall.
- 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. In addition, alarm for that parameter will not generate. Make sure that the connector is securely connected. If a waveform/numeric data is not displayed for the monitored parameter, check the patient's condition and pay attention not to miss the connector-off condition.
- The alarm for the parameter not selected for the "HR/PR Alarm Source" (ECG/SpO₂/BP) on the bedside monitor will be set to OFF on this unit.
- When "Chk TLM Receive" is displayed, alarm will not function. Arrhythmia analysis will not be performed either.
- If the "Alarm Judgment" is set 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.

- ♦ 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 on the central monitor. For the telemetry transmitter and wireless bedside monitor, "Check Battery" mark and a too-far 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 incorporated in this monitor. However, excessive waveform morphology change, motion artifact, or the inability to determine the waveform pattern may cause an error, or fail to make adequate detection. Therefore, physicians should make final decisions using manual recording, alarm recording and recall waveform for evaluation.
- ♦ If the QRS pace mask function is set to [OFF], a decrease in heart rate may not generate HR or asystole alarms due to erroneously detected QRS. Turn this function [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.
- ♦ Fukuda Denshi is not liable of the operation caused by improper TCP/IP network connection. When changing the network setting, contact our 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-7700 system, laser printer, and the server.
- ♦ As this system does not correspond to DHCP (Dynamic Host Configuration Protocol) IP address, set the IP address excluded at DHCP if DHCP server is in the network configuration.
- ♦ Be careful not to confuse the HUB for the DS-LAN network and the TCP/IP network. Fukuda Denshi is not liable of the operation caused by improper network connection.
- ♦ When a setting is changed on the "Network Configuration" and [Enter] key is pressed, a caution message will be displayed. All the operation controls will not be possible until the system is restarted.

⚠ CAUTION Precautions about Handling and Installing the Equipment

- ♦ Do not install this equipment in Patient Environment.
- ♦ Use only the accessories specified for this system. Otherwise, proper function cannot be executed.
- ♦ For quality improvement, specifications are subject to change without prior notice.
- ♦ 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. When the touch panel is left unused for a while, or when the ambient temperature is low, the surface film of the touch panel may expand, but this is not an abnormal condition. This expansion will be reduced in few hours or half a day after the power is turned ON.
- ♦ The maintenance and internal switch setting will be performed by our service representative. Users should not perform this procedure as malfunction of the equipment may occur.

⚠ CAUTION Precautions about the System

- ♦ The full disclosure waveform recording function is not available for the TCON bed.
- ♦ 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 before monitoring. The date/time must be set before monitoring. If the date/time is changed during monitoring, error may be caused to the trend data or other patient data.
 - ♦ If the time/date is changed during monitoring (manually or by time synchronization), the time/date of past measurement data will not be corrected. In such case, the time/date of NIBP list, 12-lead analysis result, etc. will differ between the central monitor and the bedside monitor.
 - ♦ The HR, SpO₂, PR value of the NIBP list may differ between this unit and the bedside monitor.
 - ♦ Many of the preset menu setup items can be set only on the network-administrating monitor (Central ID: 001). Such pre-set items will not be displayed on other monitors.
 - ♦ If constructing a network with more than one central monitors, the same preset setup should be applied to all central monitors.
 - ♦ Canceling the bed registration will clear all data for that bed.
 - ♦ The "Drift Filter" setup on the soft switch should be the same for all central monitors. Otherwise, proper function cannot be achieved.
 - ♦ Unless the correct power frequency is set, the AC filter will not properly function.
 - ♦ Do not use any slave monitors which does not satisfy the required display resolution even if it is capable of displaying higher resolution than the actual resolution. If such monitor is used, the display screen image will not be properly shown.

⚠ CAUTION Precautions about the PC/CF Card, Data Transfer

- ♦ Do not use unspecified CF card.
- ♦ Turn OFF the power when inserting/removing the CF card.
- ♦ Check that the CF card indicator is not lighted in red when turning OFF the power.
- ♦ The CF card can be used only on the unit where it was formatted.
- ♦ The data transfer using the PC/CF card is possible only between the DS-7700 system central monitors and the DS-7600 system central monitors. (However, there are some restrictions.) The data cannot be transferred to a bedside monitor.
- ♦ If the software version of the two 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.)
- ♦ For the data transfer from DS-7700 series to DS-7700W series, or from DS-7700W series to DS-7700 series, the user key settings will not be transferred.

⚠ CAUTION Precautions about the Patient Admit/Discharge

- ♦ If you start monitoring a new patient without performing a discharge procedure of the previous patient, new data will be added to the previous data 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 DS-7700.
When monitoring is resumed on the bedside monitor, the data transmission to the DS-7700 will resume. There are following restrictions when using the DS-LANII network.
 - ♦ Up to 20 characters for the patient ID can be set on this unit but some bedside monitors are capable to set only up to 10 characters depending on the software version. (For details of the software version, contact our service representative.) To synchronize the central monitor and the bedside monitor, set the transmitting starting digit of the ID on the "Patient ID Starting Column" of the soft switch menu. The 10 characters from

- the set starting digit will be transmitted as patient ID.
- ♦ Up to 16 characters for the patient name can be set on this unit but some bedside monitors are capable to set only up to 8 characters depending on the software version. (For details of the software version, contact our service representative.)
 - ♦ To display the pacemaker pulse, select [Used] on the "Admit/Discharge" screen, and select [ON] or [Distinct Color] on the "ECG Setup" screen. It is also necessary to select [Used] for pacemaker on the bedside monitor.
 - ♦ When searching patient ID using the patient data server, admit process should be performed using the patient data acquired using the search function. Do not change the Bed ID of the bedside monitor during monitoring.
 - ♦ When the monitoring is suspended, the trend data and full disclosure waveform (optional function) data will not be acquired.
 - ♦ Resuming monitoring will also resume the alarm in suspension.
 - ♦ The monitor suspend function will not be linked between the central monitor and the bedside monitor.
 - ♦ When a bed transfer is performed, all setup data for the new bed will be replaced.
The data for the wired network bed and the same data monitored on other central monitor will be initialized.
 - ♦ If bed transfer/exchange is performed for the monitors connected to the DS-LANII/III network, the GAS alarm settings will be backed up or initialized depending on the settings for "Backup at Discharge" on the bedside monitor.
 - ♦ Bed transfer/exchange of ST measurement data and full disclosure waveform data is not possible among different central monitors.
 - ♦ Depending on the bedside monitor type and software version, discharge procedure for the TCON bed can not be performed on this unit.
Even if the TCON bed patient is discharged on this unit, 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 our service representative.
 - ♦ When the discharge process is performed on the bedside monitor or other central monitors, the monitoring on this unit will not be suspended even if [Suspend] is selected for "Setup at Discharge".
 - ♦ When EMR link function is used, the patient admitted on EMR will be also admitted on this unit.
But it is also necessary to perform admit process for this patient on this unit. Make sure that the settings for the pacemaker usage and patient type are correct as these will affect the monitoring accuracy.
 - ♦ The discharge process on EMR will only initialize the patient information on this unit. The discharge process on EMR will not initialize the monitoring data and alarm settings on the central monitor. To initialize the monitored data and settings for this patient, it is necessary to perform discharge process on this unit.

CAUTION Precautions about the Parameter Monitoring

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

CAUTION Precautions about the ECG Monitoring

- ♦ There are some cases when the pacemaker pulse can not be detected depending on the pacemaker type, pulse voltage, pulse width, electrode lead type (unipolar, bipolar), or electrode placement which causes the pacemaker pulse amplitude to decrease and disables the pacemaker pulse detection.
- ♦ If signals similar to a pacemaker pulse are present, such as electric blanket noise or excessive AC frequency noise, these may be erroneously detected and displayed as a pacemaker pulse.
- ♦ Depending on the electric signal condition under transmission, noise may interfere and incorrectly display the pacemaker pulse.
- ♦ When a spontaneous QRS and pacemaker pulse overlap (ex. fusion beat, etc.), QRS detection cannot be performed properly. In this case, the heart rate is degraded.
- ♦ When continuously detecting AC noise artifact as pacemaker pulses, QRS detection stops and heart rate decreases. Also arrhythmia detection will not be possible.

- ♦ The threshold level for arrhythmia detection changes with the ECG waveform size. Set a proper waveform size for monitoring.
- ♦ About the "QRS Detect" on the "ECG Setup" screen:
It can be set only for the telemetry bed. (RF, RF+T, LW, LW+T)
QRS detection may not be possible for ECG waveform with amplitude 0.3mV or below.
When only one ECG waveform is measured, QRS detection will be performed on ECG1, regardless of the setting.
The QRS detection for the wired network bed (BED) will be according to the setting made on the bedside monitor.

 **CAUTION** Precautions about the Alarm Setup

- ♦ The adjustable alarm limit increment is different between the DS-5000 series and the DS-7000 series monitors. Therefore, the set alarm limit may change to the adjustable value depending on the monitor type constructing the system and the DS-LANII/III, TCON network specification.
- ♦ The arrhythmia alarm of Slow VT, Couplet, Pause, Trigeminy, Tachy and Brady can not be set for the DS-LANII network bed (BED, LW, LW+T).
- ♦ 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.
- ♦ Depending on the bedside monitor type and software version, the ventilator alarm factor may not be transmitted to the central monitor.
For details, refer to our service representative.
- ♦ 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" alarm generation, alarm for HR, ASYSTOLE, VF, TACHY, BRADY will be generated.
- ♦ If "Suspend Arrhy. Analysis during Noise Interference" under Alarm Related Setup (Preset) is set to [ON], the "Cannot analyze" alarm will generate when analysis suspended duration exceeds 30 seconds.
- ♦ When the DS-7300 is connected to the wired network, BP7, 8, TEMP3 to 8 alarm will not generate on the central monitor.
- ♦ Depending on the bedside monitor type and software version, BP7, BP8, TEMP3 to 8, SpMet, SpCO alarm will not be generated on the central monitor.

 **CAUTION** Precautions about the TCP/IP Network

- ♦ After setting the IP address, etc. for the laser printer, make sure to turn OFF/ON the power of the 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 a soft cleaning cloth provided as optional accessory or 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 cleaning or disinfecting, do not allow chemical solution to enter the equipment or connectors.
- ♦ Do not use organic solvents, thinner, toluene and 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.
- ♦ Do not open the housing.

- ♦ Make sure that alcohol and other liquids do not enter inside the equipment.
- ♦ Replace the periodic replacement parts periodically as specified.

Wired Network System

WARNING

- ♦ Do not connect unspecified device to the wired network.
- ♦ Do not mix devices with DS-LANII and DS-LANIII setting in the same wired network. The network may cease and proper monitoring may not be possible.
- ♦ Be careful not to confuse the HUB for the DS-LAN network and the TCP/IP network. Fukuda Denshi is not liable of the operation caused by improper network connection.
- ♦ For the DS-LANII network, used the specified 10M HUB. If a 100M HUB or a switching HUB is used, a communication error may occur.
- ♦ For the DS-LANIII network, used the specified HUB. If unspecified HUB is used, a communication error may occur.

CAUTION

- ♦ The two different network systems (DS-LANII and DS-LANIII) cannot exist in the same network.
Make sure that DS-LAN setup (DS-LANII/DS-LANIII selection) is the same for all monitors connected to the same network.
- ♦ The DS-5000 series bedside monitors, LW-5560N Telemetry Receiver, and AU-5500N 8ch Recorder are not compatible with the DS-LANIII network.
- ♦ If the DS-LAN setup is changed from DS-LANIII to DS-LANII, the registered beds from 49th to 100th will be cancelled and patient data for these beds will be erased. When using the wired network and TCON system simultaneously, make sure to connect the TCON base station and remote station on the same network.
- ♦ The central monitor with central ID: 001 functions as the network administrator and controls the wired network system. One of the central monitors must have the central ID: 001 in a network system. Also, the central ID must not be duplicated among the central monitors.
- ♦ For the alarm generation on the bedside monitor, maximum of 2.5 seconds delay will occur for the alarm generation on the central monitor.
- ♦ The "12-Lead Wave" and "12-Lead ST" screen can be displayed only for the wired bedside monitors monitoring 12-lead ECG. The "12-Lead ST" screen can be displayed only for the DynaScope 5000 series wired bedside monitors. It cannot be displayed for the DynaScope 7000 series bedside monitors.
- ♦ When connected to the DS-LANII/III network, and if the "RR source" is other than impedance respiration (Or, if [Auto] selects the RR source other than impedance respiration) on the bedside monitor, respiration waveform will not be displayed on the central monitor. Similarly, if the "RR source" is other than CO₂ (Or, if [Auto] selects the RR source other than CO₂) on the bedside monitor, the CO₂ waveform will not be displayed on the central monitor.
- ♦ When connected to the DS-LANII/III network, and if BP is selected for "HR/PR source" (Or, if [Auto] selects BP for HR/PR source) on the bedside monitor, ECG waveform will not be displayed on the central monitor.

CAUTION

Precautions about the DS-LANII Network System

- ♦ For the network-administrating monitor (Central ID: 001), the DS-7600 or DS-7700 must be set. The network will not function if the DS-5800N/NX/NX^{MB} is set as the network administrator.
- ♦ If more than three DS-5800N/NX/NX^{MB} are connected, the DS-5800N/NX/NX^{MB} cannot display the same patient data on all 3 monitors at the same time. Maximum of 2 monitors are able to display the same patient data.
- ♦ For the DS-5800N/NX/NX^{MB}, or Other Bed display on the bedside monitor, maximum of 2 monitors can simultaneously display the same patient data.

- ♦ Maximum of 32 beds can be monitored on the DS-5800N/NX/NX^{MB} which is connected to the same wired network with this unit.
- ♦ If the measurement unit for BP (mmHg/kPa) is different between the bedside monitor and the central monitor, the corresponding waveform and numeric data will not be displayed on the central monitor.
- ♦ When the temperature unit is °F, the temperature data can not be monitored on the central monitor.

⚠ CAUTION Precautions about the DS-LANIII Network System

- ♦ If the measurement unit for BP (mmHg/kPa) and temperature (°C/°F) is different between the bedside monitor and the central monitor, the corresponding waveform and numeric data will not be displayed on the central monitor.
- ♦ If the numeric data is displayed as "xxx" (out of measurement range) on the bedside monitor, maximum or minimum value of measurable range will be transmitted to the central monitor.

Wireless Network System

⚠ DANGER

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

⚠ WARNING

- ♦ Make sure to set the correct channel ID.
- ♦ Some wireless combinations of telemetry transmitters may generate interference with other devices. Before selecting the channel, verify it will not interfere with other channels.
- ♦ Make sure the telemetry manager of your system is aware of any changes to the telemetry channels.
- ♦ If transmitters are used in a neighboring medical facility, your facility and the neighboring facility must make agreements on the setting of the telemetry channels to prevent telemetry interference.
- ♦ If channel ID is changed for the transmitter, 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

- ♦ For the alarm generation on the bedside monitor connected by wireless network, maximum of 15 seconds delay will occur for the alarm generation on this unit.

TCON System

⚠ CAUTION

- ♦ Depending on the monitor model type, some functions for the TCON network bed are restricted.
- ♦ 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.
- ♦ For the alarm generation on the bedside monitor connected to the TCON network, maximum of 5 seconds delay

will occur for the alarm generation on this equipment.

RTC and Data Backup

CAUTION

- ♦ This unit is equipped with a built-in clock. When the power of this unit is turned OFF, this clock is backed up by a lithium primary battery. If incorrect time is displayed when turning ON the power, a low battery may be the cause. In such case, contact Fukuda Denshi service representative for replacing the battery.
- ♦ To protect the data during voltage dip, short interruptions and voltage variations on power supply input lines or during short duration of power turned OFF, this unit performs 10-minute (approx.) data backup using the secondary battery. If the power is turned OFF for more than 10 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 trend data, NIBP list data, ST data, and recall data.

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

In the interest of safe and sufficient performance of this equipment, the connection of other manufacturers' equipment to this unit 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 unit, it is the user's responsibility to verify that the overall system complies with IEC60601-1:2005.

WARNING

- ♦ For the connector with Δ 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.

CAUTION

- ♦ All the peripheral device connectors on this unit are isolated from the power supply, but the peripheral devices are not isolated. To prevent danger of electric shock, always position the peripheral devices away from the patient.

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 this unit, pack it with specified packing materials.
Also, transport it under appropriate environment condition.
( Operation Manual "Specification/Performance" P14-1)

Electromagnetic Compatibility

The performance of this device under electromagnetic environment complies with IEC60601-1-2:2001+A1:2004.

Precautions for Safe Operation under Electromagnetic Influence

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

The following are examples of the common cause and countermeasures.

⚠ DANGER Static Electricity

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

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

⚠ WARNING Cellular Phone

- ♦ The radio wave may cause malfunction to the 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 IEC60601-1-2:2001+A1:2004. 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-7700 system is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-7700 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-7700 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	Not Applicable	The DS-7700 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	Not Applicable	

Compliance to the Electromagnetic Immunity (1)

The DS-7700 system is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-7700 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-7700 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-7700 system is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-7700 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-7700 system, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended Separation Distance
Radiated RF IEC 61000-4-3	3V/m 80MHz to 2.5GHz	3V/m	<p>Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).</p> <p>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}.</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
<p>Note 1: At 80MHz and 800MHz, the separation distance for the higher frequency range applies.</p> <p>Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p> <p>*1: Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast can not be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the DS-7700 system is used exceeds the applicable RF compliance level above, the DS-7700 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-7700 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-7700 system

The customer or the user of the DS-7700 system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the DS-7700 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-7700 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-7780/DS-7780W

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 General Description

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Chapter 1 General Description

General Description

The DS-7700 System Central Monitor (hereinafter referred to as DS-7700) is a central monitor which supports various system constructions combining wired and wireless network in general ward, ICU, etc.

Features

- ♦ A color LCD of 15-inch (DS-7700 series) or 19-inch (DS-7700W series) is used.
- ♦ Maximum of 16 beds connected to the wireless network ^{*1}, TCON, or wired network ^{*2} can be monitored.
- ♦ The operation can be performed on the touch panel. The user keys arranged at the lower part of the display are used to access the respective menu. The keys are composed of "fixed" keys and preprogrammed "user" keys.
- ♦ An optional diversity antenna function is available which uses 2 telemetry antennas. By using this function, the telemetry antenna can be switched to the other one if reception sensitivity decreases.
- ♦ Connecting the optional mouse and keyboard allows mouse control of the touch panel keys and keyboard input.
- ♦ The alarm sound can be silenced using the remote control (optional).
- ♦ Various display configurations can be selected to monitor patient data.
- ♦ For the DS-7700W series monitors, extended display unit (LC-7019 series) can be connected. By using the extended display unit, the number of monitoring patients can be increased or full disclosure waveform can be monitored. (The L760T-C (EIZO[®]) can be also connected as the extended display unit.)
- ♦ Initial settings at admittance can be set on the Pre-Set menu.
- ♦ A recorder is incorporated which allows maximum of 3 channels of waveform recording, graphic trend recording, etc.
- ♦ The alarm priority can be changed.
- ♦ An alarm indicator is equipped which notifies the alarms by several flash patterns according to the alarm priority.
- ♦ By using the optional CF card (FCF-1000, FCF-16GA), full disclosure waveform recording can be performed. Also, using the PC/CF card allows to easily transfer patient data and setup data.
- ♦ Through the TCP/IP network connection, laser printer can be used. Also, by connecting to the network server, storing patient data, time synchronization, admit/discharge process linked to the electronic medical record (EMR), and bed transfer/exchange between the DS-7700 system central monitors is possible.

^{*1}: Mobile telemetry transmitter such as LX-5160, transmitter module such as HLX-561

^{*2}: DS-LAN II/ DS-LAN III

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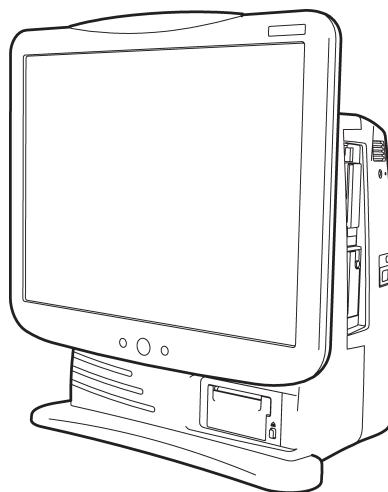
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*1: Mobile telemetry transmitter such as LX-5160, transmitter module such as HLX-561

*2: DS-LAN II/ DS-LAN III

External Appearance



External Appearance

The Product Lineup and Network Performance

The lineup and network performance of the DS-7700 system central monitor are as follows.

Model Type	Display Unit Size	Extended Display Unit (Optional)	Maximum Connection				Maximum Monitoring Beds	
			Wireless ^{*1}	Wired	Wired	TCON		
				DS-LANII ^{*2}	DS-LANIII ^{*3}			
DS-7700 Series								
DS-7780	15 inch	Cannot connect	8	48	100	16	any combination of 16 beds from the left	
DS-7700L			0	48	100	16		
DS-7700W Series								
DS-7780W	19 inch	Can connect	8	48	100	16	any combination of 16 beds from the left	
DS-7700WL			0	48	100	16		

*1 including the TCON bed.

*2 including the telemetry beds received by the LW-5560N/LW-7080.

*3 including the telemetry beds received by the LW-7080.

NOTE

- Due to network restrictions, some setups can be performed only on the network administrator or TCON base station, or may not function/cannot be set depending on the bedside monitor type.
Pay attention to these restrictions when using the equipment. (See Maintenance Manual "Network Restrictions" P3-4)

Operation Flow

This section explains the operation flow from patient admittance to discharge.

1 Admit the patient.

- 1 Input the patient information.
- 2 Enter the admit date.

2 Start monitoring.

- 1 Monitor on the home display.
- 2 Perform "Parameter ON/OFF" setting.
- 3 Configure the numeric data to be displayed on the home display.
- 4 Configure the numeric data to be displayed on the individual display.
- 5 Adjust the size/scale/baseline position of the waveform.
- 6 Perform setup for each parameter.

3 Discharge the patient.

- 1 Erase the patient name, tabular/graphic trend data, etc.
- 2 Discharge the patient.

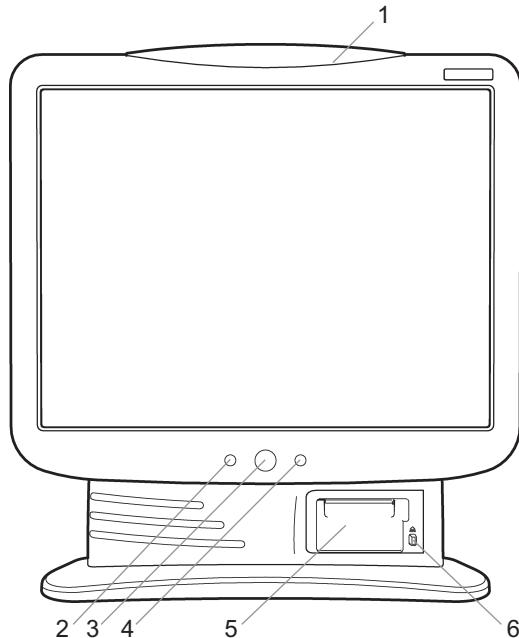
NOTE

- The short-term backup battery used for this equipment needs to be replaced periodically. (Every 3 years depending on the used frequency) Write the replacement date on the Parts Replacement Label supplied as accessory and use it for indication of replacement period.

Chapter 2 Names of Parts and Their Functions

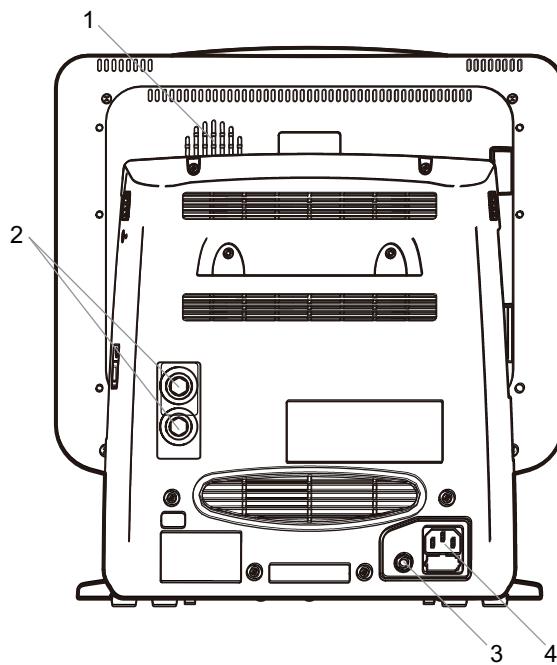
Chapter 2 Names of Parts and Their Functions

□Front Side



- 1 Alarm Indicator
Notifies the alarm by flashing.
- 2 Main Power Indicator
Lights when the AC power is supplied.
Light OFF: AC power is not supplied.
Green: Power supply switch is ON
Orange: Power supply switch is OFF
Red: Operation error
- 3 Remote Control Sensor
Receives the infrared remote control signal.
- 4 Ambient Light Sensor
Detects the ambient light.
- 5 Paper Cassette
Stores recording paper.
- 6 Paper Cassette Eject Button
Press here to remove the cassette.

□Rear Side



1 Speaker

Generates operating sound, alarm sound, etc.

2 Antenna Input 1, 2

Connects the specified antenna or antenna installation.
(Not equipped for the DS-7700L/DS-7700WL)

3 Potential Equalization Terminal

Used for equipotential connection.

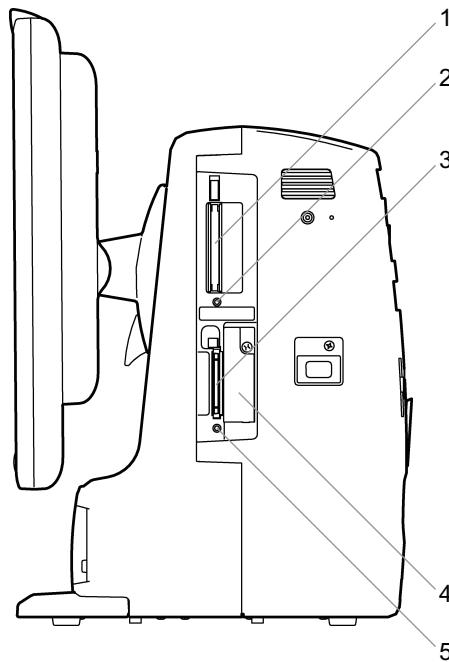
4 Power Supply Connector (with fuse holder)

Connects the power supply cable.
(Fuse is stored inside the holder.)

 **CAUTION**

- The power cable must be connected to a hospital grade outlet. When connecting, do not use a multiple portable socket-outlet.
- Do not connect any equipment or cable not authorized by Fukuda Denshi to any I/O connector. If done so by mistake, the device cannot deliver its maximum performance and the connected units may be damaged, resulting in a safety hazard.

Right Side



1 PC Card Slot

PC card such as flash memory card is inserted here.

2 PC Card Access Indicator

Indicates PC card access status.

3 CF Card Slot

Insert only the specified CF card here.

4 Side Cover

Protective cover for the device setup switch, etc.

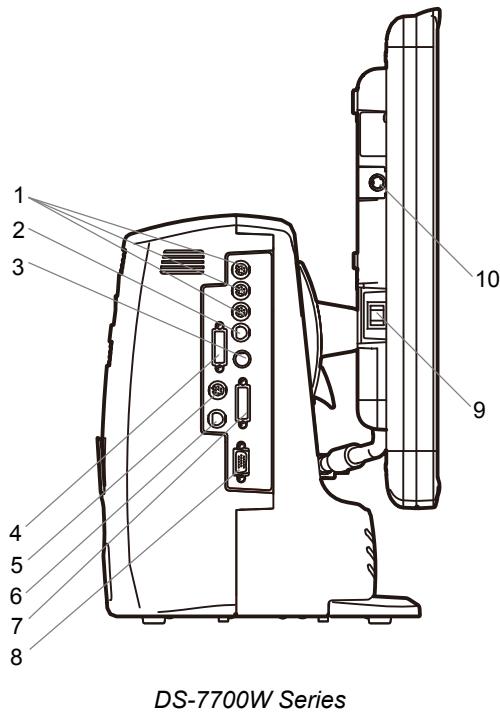
5 CF Card Access Indicator

Indicates CF card access status.

 **CAUTION**

- ♦ Do not use unspecified CF card.
Not only the data but also the equipment may be damaged.
- ♦ Do not open the side cover. The internal switch setting will be performed by our service representative.
- ♦ Do not remove the PC card and the CF card when LED is lit.

□Left Side



DS-7700W Series

- 1 Serial Connector(COM1,COM2,COM3)
Connects the specified equipment using the RS-232C cable.
- 2 Status Input/Output Connector (STATUS II-1)
Connects the specified equipment.
- 3 DS-LAN Connector
Connects the specified LAN equipment via CJ-522 Ethernet Branch Cable, CJ-530 connection cable, etc.
- 4 Extended Display Unit Connector
Connects the extended display unit.
(DS-7700W series only)
- 5 Serial Connector (COM4)
Connects the extended display unit.
(DS-7700W series only)
- 6 Status Input/Output Connector (STATUS II-2)
Connects the specified equipment.
(DS-7700W series only)
- 7 Slave Output Connector
Connects the specified slave monitor.
- 8 LAN Connector
Connects the network equipment such as laser printer and HUB using the CJ-761 LAN Interface Cable (Cross).
- 9 Power Supply Switch
Turns ON/OFF the monitor power.
- 10 External Equipment Connector
Connect the optional mouse and keyboard.
(To use the keyboard, optional PS/2 Splitter Cable is required.)



CAUTION

- Do not use the touch panel with film or adhesive tape attached to it. Malfunction of the touch panel or damage may result.
-

NOTE

- The display panel utilizes exclusive fluorescent light for the backlight. Since this fluorescent light 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.
 - There may be few pixels which does not light or constantly lights on the LCD, but it will not affect the operation.
 - Due to its material characteristic, the touch panel expands/contracts depending on the temperature/humidity. When the touch panel is left unused for a while, or when the ambient temperature is low, the surface film of the touch panel may expand, but this is not an abnormal condition. This expansion will be reduced in few hours or half a day after the power is turned ON.
-

Chapter 3 Operation Procedure and Screen Examples

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Chapter 3 Operation Procedure and Screen Examples

Operation Procedure

Touch Panel

All operations on this equipment are performed through the touch panel keys.

 **CAUTION**

- 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 or damage the touch panel.
- Do not apply pressure for a prolonged time to any part of the panel.

Keyboard and Mouse

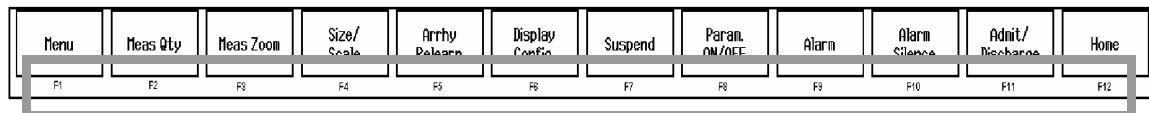
By connecting the optional keyboard and mouse, the following operation can be performed.
( Maintenance Manual "Keyboard/Mouse Setup" P2-4)

[Mouse Control]

- The touch panel keys can be controlled using the mouse.

[Keyboard Operation]

- By pressing the function keys(F1 to F12) on the keyboard, the same operation with the keys displayed at the bottom of the screen ([Menu] / User keys / [Home]) can be performed.
Depending on the used system (DS-7700 series or DS-7700W series) and number of user keys, the following function is assigned to each function key.



DS-7700 series, 7 user keys

- [F1]: [Menu]
- [F2] to [F8]: User Key
- [F9] to [F12]: [Home]

DS-7700 series, 9 user keys

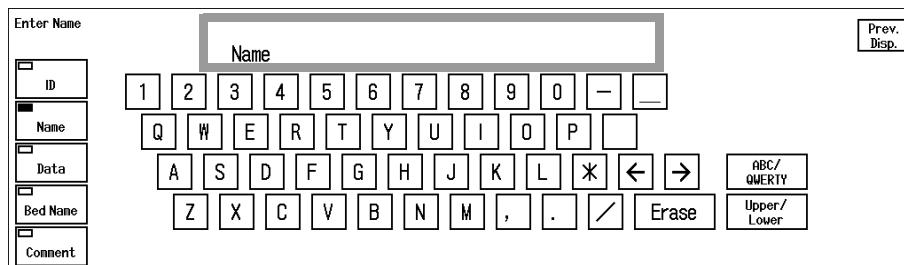
- [F1]: [Menu]
- [F2] to [F10]: User Key
- [F11] to [F12]: [Home]

DS-7700W Series

- [F1]: [Menu]

[F2] to [F11]: User Key
 [F12]: [Home]

- The character input such as patient ID and patient name can be performed using the keyboard.

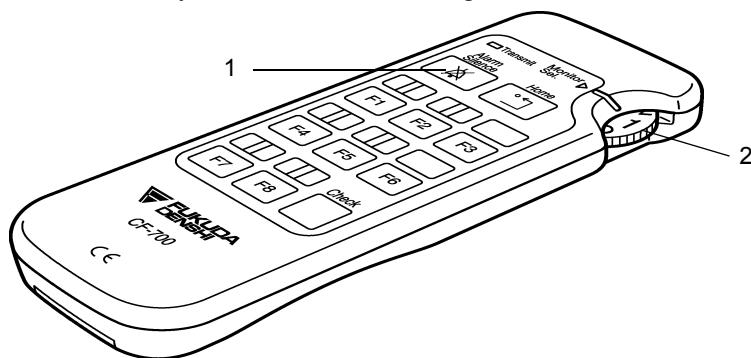


NOTE

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

Remote Control Unit

The alarm sound on the DS-7700 system can be silenced using the remote control unit, CF-700 (optional)



1 Alarm Silence Key

This key functions the same as the [Alarm Silence] key on the monitor.

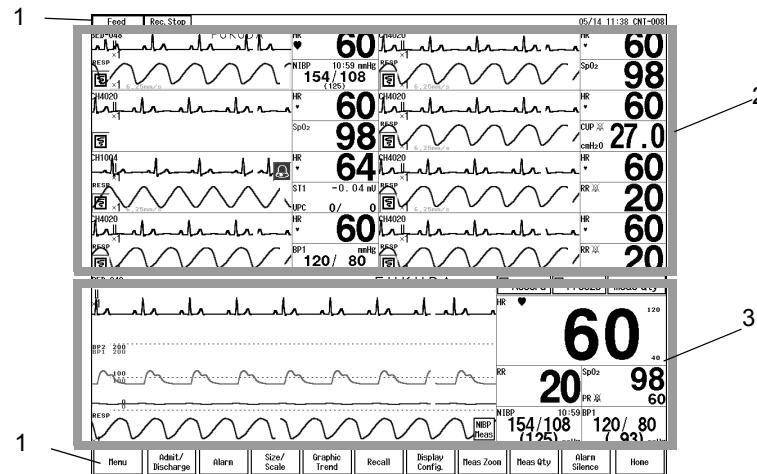
2 Monitor Selection Dial

The remote control bed ID can be selected. The remote control bed ID should be preprogrammed on each monitor. Maximum of 8 monitors can be controlled on one remote control unit.
 (☞ Maintenance Manual "Remote Control Setup" P2-6)

Home Display

The home display is the basic display to monitor the patient.

It is composed of upper display area, all beds display area, individual bed display area, and lower display area.



1 Upper/Lower Display Area

[Feed] key, [Rec. Stop] key, [Menu] key, [Home] key, user keys

2 All Beds Display Area

Bed selection area, (Manual Record) key, (Event) key

3 Individual Bed Display Area

Parameter Key, [Record] key, [Freeze] key, [Meas. Qty] key, (NIBP Measurement) key

NOTE

- If there is no individual bed display, the area will function as all beds display area.

Description of the Display

Refer following for the meaning of the icons displayed on the screen.

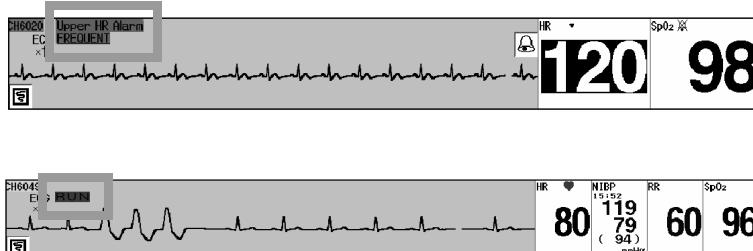
Symbol	Description
	Alarm OFF Indicates the alarm is OFF.
	Alarm Silence Key Indicates the alarm is silenced when alarm system is IEC mode.
	Alarm Suspend Indicates the alarm is suspended when alarm system is IEC mode.
	Heart Rate Synchronization Mark This mark flashes synchronizing to the heartbeat.
	Lead OFF Indicates the lead-off condition.
	Check Battery Indicates the low battery condition of the telemetry transmitter.
	Print Start/Stop Starts/stops the printing.
	Alarm Silence/Event List Display/Too Far Alarm/Monitor Suspend Timer Displayed when alarm, <Check SpO ₂ Sensor> alarm (when SpO ₂ measurement is disabled for the wireless network bed due to the sensor been disconnected, etc.), or too far alarm generates, or when monitoring is suspended using the timer.
	TCON Indicates the Bidirectional Wireless Communication (TCON) conenction status while in communication.
	Laser Printer Indicates that a laser printer connected to the TCP/IP network is used.
	Laser Printer Output Indicates the current printing progress.
	EMR Notice Icon Indicates that the patient on the electronic medical record is admitted. (When EMR link function is used.)

Message Display Area

In addition to waveforms and numeric data, alarm messages and status messages are displayed.

Numeric Data Alarm, Arrhythmia Alarm Message

There are 2 types of alarm messages; numeric data alarm and arrhythmia alarm.



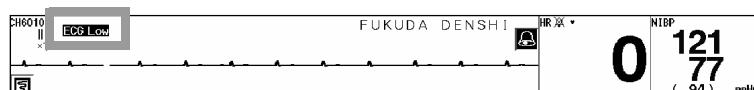
NOTE

- The alarm message for the arrhythmia alarm (except Tachy, Brady) will continue to be

displayed for 30 seconds even after the alarm condition dissolves.

Measurement Status and Arrhythmia Status Message

These messages indicate measurement status and arrhythmia status.

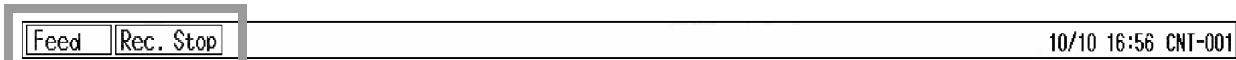


Upper Display Area

The following keys are displayed on the upper display area.

These keys can be used at any time, as these will be always displayed regardless of which menu are displayed.

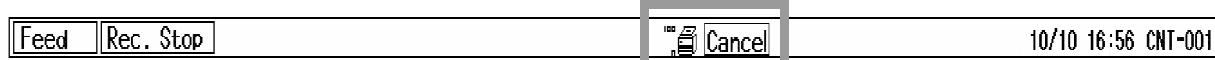
- During Monitoring



[Feed] key will feed the recording paper to the page top.

[Rec. Stop] key will stop the recording.

- During Laser Printer Operation



Pressing the [Cancel] key during recording on the laser printer will delete all stacked data.



1 Built-in Recorder Status Message

The messages related to the built-in recorder such as "Check Magazine", "Paper Out" will be displayed.

2 System Status Message

When malfunction occurs to the equipment, message such as "Check PC Card" will be displayed.
("Displayed Message" P6-3)

3 Laser Printer Status Message (When laser printer is used)

The laser printer status will be displayed.

LP Com Error	The specified printer does not exist on the TCP/IP network, or is in a paper out condition.
0Printing	In process of printer output. (x: total number of stacked data, max. 64 data) The icon indicates the current printing progress. ()
LP Waiting	Waiting condition for printer output.

4 TCON Group

TCON group for this device will be displayed.

5 TCON Mark

TCON mark will be displayed on the TCON remote station. The mark indicates the communication status with the TCON base station.

-  (Green) The electrical field strength is sufficient and communication errors rarely occur.
-  (Green) The electrical field strength is sufficient, but the communication errors may occur due to the transmitter condition and the surrounding environment.
-  (Yellow) The communication is possible, but the communication errors may occur frequently.
-  (Red) The communication is not possible.

6 Date/Time

The current time and date will be displayed.

If the SNTP server is set ON, and the time synchronization fails, the date/time will be displayed in yellow.

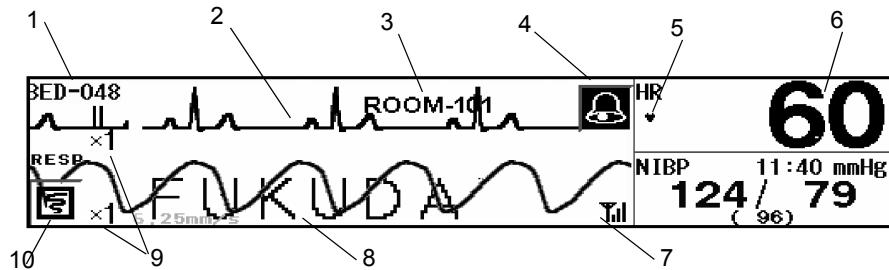
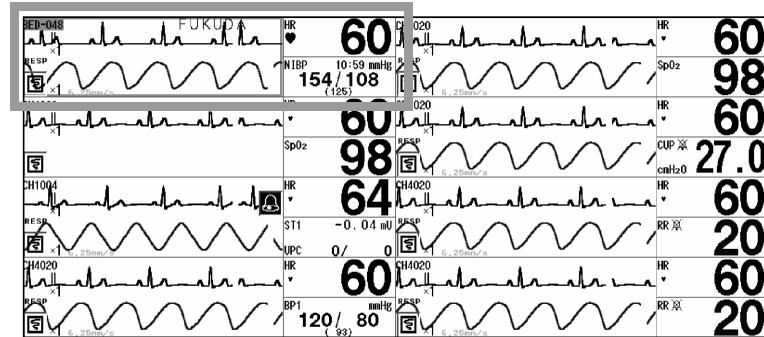
CAUTION

- Verify that the correct date/time is set before monitoring. The date/time must be set before monitoring. If the date/time is changed during monitoring, error may be caused to the trend data or other patient data.

7 Central ID

Displays the central monitor ID for this device.

All Beds Display Area



Explanation of the Display

1 Room, Bed ID, Channel ID

The room/bed ID of the bedside monitor and channel ID will be displayed.

2 Waveform

A stationary method is used for the waveform trace and is drawn from left to right.

The waveform thickness can be selected from 3 selections.

(☞ Maintenance Manual "Soft Switch" P6-8)

To select a bed, press the waveform area for that bed. If [Selected Bed] is set for "Sync Tone Bed Selection" under Soft Switch menu, pressing the waveform area will display the individual bed display.

(Refer to "7. Numeric Data (Individual Bed Display Key)")

3 Bed Name

Displays the bed name set on the patient admit menu. It can be displayed in standard or enlarged size, or not displayed depending on the selection on the display configuration setup menu.

(☞ "Display Configuration" P10-2)

(☞ Maintenance Manual "Bed Name Registration" P6-27)

4 (Event) Key

By selecting [ON] for "Event Key" under the Alarm Related Setup (Pre-Set menu), this  (event) key will be displayed when an alarm event generates.

Even if [OFF] is set for "Event Key", the  (event) key will be displayed for the following cases;

- ♦ When the too far alarm generates when set to [ON].
- ♦ When the monitor suspend duration is set, and the set duration has elapsed.
(☞ "Monitor Suspend" P5-12)
- ♦ When <Check SpO₂ Sensor> alarm generates. (when SpO₂ measurement is disabled for the wireless network bed due to the sensor been disconnected, etc.)

In addition to above, there are following functions.

- ♦ At alarm occurrence, pressing this event key will silence the alarm sound and displays the event list.
(☞ "Alarm Silence" P6-20)
- ♦ Pressing the event list will display the recall screen.
(☞ "Recall" P8-11)
- ♦ When <Check SpO₂ Sensor> alarm generates. (when SpO₂ measurement is disabled for the wireless network bed due to the sensor been disconnected, etc.), pressing this key will silence the alarm and displays the event list with "SpO₂ Sens." in yellow. By pressing the event list or the [Cancel] key displayed on the left, the <Check SpO₂ Sensor> message will disappear.
(☞ "Check SpO₂ Sensor" P6-24)
- ♦ When the too far alarm generates, pressing this key will silence the alarm sound and displays the [Too Far Alarm Silence] key.
(☞ "Too-Far Alarm" P6-24)
- ♦ Pressing this key after completion of the set monitoring suspend duration will extend the suspend duration.
(☞ "Monitor Suspend" P5-12)
(☞ Maintenance Manual "Soft Switch" P6-8)
- ♦ Whether or not to light (ON) the alarm indicator or not (OFF) when  is displayed, can be selected.
(Default: OFF (not light))
(☞ Maintenance Manual "Alarm Related Setup" P6-16)

- ♦ A different event key icon will be displayed depending on the alarm system (FUKUDA DENSHI/IEC) and alarm status.

Status	Event Key Icon	
	When the alarm system is FUKUDA DENSHI	When the alarm system is IEC
During Alarm Generation (If no parameter is in alarm silence condition)		
During Alarm Generation (If parameter in alarm silence condition is present)		(Red-Yellow Blink)
End of Alarm Generation (Unchecked) Monitor Suspend Timer Too Far Alarm Check SpO2 Sensor Alarm (When the SpO2 measurement is disabled for the wireless network bed due to the sensor been disconnected, etc.)		

5 Symbol Display

The following symbols will be displayed inside the numeric data box.

♥ (HR Synchronization Mark)	This symbol is synchronized to the heart beat. The alarm indicator can be flashed synchronizing with HR. (Default: OFF) (Maintenance Manual "Alarm Related Setup" P6-16) The symbol for the specified bed can be emphasized in red color with the Soft Switch setup. ("Synchronized Tone/Mark" P10-15)
□ (Low Battery Symbol)	This symbol indicates low battery condition of the telemetry transmitter or bedside monitor.
ⓧ (Lead OFF Symbol)	This symbol indicates the lead OFF condition.
Alarm OFF Symbol	This symbol indicates alarm off condition for the respective parameter. When the alarm system is FUKUDA DENSHI: When the alarm system is IEC:
⊗ (Alarm Silence Symbol)	When the alarm system is IEC, this symbol will be displayed for the parameter in alarm silence condition. It will be not displayed when the alarm system is FUKUDA DENSHI. (Maintenance Manual "Alarm Related Setup" P6-16)

NOTE

- ♦ When the battery status becomes low, the low battery symbol will enlarge. This is to warn the low battery condition when a telemetry transmitter (ex. LX-5160) is used. For the bedside monitor such as DS-7001, the low battery symbol will be also displayed enlarged when the battery status becomes low.

6 Numeric Data (Individual Bed Display Key)

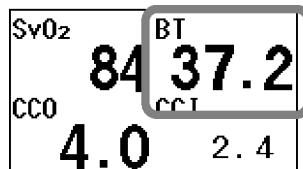
The numeric data for each patient will appear.

The numeric data box will also function as individual bed display key. Pressing the numeric data box will display the individual bed display of the corresponded patient. It will also make the bed into selected status.

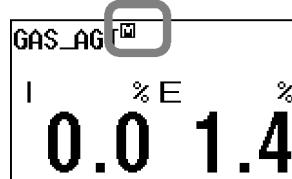
NOTE

- ♦ The waveform and numeric data (HR, RR) may slightly differ with the bedside monitor due to difference of processing among the different monitor model types and wireless network condition.
- ♦ When the temperature unit is °F, the Vigilance data, BT (blood temperature) cannot be

monitored.



- If AGT2 is monitored on the bedside monitor, only AGT1 data will be displayed on the DS-7700 system numeric data box. However, "M" mark will be displayed to indicate that a mixed agent is monitored.



7 TCON Mark

Displayed when TCON is used. Indicates the communication status with the bedside monitor.

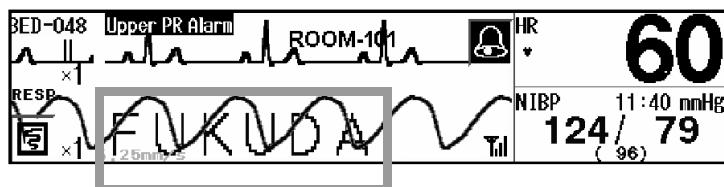
8 Patient Name

The patient name which was input on the "Admit/Discharge" menu will be displayed. The patient name can be displayed enlarged by selecting [Zoom] for "Name" on the "Display Configuration" menu.

The color of the patient name can be changed on the "Color" menu.

(☞ "Color" P10-12)

The numbers of letters that can be displayed for the patient name depends on the display layout.



9 Lead/Size

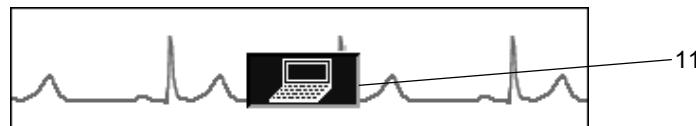
Displays ECG lead and size/scale of each waveform.

10 (Record) Key

This key is used to start the manual recording. When pressed, the key will turn to red and starts recording. Pressing the key again will stop the recording. Pressing the keys for more than one bed will sequentially start the manual recording for the pressed beds. The manual record key for the recording standby beds will be displayed in orange. However, it is necessary to set the recording duration to [12 sec.] or [24 sec.] for the manual recording setup.

11 EMR Notice Icon

When using the EMR link function, this icon will be displayed to indicate that the patient on the electronic medical record is admitted. Pressing this icon will display the patient admit/discharge menu.



CAUTION

- 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.
 Setting the pacemaker usage and patient type is especially important as these will affect the monitoring accuracy.

- The discharge process on EMR will only initialize the patient information on the central monitor. To initialize the monitored data and settings for this patient, it is necessary to perform discharge process on the central monitor.

NOTE

- To use the EMR link function, it is necessary to perform setup on the "Network Configuration (Patient Data Server)" under Pre-Set menu.
( Maintenance Manual "Patient Data Server Setup" P5-2)

12 Alarm Message

The alarm message will be displayed. When more than one alarm generate at the same time, the alarm message of the higher priority alarm will be displayed.

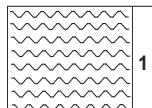
**REFERENCE**

- The alarm message for each patient will appear. If more than one alarm generate at the same time, the alarm message of the higher priority alarm will be displayed.
( "Displayed Message" P6-3)

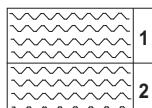
□ The Display Layout of the Home Display

The display layout of the home display can be selected from the following 11 types.

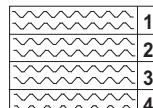
1bed 8waves



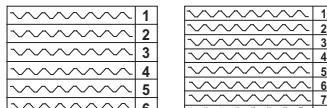
2beds 4waves



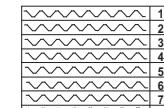
4beds 2waves



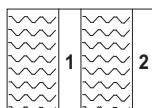
6beds 1wave



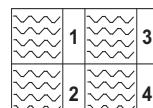
8beds 1wave



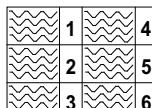
2beds 8waves



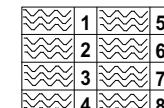
4beds 4waves



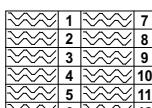
6beds 4waves



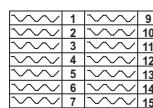
8beds 3waves



12beds 2waves



16beds 1wave



The size and types of numeric data, number of beds can be changed according to the monitoring purpose. On the waveform display area, the patient name can be displayed enlarged, or short trend graph can be displayed.

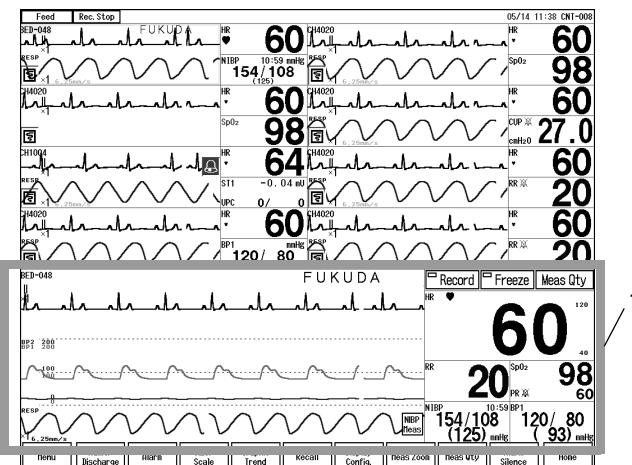
REFERENCE

- The settings for number of beds, waveforms, and numeric data to be displayed can be performed on the "Display Configuration" menu.
(☞ "Display Configuration" P10-2)
- To display the short trend, select [ON] or [Overlap] for "Short Trend" on the "Display Configuration" menu.
(☞ "Home Display Layout" P10-3)

Individual Bed Display Area

A detailed data for the selected patient can be monitored on this display.

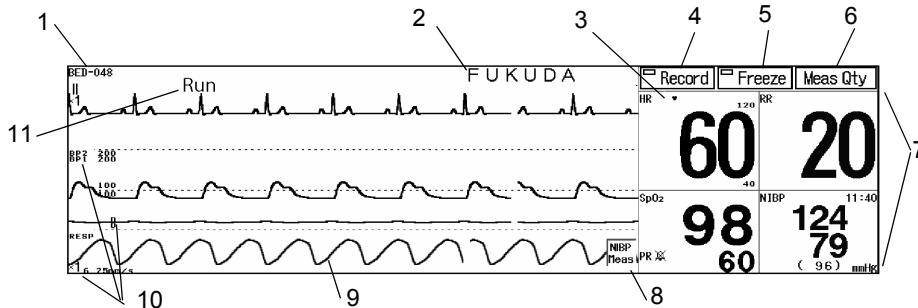
The individual bed can be displayed by pressing the bed selection area (numeric data box on the all beds display).



REFERENCE

- The settings for number of beds, waveforms, and numeric data to be displayed can be performed on the "Display Configuration" menu.
(☞ "Display Configuration" P10-2)
- The number and types of numeric data to be displayed on the individual display can be changed according to the monitoring purpose.

□ Individual Bed Display Area



1 Room, Bed ID, Channel ID

The room/bed ID of the bedside monitor and channel ID will be displayed.

2 Patient Name

The patient name which was input on the "Admit/Discharge" menu will be displayed. The patient name can be displayed enlarged by selecting [Zoom] for "Name" on the "Display Configuration" menu.

The numbers of letters that can be displayed for the patient name depends on the display layout.

3 Symbol Display

The following symbols will be displayed.



This symbol is synchronized to the heart beat.

The symbol for the specified bed can be emphasized in red color with the Soft Switch setup.

(☞ "Synchronized Tone/Mark" P10-15)

The alarm indicator can be flashed synchronizing with HR. (Default: OFF)

(☞ "Alarm Related Setup" P6-16)



This symbol indicates low battery condition of the telemetry transmitter or bedside monitor.



This symbol indicates the lead OFF condition.

Alarm OFF Symbol

This symbol indicates the alarm off condition for the respective parameter.

When the alarm system is FUKUDA DENSHI:

When the alarm system is IEC:



When the alarm system is IEC, this symbol will be displayed for the parameter in alarm silence condition.

It will be not displayed when the alarm system is FUKUDA DENSHI.

(☞ Maintenance Manual "Alarm Related Setup" P6-16)

NOTE

- When the battery status becomes low, the low battery symbol will enlarge. This is to warn the low battery condition when a telemetry transmitter (ex. LX-5160) is used. For the bedside monitor such as DS-7001, the low battery symbol will be also displayed enlarged when the battery status becomes low.

4 [Record] Key

Pressing this key will start recording with the preprogrammed condition. Pressing the key will start the recording, and pressing the key again will stop the recording.

5 [Freeze] Key

Pressing this key will freeze the waveform trace on the individual display. This will not affect the numeric data display such as HR and BP. Pressing the key once will stop the waveform trace, and pressing the key again will resume the waveform trace.

NOTE

- The freeze recording function (waveform recording during freeze condition) is not

supported for this equipment.

6 [Meas Qty] Key

Pressing this key will sequentially change the number of displayed numeric data.
 (☞ "Numeric Data on the Individual Bed Display" P7-11)

7 Numeric Data Box

The numeric data parameter selection will be displayed. Up to 10 waveforms can be displayed. The numeric data box of the individual bed display functions as parameter key, and pressing this key allows to perform setup of corresponded parameter.

Also, by "Parameter ON/OFF" setting, "OFF" can be displayed inside the parameter key.
 (☞ "Parameter ON/OFF Setup" P7-8)

8 (NIBP Measurement) Key

Starts/stops the NIBP measurement.
 (☞ "NIBP Manual Measurement" P7-7)

This key will be displayed only for the DS-LANIII bed and the TCON bed (TCON, LW-T, RF-T).

9 Waveform

Up to 5 waveforms can be displayed. A stationary method is used for the waveform trace and is drawn from left to right.

The waveform thickness can be selected from 3 selections.

(☞ Maintenance Manual "Soft Switch" P6-8)

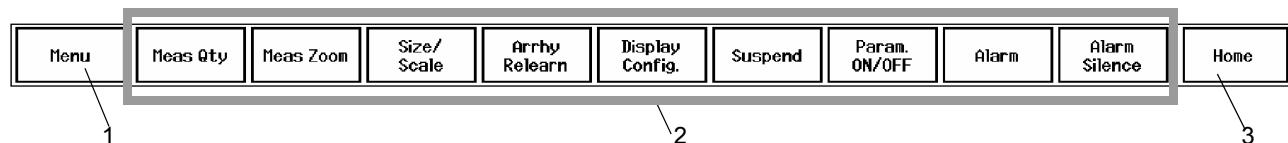
10 Size, Lead, Scale

Displays the waveform size, scale, and ECG lead. This information will be printed at time of recording.

11 Alarm Message

The alarm message for each patient will be displayed. If more than one alarm generate at the same time, the alarm message of the higher priority alarm will be displayed.

Lower Display Area



1 [Menu] Key

The "Menu" selection will be displayed.

2 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 menu can be attained.

DS-7700 Series: 7 or 9 user keys

DS-7700W Series: 10 user keys

3 [Home] Key

Pressing the [Home] key will return the display to the home display.

NOTE

- As [Home] and [Menu] are fixed keys, other keys cannot be assigned.
- The user keys can be set on the preset menu.
 (☞ Maintenance Manual "User Key" P6-14)

Function Key:

When optional keyboard is connected, the function keys (F1 to F12) on the keyboard will also function as [Menu] key, [Home] key, and user keys.

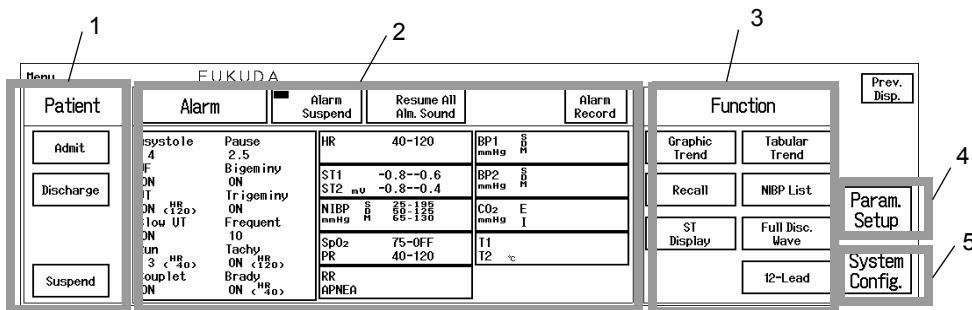
Menu	Meas Qty	Meas Zoom	Size/ Scale	Arrhy Relearn	Display Config.	Suspend	Param. ON/OFF	Alarm	Alarm Silence	Admit/ Discharge	Home
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12

NOTE

- For the DS-7700W series, [F1] to [F12] will be displayed below each key. The DS-7700 series can also use the keyboard, but [F1] to [F12] will not be displayed on the monitor screen.

Menu Functions

Press the [Menu] key to display the "Menu" window.



1 Patient Setup

This menu allows admitting, discharging, suspending monitoring of a patient.
(☞ "Patient Setup" P3-17)

2 Alarm Setup

This menu allows alarm setup for each patient.
(☞ "Alarm Setup" P3-17)

3 Function

This menu allows to check the measurement result of each patient on a graph, etc.
(☞ "Function" P3-18)

4 [Param. Setup] Key

Pressing this key displays the "Parameter Setup" menu.
(☞ "Parameter" P3-18)

5 [System Config.] Key

Pressing this key displays the "System Configuration" menu.
(☞ "System Configuration" P3-19)

Operation Flow

This section shows the access procedure to the keys displayed on Home Display, Menu, System Configuration, and Preset.

The keys are shown for each screen layer level.

For example, "Graphic Trend" can be displayed by pressing the [Graphic Trend] under "Function" menu.

For details of the function of each key, refer to the respective reference page.

REFERENCE

- ♦ * mark indicates the following.
- *1: The operation procedure explained in the reference page differs with the access procedure explained in this section.
- *2: A password is required to access the Preset menu.
(Maintenance Manual "Password Setup" P6-2)
- *3: "(MM)" indicates the Maintenance Manual.

 Home Display/User Key

Feed (P9-23)
Cancel (When a laser printer is used)
(User Key) (P3-14)

Rec. Stop (P9-23)
Menu (P3-14)
Home (P3-3)

 Individual Bed Display

Record (P3-11)
Meas Qty (P3-11)

NIBP Meas (P3-11)
Freeze (P3-11)

 Patient, Alarm, Function

Menu	
Patient (P3-17)	Admit (P5-2)
	Discharge (P5-18)
	Suspend (P5-12)
Alarm (P3-17)	HR
	Arrhy.
	ST
	NIBP
	SpO ₂ -1
	SpO ₂ -2
	SpMet
	SpCO
	RESP
	BP1 to 6
	CO ₂
	TEMP
	GAS
	SPIRO
	Alarm Suspend (P6-10)
	Resume All Al. Sound (P6-23)
	Alarm Record(P9-3) ^{*1}
Function (P3-18)	Graphic Trend (P8-1)
	Tabular Trend (P8-8)
	Recall (P8-11)
	NIBP List (P8-21)
	ST Display (P8-24)

	12-Lead (☞ P8-28)
	Full Disclosure Waveform (☞ P8-32)
	Night Mode (☞ P8-61)

□ Parameter

Menu	Parameter Setup (☞ P3-18)														
	<table border="1"> <tr><td>ECG(☞ P3-18)</td><td>BP1(☞ P3-18)</td></tr> <tr><td>BP2(☞ P3-18)</td><td>BP3(☞ P3-18)</td></tr> <tr><td>BP4(☞ P3-18)</td><td>SpO₂-1 (☞ P3-18)</td></tr> <tr><td>RESP(☞ P3-18)</td><td>SpO₂-2 (☞ P3-18)</td></tr> <tr><td>NIBP(☞ P3-18)</td><td>CO₂ (☞ P3-18)</td></tr> <tr><td>SPIRO(☞ P3-18)</td><td>GAS(☞ P3-18)</td></tr> <tr><td>Parameter ON/OFF(☞ P3-18)</td><td></td></tr> </table>	ECG(☞ P3-18)	BP1(☞ P3-18)	BP2(☞ P3-18)	BP3(☞ P3-18)	BP4(☞ P3-18)	SpO ₂ -1 (☞ P3-18)	RESP(☞ P3-18)	SpO ₂ -2 (☞ P3-18)	NIBP(☞ P3-18)	CO ₂ (☞ P3-18)	SPIRO(☞ P3-18)	GAS(☞ P3-18)	Parameter ON/OFF(☞ P3-18)	
ECG(☞ P3-18)	BP1(☞ P3-18)														
BP2(☞ P3-18)	BP3(☞ P3-18)														
BP4(☞ P3-18)	SpO ₂ -1 (☞ P3-18)														
RESP(☞ P3-18)	SpO ₂ -2 (☞ P3-18)														
NIBP(☞ P3-18)	CO ₂ (☞ P3-18)														
SPIRO(☞ P3-18)	GAS(☞ P3-18)														
Parameter ON/OFF(☞ P3-18)															

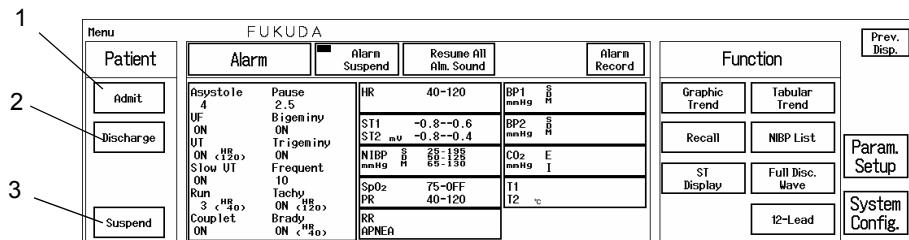
□ System Configuration, Preset

Menu	System Configuration(☞ P10-1)																						
	<table border="1"> <tr><td>Record(☞ P9-2)</td><td>Channel Setup(☞ (MM) P3-15)</td></tr> <tr><td>Color(☞ P10-12)</td><td>Clock (☞ (MM) P6-3)</td></tr> <tr><td>Display Config.(☞ P10-2)</td><td>Alarm Related Setup(☞ (MM) P3-15)</td></tr> <tr><td>Brightness Setup (☞ P10-2)</td><td>Unit(☞ (MM) P6-13)</td></tr> <tr><td>Sweep Speed(☞ P10-2)</td><td>Admit Setup (☞ (MM) P6-26)</td></tr> <tr><td>Bed Transfer(☞ P10-2)</td><td>PC/CF Card (☞ (MM) P3-15)</td></tr> <tr><td>Tone/Volume (☞ P10-13)</td><td>Keyboard/Mouse Setup(☞ (MM) P3-15)</td></tr> <tr><td>Mon. Suspend Setup(☞ P10-2)</td><td>DS-LAN Setup(☞ (MM) P3-15)</td></tr> <tr><td>Nurse Team Setup(☞ P10-18)</td><td>LAN Info.(☞ (MM) P3-15)</td></tr> <tr><td>Preset *2(☞ (MM) P6-1)^{*3}</td><td>Maintenance (☞ (MM) P3-15)</td></tr> <tr> <td></td><td>Password Setup (☞ (MM) P6-2)</td></tr> </table>	Record(☞ P9-2)	Channel Setup(☞ (MM) P3-15)	Color(☞ P10-12)	Clock (☞ (MM) P6-3)	Display Config.(☞ P10-2)	Alarm Related Setup(☞ (MM) P3-15)	Brightness Setup (☞ P10-2)	Unit(☞ (MM) P6-13)	Sweep Speed(☞ P10-2)	Admit Setup (☞ (MM) P6-26)	Bed Transfer(☞ P10-2)	PC/CF Card (☞ (MM) P3-15)	Tone/Volume (☞ P10-13)	Keyboard/Mouse Setup(☞ (MM) P3-15)	Mon. Suspend Setup(☞ P10-2)	DS-LAN Setup(☞ (MM) P3-15)	Nurse Team Setup(☞ P10-18)	LAN Info.(☞ (MM) P3-15)	Preset *2(☞ (MM) P6-1) ^{*3}	Maintenance (☞ (MM) P3-15)		Password Setup (☞ (MM) P6-2)
Record(☞ P9-2)	Channel Setup(☞ (MM) P3-15)																						
Color(☞ P10-12)	Clock (☞ (MM) P6-3)																						
Display Config.(☞ P10-2)	Alarm Related Setup(☞ (MM) P3-15)																						
Brightness Setup (☞ P10-2)	Unit(☞ (MM) P6-13)																						
Sweep Speed(☞ P10-2)	Admit Setup (☞ (MM) P6-26)																						
Bed Transfer(☞ P10-2)	PC/CF Card (☞ (MM) P3-15)																						
Tone/Volume (☞ P10-13)	Keyboard/Mouse Setup(☞ (MM) P3-15)																						
Mon. Suspend Setup(☞ P10-2)	DS-LAN Setup(☞ (MM) P3-15)																						
Nurse Team Setup(☞ P10-18)	LAN Info.(☞ (MM) P3-15)																						
Preset *2(☞ (MM) P6-1) ^{*3}	Maintenance (☞ (MM) P3-15)																						
	Password Setup (☞ (MM) P6-2)																						

Patient Setup

The "Patient" menu is explained below.

(☞ "Admit / Discharge" P5-1)



1 Admit

Allows to enter the patient information before monitoring.

(☞ "Admit" P5-2)

2 Discharge

Deletes patient information, monitoring data, setup condition of discharging patient.

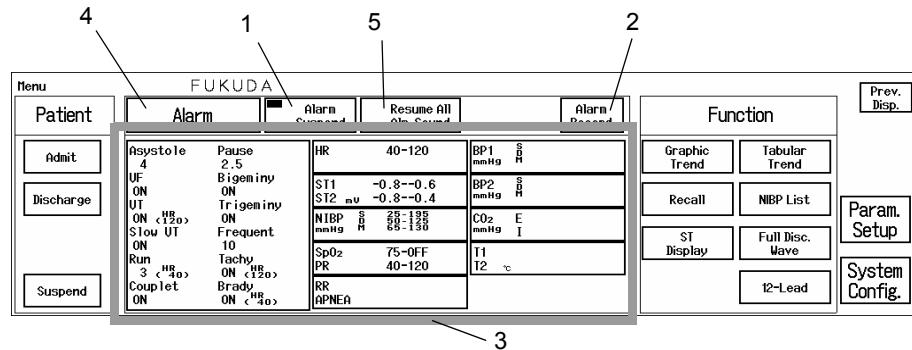
(☞ "Discharge" P5-18)

3 Suspend

When a patient leaves the bed for a long period of time, this key temporarily suspends the measurement, alarm generation, automatic measurement and recording with the data and setup condition unchanged.

(☞ "Monitor Suspend" P5-12)

Alarm Setup



1 Alarm Suspend

Temporarily suspends or sets the alarm ON for that patient.

2 Alarm Record

The alarm recording setup menu will be displayed.

(☞ "Recording" P9-1)

3 Parameter

Sets ON/OFF, and upper / lower limit of alarm for each parameter.

(☞ "Alarm Function" P6-1)

4 Alarm

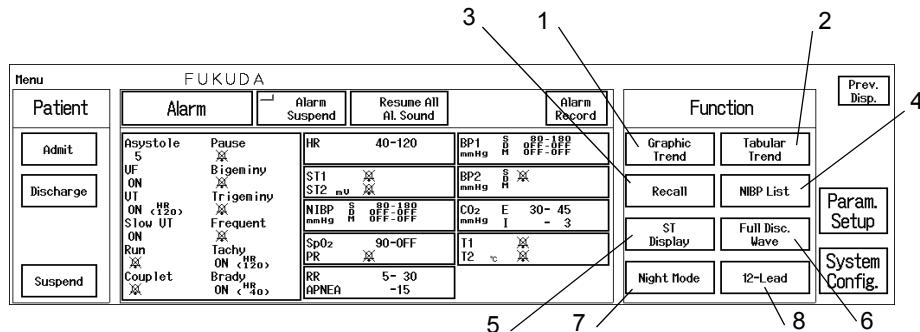
The "Alarm Setup" menu will be displayed.

5 Resume All Alm. Sound

Cancels the alarm silence condition.

Function

(☞ "Review Function" P8-1)



1 Graphic Trend

Displays 48 hours of data in graphic format.

2 Tabular Trend

Displays 48 hours of data in tabular format.

3 Recall

Allows verification of the waveform and numeric data at alarm occurrence.

4 NIBP List

Displays NIBP data with HR, SpO₂, PR data in tabular format.

5 ST Display

Measures the ST level for the monitoring ECG.

6 Full Disclosure Waveform

By using the optional CF card, maximum of 96 hours of waveform can be stored and monitored on the display.

7 Night Mode

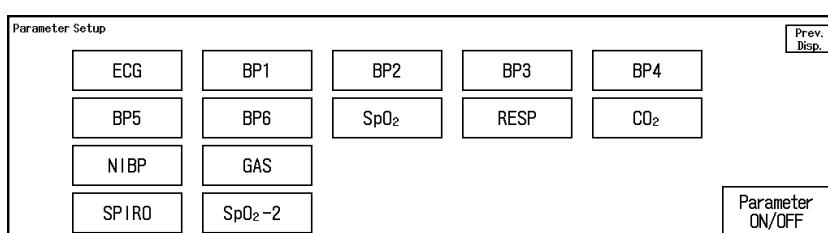
Sets the Night Mode for the DS-LANIII BED.

8 12-Lead

Displays the 12-lead waveform.

(☞ "Parameter Setup" P7-13)

Parameter

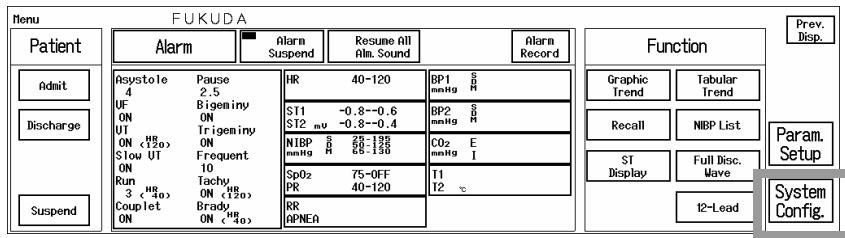


Pressing the [Param. Setup] key will display the "Parameter Setup" window.

On the "Parameter Setup" window, setting for the monitoring parameter can be performed.

(☞ "Setup Item for Each Parameter" P7-13)

System Configuration



Pressing the [System Config.] key will display the "System Configuration" window.

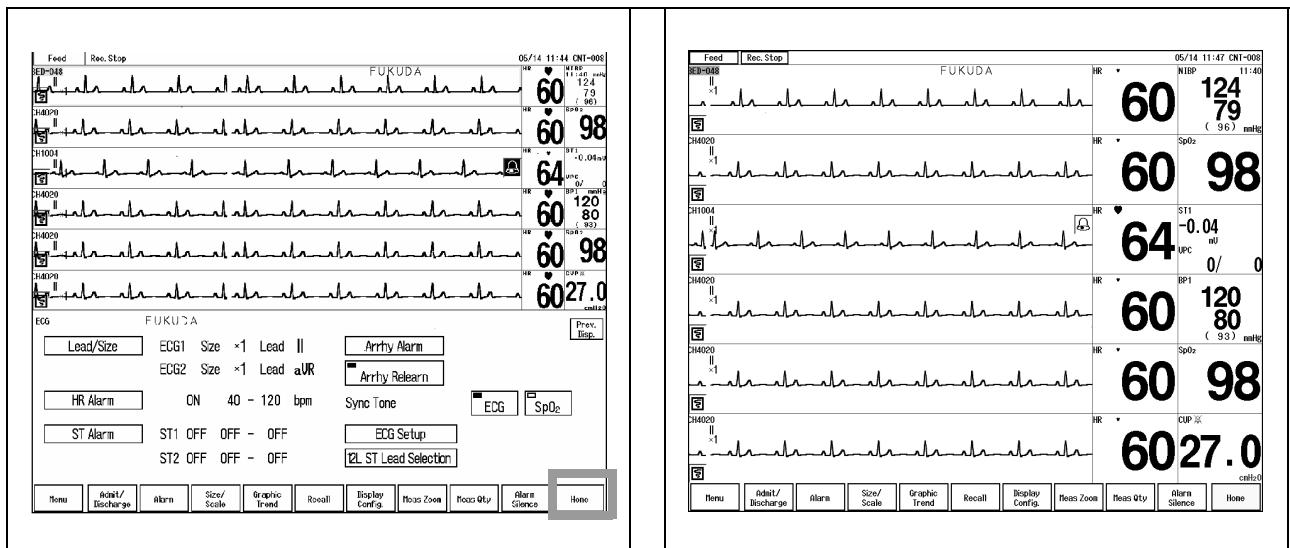
On the "System Configuration" window, system configuration of this device can be set.

(☞ "System Configuration Menu" P10-1)

Procedure to Return the Display

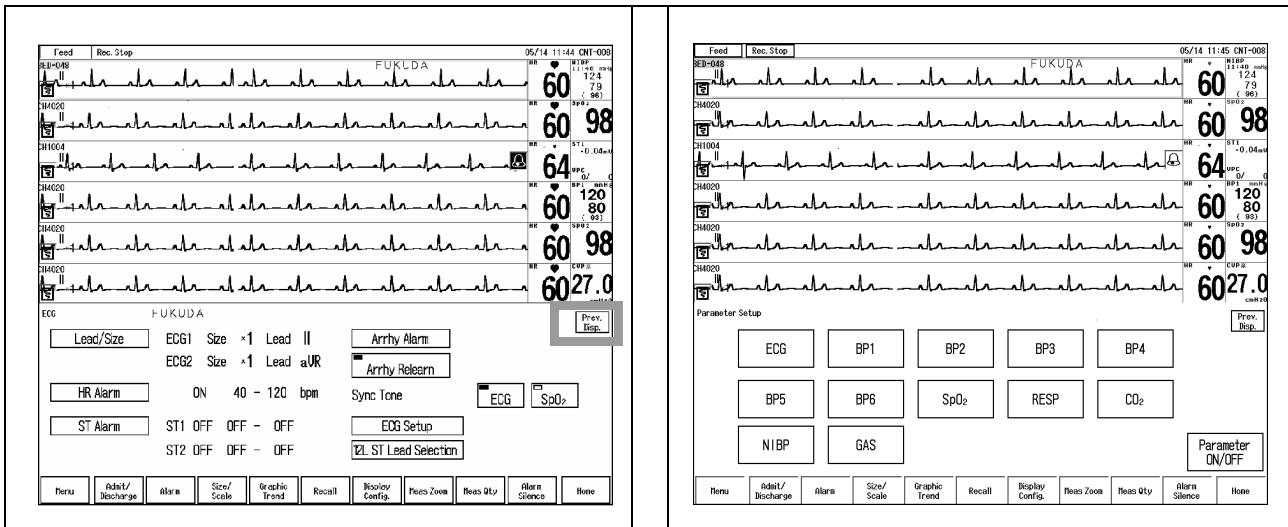
To Return to the Home Display

Press the [Home] key at the lower right of the screen to return to the home display.



To Return to the Previous Display

Press the [Prev. Disp.] key to return to one previous display.



Main Unit, Slave Monitor, and Extended Display Unit

For the DS-7700 system, in addition to the main display, another display unit can be used for extended display.

For installation procedure of 19-inch display unit, refer to the operation manual of LC-7019FT.

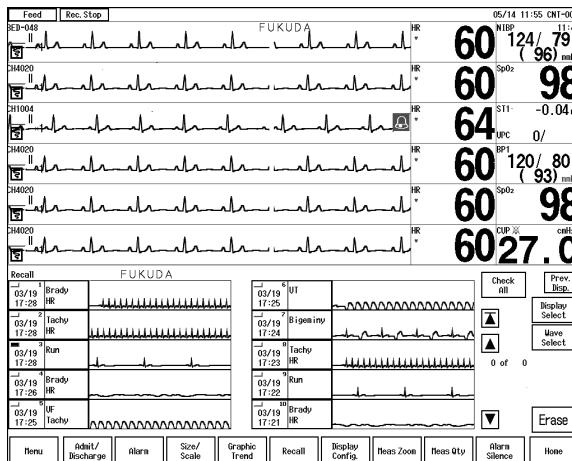
(☞ Maintenance Manual "Using the Slave Monitor" P2-8)

(☞ "Full Disclosure Waveform Recording (Optional Function)" P8-32)

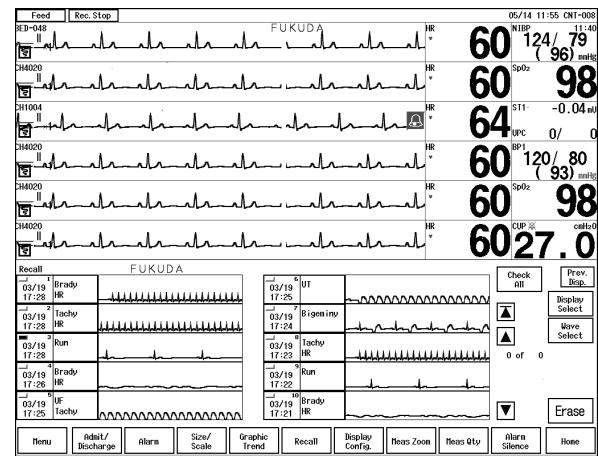
	Connector	Display Unit that can be Connected	Displayable Screen (Yes: Can be displayed, No: Cannot be displayed)		
			Slave Display	Extended Display	Full Disclosure Waveform
DS-7700 Series	Slave Output Connector	15 inch Slave Monitor	Yes	No	Yes
DS-7700W Series	Slave Output Connector	19 inch Slave Monitor	Yes	No	No
DS-7700W Series	Extended Display Unit Connector and Serial Connector (COM4)	19 inch Extended Display Unit	No	Yes	Yes

Slave Display

The same display with the main display unit can be displayed on another display unit.



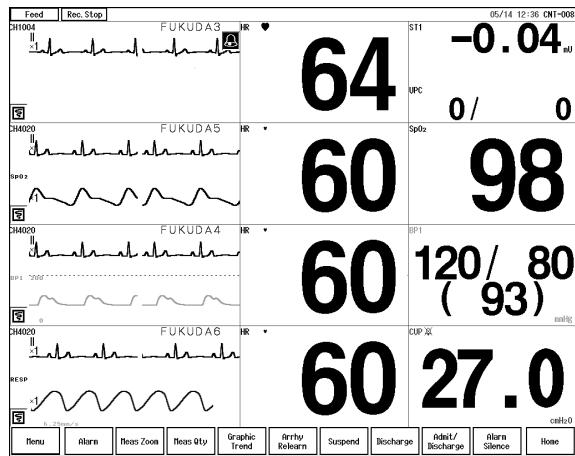
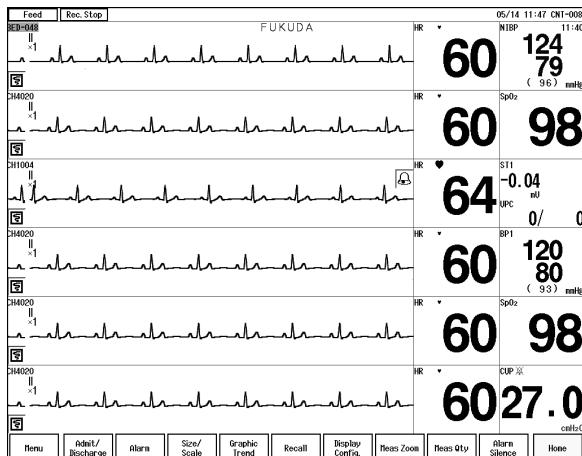
Main Unit



Extended Display Unit/Slave Monitor

Extended Display Unit

By using the main display unit and extended display unit, maximum of 16 beds can be displayed with different configuration.



Multimode Display

When multimode function is used, the operation on the main display unit and the extended display unit will differ.

Alarm Indicator Operation

	Main Unit	Extended Display Unit
When an alarm generates for the patient monitored on the main display unit;	Alarm indicator will light.	Alarm indicator will not light.
When an alarm generates for the patient monitored on the extended display unit;	Alarm indicator will light.	Alarm indicator will light.
When alarms generate for the patients monitored on the main display unit and the extended display unit;	Alarm indicator will light for the patient with higher alarm priority.	Alarm indicator will light for the patient monitored on the extended display unit.

Operation during Alarm Silence

When [Individual] is selected for "Alarm Silence Key Function";

	Patient on the Main Display Unit	Patient on the Extended Display Unit
When alarm is silenced using the user key on the main display unit;	Alarm will be silenced.	Alarm will not be silenced.
When alarm is silenced using the user key on the extended display unit;	Alarm will not be silenced.	Alarm will be silenced.

When [Common] is selected for "Alarm Silence Key Function":

Operation during Alarm Silence	Patient on the Main Display Unit	Patient on the Extended Display Unit
When alarm is silenced using the user key on the main display unit;	Alarm will be silenced.	Alarm will be silenced.
When alarm is silenced using the user key on the extended display unit;	Alarm will be silenced.	Alarm will be silenced.

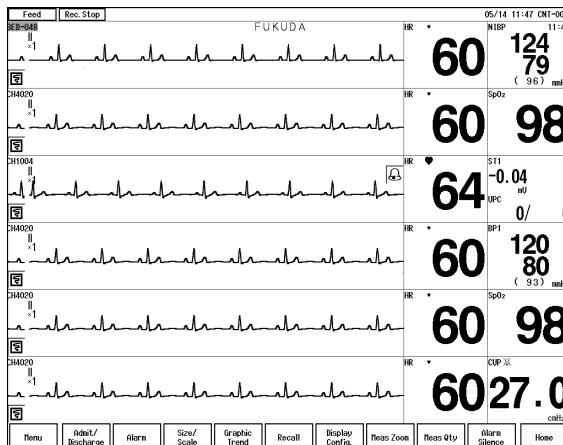


CAUTION

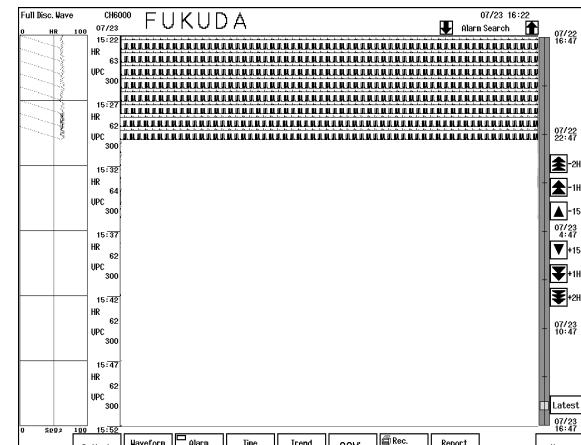
- Alarm sound will not generate from the extended display unit as a speaker is not incorporated. Alarm sound will be generated from the main unit. When using the multimode display function, make sure to locate the extended display unit where the alarm sound from the main unit can be heard.

Full Disclosure Waveform

A full disclosure waveform data (max. 96 hours) stored on the CF card can be displayed.



Main Unit



Extended Display Unit/Slave Monitor

Chapter 4 Preparation

Installing the Recording Paper	4-1
To Turn On the Power	4-3
To Turn Off the Power	4-4
To Check the Time/Date.....	4-4
Daily Check	4-5

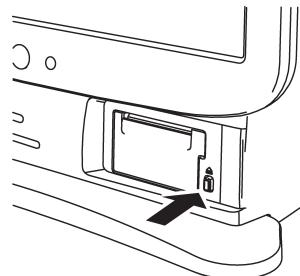
Chapter 4 Preparation

Installing the Recording Paper

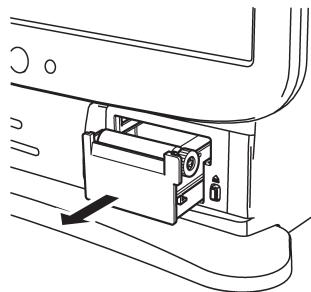
CAUTION

- About the Recording Paper
 - Use only "OP-124TE" recording paper specified by Fukuda Denshi.
The surface treatment and thickness of the recording paper affects the printing quality.
- Storing the Recording Paper
As thermal type recording paper is used, improper storage may change the quality of the recorded content, and make it illegible.
When storing the recording paper, 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 or 122 °F or 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.

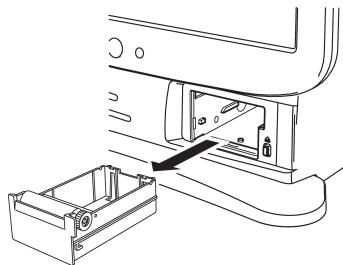
1 Press the button located at the side of the recorder paper cassette.



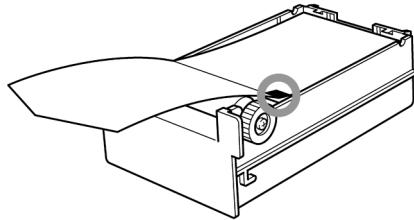
► The paper cassette will come out.



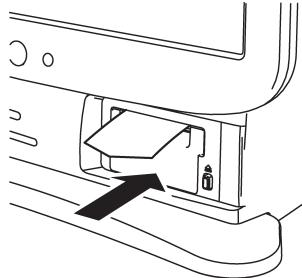
2 Remove the paper cassette from the main unit.



3 Set the paper in the cassette so that the printed mark is on the right side.



4 Insert the paper cassette back into the main unit.



NOTE

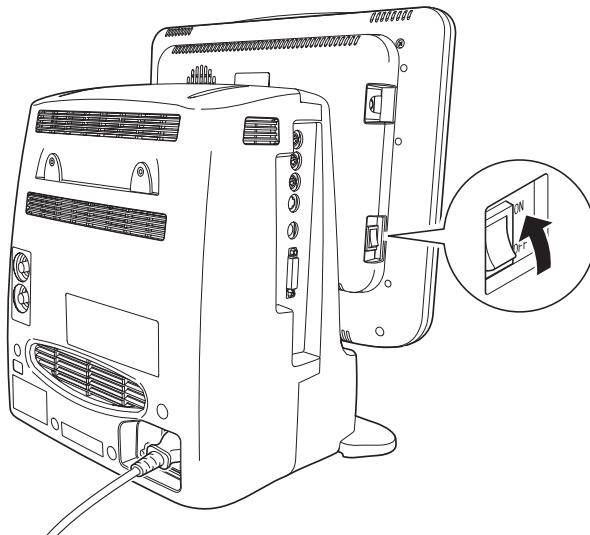
- Push in until it locks into place with a click sound.

To Turn On the Power

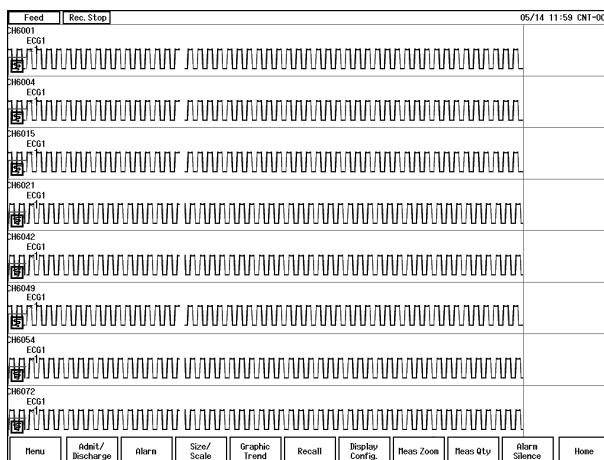
CAUTION

- The power cable must be connected to a hospital grade outlet.

1 Turn ON the power switch.



- The main power indicator on the front side of the unit will light in green, and the display will turn ON.



[Example of Startup Display]

2 Adjust the angle of the display unit for optimum view.

NOTE

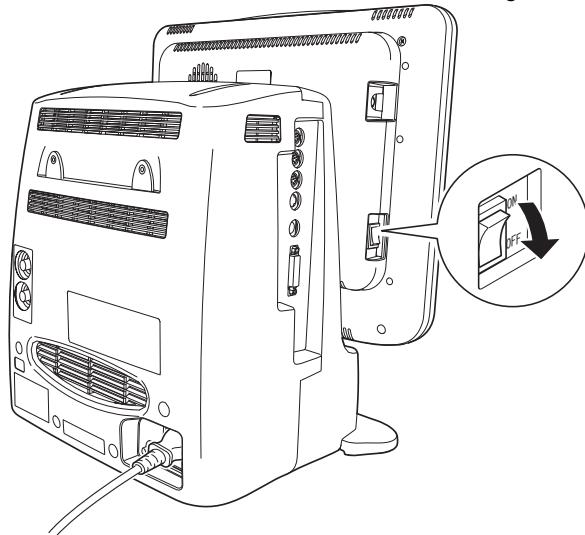
- The display at power ON will differ according to the setup.
- When adjusting the angle of the display unit, do not apply excessive force.
- The display brightness can be adjusted for optimum view.
("Brightness" P10-13)

To Turn Off the Power

1

Turn OFF the power switch.

- ▶ The main power indicator on the front side of the unit will turn in orange.



2

Disconnect the power supply cable.

- ▶ The main power indicator will turn OFF.

⚠ CAUTION

- ♦ After using the device, turn the power OFF before storing.
- ♦ When turning the power OFF, make sure that the CF card indicator is turned OFF. If the power is turned OFF while the CF card indicator is ON, it may result in data damage and equipment failure.
- ♦ When unplugging the cables, make sure to pull from the connector part of the cable and avoid applying excessive force. Otherwise, it may result in wire break or contact failure.
- ♦ Keep the unit clean to ensure proper operation for the next usage.
- ♦ Clean the accessories and cables, and organize them for storage.

To Check the Time/Date

⚠ CAUTION

- ♦ The time/date should be set by the system administrator.
( Maintenance Manual "Date/Time Setup" P6-3)

Daily Check

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

Daily Check List

No. _____

Inspected Date _____ Inspected by _____ Location _____

Device Type _____ Serial No. _____ Date of Purchase _____

Item	Details	Criteria	Judgment
Appearance	Visually check the exterior for scratches, cracks, deformation, and rust.	No abnormality should be found.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
Installation	Check whether the unit is installed on a level surface.	The installation area must be level and free from vibration and shock.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
	Check whether the unit is installed in a place susceptible to adverse environment.	The environmental condition (ex. temperature, humidity) of the installed place should be as specified. The unit should not be subjected to splashing water.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
Functions	Turn ON the monitor, and check whether it operates normally.	The home display appears, and the lamp located at the right side of the display panel lights.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
		The date and time should be correct.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
		The waveform is properly received and displayed.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
		Pressing the manual record key  will start recording on the recorder.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
Cables	Visually check on all cables for any damage.	No damage should be found.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
Telemetry Channel	Verify the channel IDs are as specified by the telemetry channel administrator.	It should conform to telemetry channel checklist.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
TCON	Operate under normal operating conditions, and check the communication function and operation.	Measurement values etc. should be transmitted correctly.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
Alarm Sound	Check the alarm sound on the "Tone/Volume" screen.	Pressing the [Test Sound] key should generate an alarm sound.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
Periodic Inspection	Check the previous periodic inspection date.	It should be within 1 year.	<input type="checkbox"/> OK / <input type="checkbox"/> NG

Comment

Chapter 5 Admit / Discharge

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Admit	5-2
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Chapter 5 Admit / Discharge

What You Can Do on the Admit/Discharge Menu

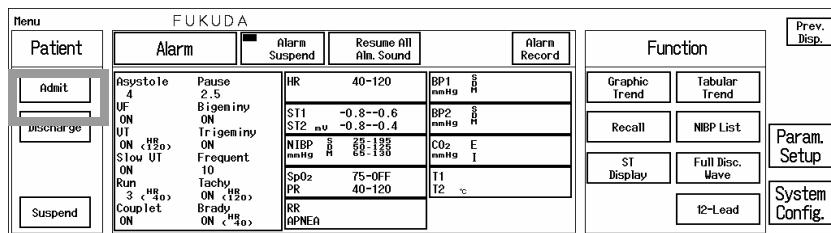
Before starting monitoring, patient information can be entered.

When the patient leaves the bed for a long period of time, monitoring can be suspended to temporary cease the measurement and alarm generation.

1 Press the [Menu] key.

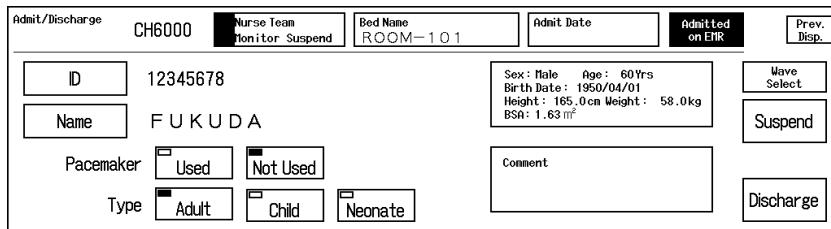
► The "Menu" screen will be displayed.

2 Press the [Admit], [Discharge], or [Suspend] key as required.



"Menu" Screen

► "Admit/Discharge" screen, "Discharge" screen, "Suspend" screen will be displayed respectively.



"Admit/Discharge" Screen

⚠ CAUTION

- When the monitoring is completed, delete the patient's monitoring data by performing the discharging procedure.
- When a patient is discharged, make sure to perform the discharge procedure. If you start monitoring a new patient without performing a discharge procedure for the previous patient, new data will be added to the previous data which will result in inaccuracy.
- 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.

Admit

Name, Sex, and Age

Enter the following patient information before starting monitoring. This is called "Admit" process.

- ♦ Patient ID
- ♦ Patient Name
- ♦ Comment
- ♦ Pacemaker (Used / Not Used)
- ♦ Patient Type (Adult / Child / Neonate)
- ♦ Patient Information (Sex, Birth Date, Age, Height, Weight, BSA)
- ♦ Nurse Team
- ♦ Bed Name

There are following ways to enter the patient information.

- 1 Manually input using the displayed touch keys or keyboard (optional).
- 2 Automatically input by searching the patient data server using the patient ID.
- 3 Automatically input using the EMR link function through the patient data server.

NOTE

- ♦ To use the patient data server, it is necessary to perform network setup in advance.
(☞ Maintenance Manual "TCP/IP Network Connection" P3-19)
(☞ Maintenance Manual "EMR Link Function" P5-1)

If the DS-7700 system is connected to the TCP/IP network and the data server is used, the admit date of the patient can be changed.
(☞ "To Change the Admit Date" P5-9)

To Input the Patient Information Using the Touch Keys

- 1** Select the patient to perform the admit procedure by pressing the bed selection area.
- 2** Press the [Menu], [Admit] ("Patient") keys.

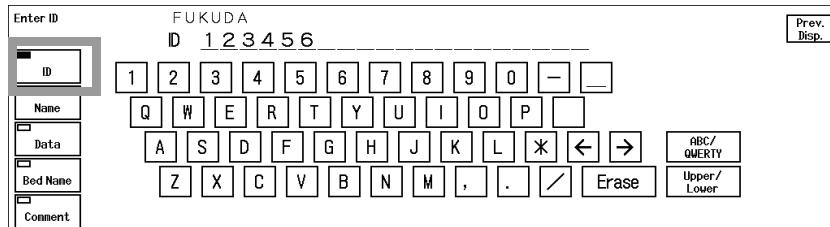
- The "Admit/Discharge" menu will be displayed.

Admit/Discharge	CH6004	Nurse Team TENIT A	Bed Name ROOM-105	Admit Date	Admitted on EHR	Prev. Disp.
ID	ID-00000004		Sex : Male Age : 60Yrs Birth Date : 1950/04/12 Height : 168.0cm Weight : 58.0kg BSA : 1.63 m ²			Wave Select
Name	S M I T H					Suspend
Pacemaker	<input checked="" type="checkbox"/> Used	<input type="checkbox"/> Not Used				Discharge
Type	<input checked="" type="checkbox"/> Adult	<input type="checkbox"/> Child	<input type="checkbox"/> Neonate			
Comment						

□Patient ID

1 Press the [ID] key.

- The "Enter ID" screen will be displayed.



2 Enter the patient ID.

REFERENCE

- Use the touch keys or keyboard to enter the ID of maximum 20 characters.
- The characters not displayed (ex: "#", "&") cannot be input from the keyboard.
- Use **<**, **>** (or **<**/**>**) keys on the keyboard to move the cursor (red underline) position.
- [Erase] key ([Delete] key on the keyboard) will delete the character at cursor position.
- [Back Space] key on the keyboard will delete the character at left of cursor position.
- The key arrangement can be changed using the [ABC / QWERTY] key.
- The upper case and lower case can be selected using the [Upper / Lower] key. ([Shift]+[Caps Lock] key, or input character while pressing [Shift] key on the keyboard.)

**CAUTION**

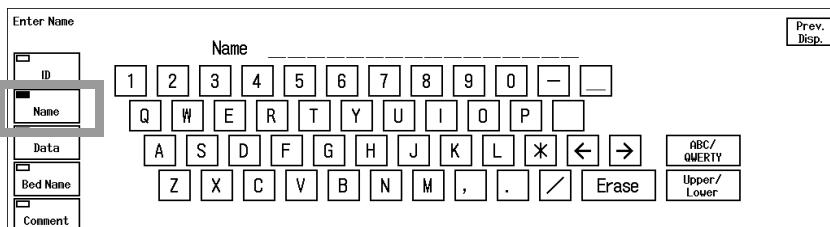
- On the DS-LANII network, up to 20 characters of patient ID can be set on this unit but some bedside monitors are capable to set only up to 10 characters depending on the software version.
For details of the bedside monitor, contact your nearest service representative.
- To synchronize the central monitor and the bedside monitor, set the transmitting starting digit of the ID on the "Patient ID Starting Column" of the Soft Switch menu.
The 10 characters from the set starting digit will be transmitted as patient ID.
(Maintenance Manual "Soft Switch" P6-8)

□Patient Name

Use the touch panel keys or keyboard to enter the patient name up to 16 characters.

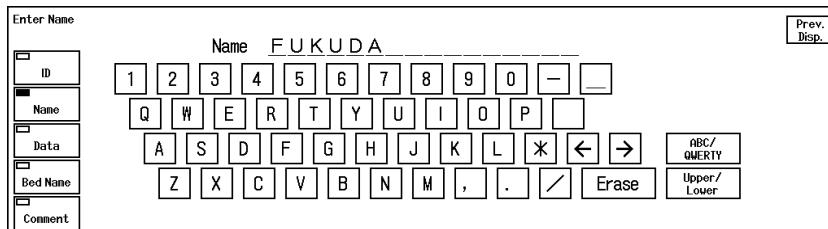
1 Press the [Name] key.

- The "Enter Name" menu will be displayed.



CAUTION

- On the DS-LANII network, up to 16 characters for the patient name can be set on this unit but some bedside monitors are capable to set only up to 8 characters depending on the software version.
- For details of the bedside monitor, contact your nearest service representative.

1 Enter the patient name.

NOTE

- The key arrangement and upper/lower case can be selected using the [ABC/QWERTY] and [Upper/Lower] keys respectively.

Patient Information
1

Press the [Data] key.

- The "Enter Data" screen will be displayed.

2

Select the patient's sex.

- Select [Male] or [Female].

NOTE

- The default is set as undetermined.
- This selection will not affect monitoring such as measurement accuracy.

3

Enter the patient's birth date and age.

REFERENCE

- There are following ways to enter the patient's age.
- Automatically calculate from the birth date.
- Manually input using the touch keys (or keyboard keys).

- If [Neonate] is selected for patient type, age will be displayed in days.

To Manually Input the Age:

- 1 Enter the age using the numeric keys.
- 2 Press the [Yrs] key.

To Automatically Calculate the Age from the Birth Date:

- 1 Enter the year, month, date using the numeric keys.
 - 2 Press the [Yr], [Mo], [Dy] key respectively.
- The entered year, month, day will be displayed inside the [Yr], [Mo], [Dy] keys respectively.

4 Enter the patient's height.

- 1 Use the numeric keys to enter the numbers.
- 2 Press the [cm] or [in] key.

5 Enter the patient's weight.

- 1 Use the numeric keys to enter the numbers.
 - 2 Press the [kg] or [lbs] key.
- The BSA (Body Surface Area) will be automatically calculated from the height and weight.

To Manually Input the BSA:

- 1 Use the numeric keys to enter the numbers.
- 2 Press the [m^2] key.

Comment

A comment of up to 30 characters can be entered.

1 Press the [Comment] key.

- The "Enter Comment" screen will be displayed.

- 1 Enter a comment.

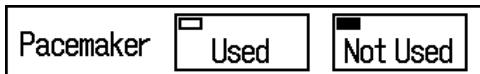
2 Press the [Prev. Disp.] key.

- The "Admit/Discharge" screen will be displayed.

Admit/Discharge	CH6002	Nurse Team Not Set	Bed Name ROOM-115	Admit Date	Admitted on EHR	Prev. Disp.
ID	1234567				Sex: Male Age: 60Yrs Birth Date: 01 Apr. 1950 Height: 165.0cm Weight: 58.0kg BSA: 1.63m ²	
Name	F U K U D A				Wave Select	Suspend
Pacemaker	<input type="checkbox"/> Used	<input checked="" type="checkbox"/> Not Used				Comment
Type	<input checked="" type="checkbox"/> Adult	<input type="checkbox"/> Child	<input type="checkbox"/> Neonate	<input type="button" value="Discharge"/>		

□ Pacemaker

- 1 Set the "Pacemaker".



- [Used]: The monitor will identify the pacemaker pulse and insert an artificial pulse onto the ECG waveform.

⚠ WARNING

- Make sure to select [Used] when a patient is using the pacemaker. The pacemaker usage setting influences the precision of the QRS detection and arrhythmia analysis.

NOTE

- To display the pacemaker pulse, select [Used] on the "Admit/Discharge" screen, and select [ON] or [Distinct Color] on the "ECG Setup" screen. It is also necessary to select [Used] for pacemaker on the bedside monitor.

REFERENCE

- By detecting the pacemaker pulse, it prevents to erroneously detect QRS as pacemaker pulse when pacing waveform does not appear (pacing failure). It also prevents erroneous judgment of VPC by analyzing the pacing beats in following 2 types.
 - P: Pacemaker Beat
 - F: Fusion Beat

□ Patient Classification

The patient type selection affects NIBP measurement range, HR measurement range, and respiration filter. It also affects the delay time to generate the measurement data alarm.

	Adult	Child	Neonate
HR Measurement Range	0bpm, 12 to 300bpm	0bpm, 30 to 300bpm	
Resp. Rejection Filter	1.5Hz	2.5Hz	
Alarm Delay Time	5 sec.	0 sec.	

The alarm delay time is the function to prevent frequent generation of the measurement data alarm by holding the alarm generation for fixed duration.

The alarm delay functions for HR/PR, BP, RR, SpO₂-2, SpMet, SpCO, TEMP, EtCO₂/InspCO₂, MVe, PEAK, PEEP, TACHY, BRADY.

- 1** Select from [Adult] / [Child] / [Neonate].

Type	<input checked="" type="checkbox"/> Adult	<input type="checkbox"/> Child	<input type="checkbox"/> Neonate
------	---	--------------------------------	----------------------------------

⚠ WARNING

- Make sure the proper selection is made. The monitor determines the detection algorithms for QRS and NIBP according to the selected patient type.

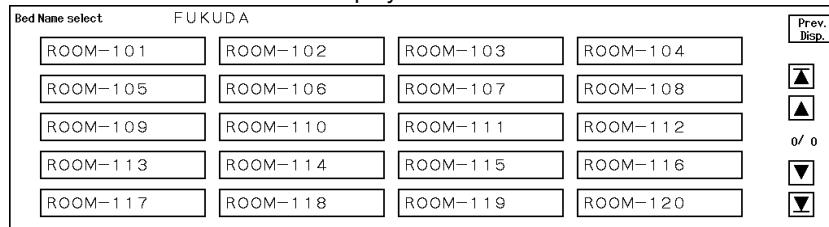
The admit procedure for one patient is complete with the above procedure.

To continue with the admit procedure for another patient, repeat the steps from "To Input the Patient Information Using the Touch Keys" P5-2.

□ Bed Name

- 1** Press the [Bed Name] key to select the bed name for the patient.

- The "Bed Name Select" screen will be displayed.



- 2** Select the bed name from the selections.

REFERENCE

- The bed name displayed in gray indicates that it is already used by other bed.
- The bed name displayed in green indicates that it is selected for that bed.
- By using the arrow keys displayed at the right side, the screen can be scrolled.

▲: Displays the first page.

▲: Displays the previous page.

▼: Displays the next page.

▼: Displays the last page.

To Enter Patient Data Using Search Patient Function

The patient data can be entered by searching the patient data server.

NOTE

- To use the patient data server, it is necessary to perform network setup in advance.
( Maintenance Manual "Patient Data Server Setup" P3-23)

REFERENCE

- The patient admit/discharge process linked to the electronic medical record (EMR) can be performed.

(Maintenance Manual "EMR Link Function" P5-1)

1 Select the patient to perform the admit procedure by pressing the bed selection area.

2 Press the [Menu], [Admit] ("Patient"), [ID] keys.

- ▶ The "Enter ID" screen will be displayed.

3 Use the touch keys or keyboard to enter the ID.

4 Press the [Search Patient] key and start searching based on the patient ID.

- ▶ The searched patient data will be displayed in the "New Information" area.

REFERENCE

- ♦ Messages displayed for "New Information":
"Searching": In process of searching the patient server.
"No relevant patient found": No relevant patient has been found on the patient server.

5 Select from [Change only patient info.] / [Discharge and admit as new patient.] / [Cancel].

- ▶ [Change only patient info.]: Replaces the current patient information with the newly acquired information.
- ▶ [Discharge and admit as new patient.]: Initializes the current patient data/monitoring condition and admit the searched patient as new patient.
- ▶ [Cancel]: Cancels the acquired information.

CAUTION

- ♦ The item not acquired from the patient data server will be left blank.
For the blank item, manually input the information.
("To Input the Patient Information Using the Touch Keys" P5-2)
- ♦ After the patient data is acquired by searching the patient data server, make sure to perform the admit process by pressing the [Discharge and admit as new patient.] key.
- ♦ Do not change the Bed ID of the bedside monitor during monitoring.

To Change the Admit Date

If the DS-7700 system is connected to the TCP/IP network and the data server is used, the [Admit Date] key will be displayed on the [Admit/Discharge] screen which allows to change the admit date of the patient.

NOTE

- To change the admit date, it is necessary to perform network setup for data server in advance.
(Maintenance Manual "Data Server Setup" P3-26)

1 Select the patient to change the admit date by pressing the bed selection area.

2 Press the [Menu], [Admit] ("Patient") keys.

- ▶ The "Admit/Discharge" screen will be displayed.

3 Press the [Admit Date] key.

- ▶ The "Date of Admission" screen will be displayed.

4 Enter the year, month, day, hour, and minute.

- 1 Enter the year using the numeric keys.
- 2 Press the [Yr] key.
- 3 Enter the month, day, hour, minute using the numeric keys.
- 4 Press the [Mo], [Dy], [hh], [mm] key respectively.
Example:
[2][0][1][0][Yr][1][Mo][2][2][Dy][9][hh][5][4][mm]
- 5 Press the [Setup] key.

- ▶ The entered numbers will be finalized.

NOTE

- It is not possible to set a future date/time.

To Select the Nurse Team

By selecting a nurse team, the following can be performed.

- ♦ To easily recognize the patients for each nursing team, the displayed colors on the home display and individual display can be changed according to the nursing team.
- ♦ When the nurse team is changed, the displayed order of patients can be rearranged according to the nurse team.

The nurse team can be selected only when [ON] is selected for "Nurse Team Function" under the "Soft Switch" menu.

NOTE

- ♦ Perform the nurse team setup (name and color) in advance on the "Soft Switch" menu and "Nurse Team Setup" under "System Configuration" menu.
(☞ "Nurse Team Setup" P10-18)

1 Press the [Menu], [Admit] ("Patient") keys.

- The "Admit/Discharge" menu will be displayed.

REFERENCE

- ♦ When [ON] is selected for "Nurse Team Function", [Nurse Team] will be displayed on the "Admit/Discharge" screen.

The screenshot shows the 'Admit/Discharge' screen for patient CH6000. The screen includes fields for ID (123456), Name (FUKUDA), sex (Male), age (60Yrs), birth date (1950/04/01), height (165.0cm), weight (58.0kg), and BSA (1.63 m²). Buttons for 'Prev. Disp.', 'Wave Select', 'Suspend', and 'Discharge' are visible. A 'Nurse Team Monitor Suspend' button is highlighted. The 'Nurse Team' button is located at the top right of the screen.

2 Press the [Nurse Team] key.

- The "Nurse Team Selection" screen will be displayed.

The screenshot shows the 'Nurse Team Selection' screen for patient CH6000, FUKUDA. It displays five team options: TEAM A, TEAM B, TEAM C, TEAM D, and TEAM E. Buttons for 'Prev. Disp.', 'Not Set', and 'Cancel' are located at the bottom right.

3 Select the nurse team for the patient.

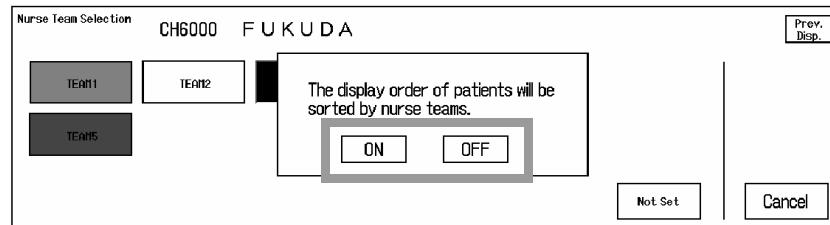
- [Not Set]: A nurse team will not be assigned for the patient.

REFERENCE

- ♦ To cancel the nurse team selection, press the [Cancel] key.

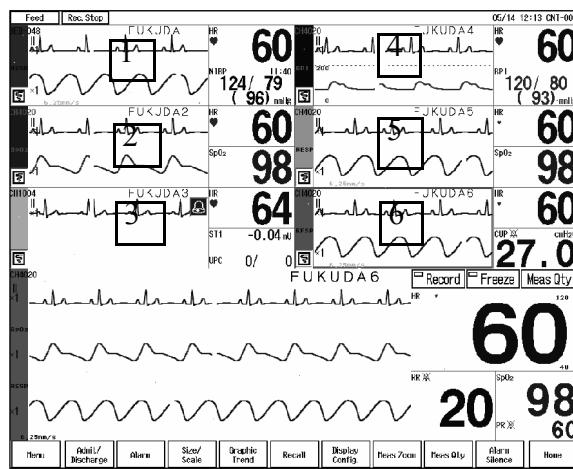
When [ON] is selected for "Sort patients by nurse teams." on the "Nurse Team Setup":

- A confirmation message of whether or not to sort the patients will be displayed.

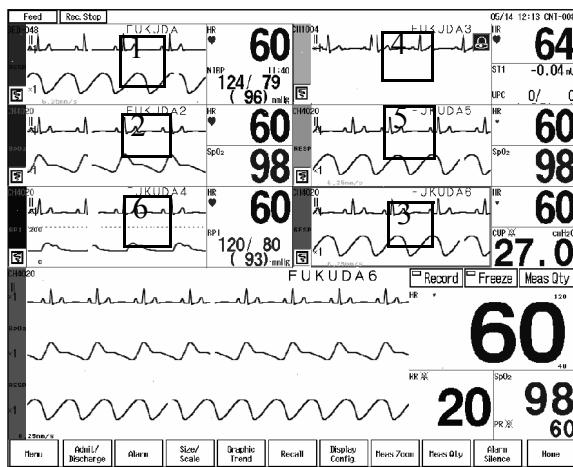


1 Select [ON]/[OFF].

- [ON]: The display order of the patients on the home display will be sorted by nurse teams.
 ► [OFF]: The display order will not be sorted.



Before Sorting



After Sorting

Monitor Suspend

Suspend / Resume Monitoring

This section explains the procedure to suspend and resume monitoring when a patient temporarily leaves the bed. With this suspend monitoring function, data measurement, alarm generation, automatic measurement, and automatic recording can be suspended without erasing any data and setup condition.

By selecting ON for "Monitor Suspend's Message Selection" on the Soft Switch menu, different messages in different colors according to the patient's destination can be displayed during monitoring suspend condition. To remind the user to resume monitoring, alarm will generate after the preprogrammed duration (15min./30min./1hr/1.5hr/2hr) for "Monitor Suspend Time".

CAUTION

- When the monitoring is suspended, the trend data and full disclosure waveform (optional function) data will not be acquired.
- Resuming monitoring will also resume the alarm in suspension.
- The monitor suspend function will not be synchronized between the central monitor and the bedside monitor.
 - The monitor suspend/resume operation for central monitor and bedside monitor is independent.
 - Resuming monitoring on the bedside monitor will not resume monitoring on the central monitor.
 - In the same way, resuming monitoring on the central monitor will not resume monitoring on the bedside monitor.
 - 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.

NOTE

- To display the detailed message during monitoring suspend condition, select ON for "Monitor Suspend's Message Selection" on the Soft Switch menu, and set the details on the "Monitor Suspend Setup" menu of the system configuration menu.
( Maintenance Manual "Soft Switch" P6-8)
( "Monitor Suspend Setup" P10-17)

To Suspend Monitoring

- 1 Select the patient to suspend monitoring by pressing the bed selection area.
- 2 Press the [Menu], [Suspend] ("Patient") keys.

If "Monitor Suspend's Message Selection" (soft switch) is set to OFF:

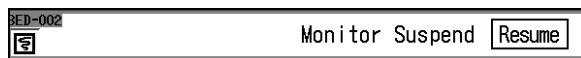
- The "Suspend" screen will be displayed.

REFERENCE

- To cancel the monitor suspend operation, press the [Cancel] key.

1 Press the [Suspend] key.

- The screen will automatically return to the home display with the [Resume] key displayed for the monitoring suspended patient.



If both "Monitor Suspend's Message" and "Monitor Suspend Time" are set:

- The "Suspend" screen will be displayed.

1 Select the monitor suspend's message.

- The screen to select the monitor suspend duration will be displayed.

REFERENCE

- Pressing the [Monitor Suspend] key on this screen will immediately suspend monitoring without setting the monitor suspend duration.

2 Select the "Monitor Suspend Time" from [15Min.]/[30Min.]/[1Hr.]/[1.5Hr.]/[2Hr.].

- The monitoring will be suspended.

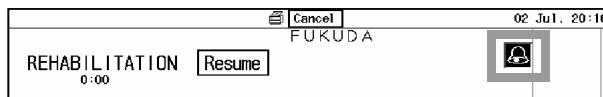
- The time will start counting down for the set duration.



REFERENCE

- [Continuous] will start to suspend monitoring without setting the duration.
- The selected monitor suspend's message with the set color will be displayed on the home display.

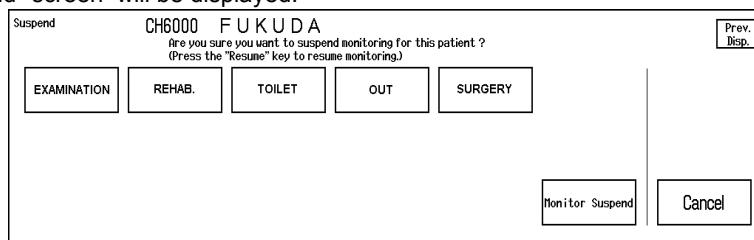
- When the preprogrammed duration completes, alarm will generate.
 ►  (Event) will be displayed, alarm sound will generate (5 sec. interval), and alarm indicator will light.

**REFERENCE**

- To extend the monitor suspend duration, press  to display the monitor suspend duration selection screen.

If "Monitor Suspend's Message" is set, but "Monitor Suspend Time" is not set:

- The "Suspend" screen will be displayed.



- 1 Select the monitor suspend's message.

- The screen will automatically return to the home display and the monitoring for the selected patient will be suspended.

**REFERENCE**

- The selected monitor suspend's message with the set color will be displayed on the home display.

To Resume Monitoring

- 1 Press the [Resume] key on the home display.

- The monitoring will resume.

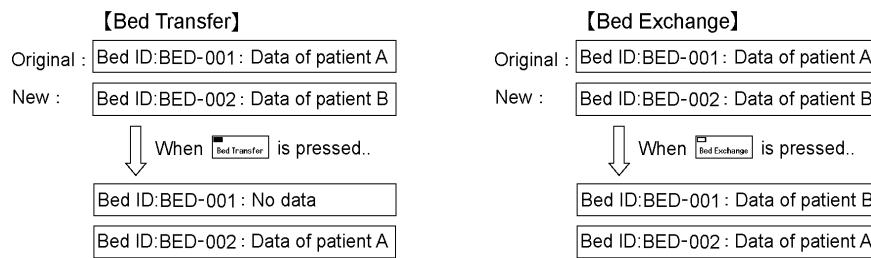


Bed Transfer and Bed Exchange

By using the bed transfer/exchange function, patient information and monitoring data can be transferred/exchanged between the beds.

Bed Transfer: The setup data of the original bed will be overwritten to the setup data of the new bed.
The original bed will be treated as discharged bed, monitoring data will be cleared and setup data will be initialized.

Bed Exchange: The setup data of the original bed and the new bed will be exchanged.



By performing network setup for the central monitors, bed transfer/exchange (transfer/exchange of patient information and monitoring data) among several central monitors will become possible through the TCP/IP network.

	Details	Bed Transfer		Bed Exchange	
		Original	New	Original	New
Patient Information	Admit Settings	Discharge * ¹	Transfer	Transfer	Transfer
Alarm	Alarm Settings	Discharge * ²	Transfer	Transfer	Transfer
Record	Record Settings	Discharge * ³	Transfer	Transfer	Transfer
Review Data	Graphic Trend	Discharge * ¹	Transfer	Transfer	Transfer
	Tabular Trend		Transfer	Transfer	Transfer
	NIBP List		Transfer	Transfer	Transfer
	Full Disclosure Waveform		Delete or Transfer* ⁴	Delete or Transfer* ⁴	Delete or Transfer* ⁴
	Recall		Transfer	Transfer	Transfer
	ST Measurement		Delete or Transfer* ⁴	Delete or Transfer* ⁴	Delete or Transfer* ⁴
Pre-Set	Bed Name Settings	Initialize	Initialize	Initialize	Initialize

*¹: The data will be initialized or deleted.

*²: The initial settings at admittance will be applied.

*³: The settings will be backed up.

*⁴: The data will be deleted if between different central monitors, and the data will be transferred if within the same central monitor.

CAUTION

- When a bed transfer is performed, all setup data for the new bed will be replaced. The data for the wired network bed and the data for the same bed monitored on other central monitor will be initialized.
- If the bed transfer/exchange is performed for the monitors connected to the DS-LANII/III network, the GAS alarm settings will be backed up or initialized depending on the settings for "Backup at Discharge" on the bedside monitor.
- When using the EMR link function, bed transfer/exchange cannot be performed.

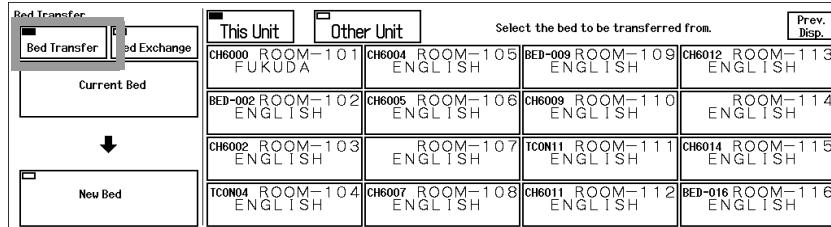
However, bed transfer/exchanbe can be performed when the EMR link is offline.

NOTE

- Perform settings in advance for the "Central Monitor Communication" under "Network Configuration" (Pre-Set menu).
( Maintenance Manual "Central Monitor Communication" P3-31)

1 Press the [Menu], [System Config.], [Bed Transfer] keys.

- ▶ The "Bed Transfer" screen will be displayed.



Bed Transfer		This Unit		Other Unit		Select the bed to be transferred from.		Prev. Disp.
<input checked="" type="checkbox"/>	Bed Transfer	CH6000	ROOM-101	CH6004	ROOM-105	BED-009	ROOM-109	CH6012
		FUKUDA	ENGLISH	ENGLISH	ENGLISH	ENGLISH	ENGLISH	ENGLISH
<input checked="" type="checkbox"/>	Bed Exchange	BED-002	ROOM-102	CH6005	ROOM-106	CH6009	ROOM-110	CH6013
		ENGLISH	ENGLISH	ENGLISH	ENGLISH	ENGLISH	ENGLISH	ENGLISH
		Current Bed						
		↓						
		New Bed						

2 Press the [Bed Transfer] / [Bed Exchange] key.

- ▶ The LED will light for the pressed key.

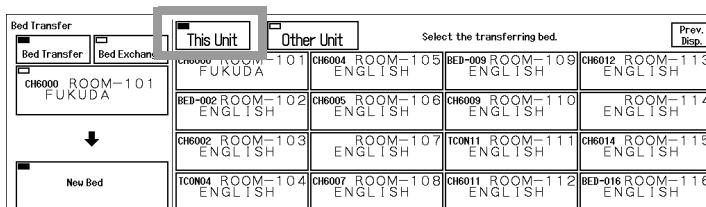
3 Select the central monitor by pressing [This Unit] / [Other Unit].

NOTE

- If "Central Monitor Communication" under "Network Configuration" (Pre-Set menu) is not set, [Other Unit] cannot be set.

When [This Unit] is selected:

- ▶ The list of beds monitored on this unit will be displayed.



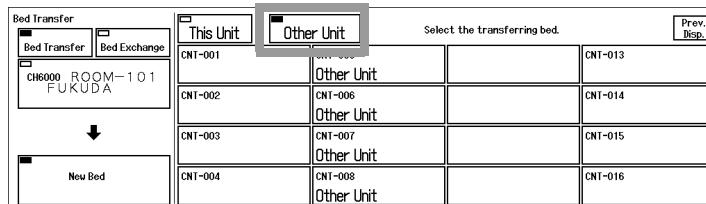
Bed Transfer		This Unit		Other Unit		Select the transferring bed.		Prev. Disp.
<input checked="" type="checkbox"/>	Bed Transfer	CH6000	ROOM-101	CH6004	ROOM-105	BED-009	ROOM-109	CH6012
		FUKUDA	ENGLISH	ENGLISH	ENGLISH	ENGLISH	ENGLISH	ENGLISH
<input checked="" type="checkbox"/>	Bed Exchange	BED-002	ROOM-102	CH6005	ROOM-106	CH6009	ROOM-110	CH6013
		ENGLISH	ENGLISH	ENGLISH	ENGLISH	ENGLISH	ENGLISH	ENGLISH
		Current Bed						
		↓						
		New Bed						

1 Select the original bed to be transferred or exchanged.

- ▶ The selected bed will be set as the bed to be transferred or exchanged.
- ▶ The LED will light for the [New Bed] / [Bed B] key.

When [Other Unit] is selected:

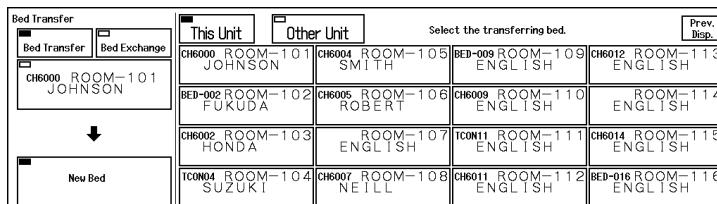
- The list of central ID of the central monitors (max. 16) connected to the TCP/IP network will be displayed.



Bed Transfer		This Unit	Other Unit	Select the transferring bed.	Prev. Disp.
CNT-001	CH6000 ROOM-101 FUKUDA	CNT-001	Other Unit		CNT-013
CNT-002		CNT-002	CNT-006 Other Unit		CNT-014
CNT-003		CNT-003	CNT-007 Other Unit		CNT-015
CNT-004		CNT-004	CNT-008 Other Unit		CNT-016

1 Select the central monitor.

- The list of beds monitored on the selected central monitor will be displayed.



Bed Transfer		This Unit	Other Unit	Select the transferring bed.	Prev. Disp.
CH6000	ROOM-101 JOHNSON	CH6004	ROOM-105 SMITH	BED-009 ROOM-109 ENGLISH	CH6012 ROOM-113 ENGLISH
BED-002	ROOM-102 FUKUDA	CH6005	ROOM-106 ROBERT	CH6009 ROOM-110 ENGLISH	ROOM-114 ENGLISH
CH6008	ROOM-103 TONDA		ROOM-107 ENGLISH	TCON11 ROOM-111 ENGLISH	CH6014 ROOM-115 ENGLISH
TCON04	ROOM-104 SUZUKI	CH6007	ROOM-108 NEILL	CH6011 ROOM-112 ENGLISH	BED-016 ROOM-116 ENGLISH

2 Select the original bed to be transferred or exchanged.

- The selected bed will be set as the bed to be transferred or exchanged.

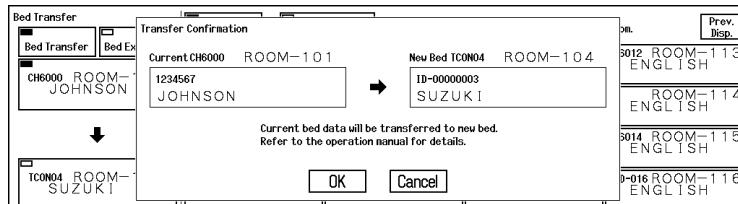
- The LED will light for the [New Bed] / [Bed B] key.

4 Select the original bed to be transferred or exchanged using the same procedure as step 3.

NOTE

- Either of the "Current Bed" or "New Bed" (Bed A or Bed B) must be the bed on [This Unit]. The beds on [Other Unit] cannot be set for both "Current Bed" and "New Bed" (Bed A and Bed B).

- The "New Bed" or "Bed B" will be finalized and confirmation message will be displayed.



5 Press the [OK] key.

Discharge

Erasing the Patient Name, Tabular/Graphic Trend

The patient information, monitoring data, monitoring condition will be cleared to prepare for monitoring a next patient.

The following data will be cleared after the discharge procedure.

- ♦ Patient information input during the admit procedure (patient name, pacemaker used/not used, etc.)
- ♦ Patient monitoring data (trend data, recall waveform, etc.)
- ♦ Setup data changed during monitoring

CAUTION

- ♦ Depending on the bedside monitor type and software version, discharge procedure for the TCON bed can not be performed on this unit. The discharge operation for the central monitor and bedside monitor is independent.
- For details of the bedside monitor type and software version, refer to our service representative.

NOTE

- ♦ The alarm limit will be initialized to the value set for the "Admit Setup" of the Pre-Set menu.
( Maintenance Manual "Initial Settings at Admittance" P6-26)

REFERENCE

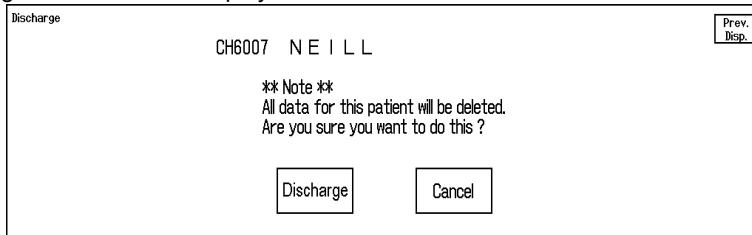
- ♦ The monitoring condition after discharge can be selected from [Admit] or [Suspend] for "Setup at Discharge" under the Soft Switch menu.
( Maintenance Manual "Soft Switch" P6-8)

Discharging the Patient

1 Select a patient to perform the discharge procedure by pressing the bed selection area on the home display.

2 Press the [Menu], [Discharge] ("Patient") keys.

- The "Discharge" screen will be displayed.



REFERENCE

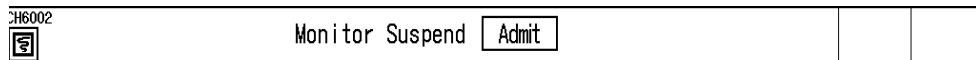
- ♦ To cancel the discharge procedure, press the [Cancel] key.

3 Press the [Discharge] key.

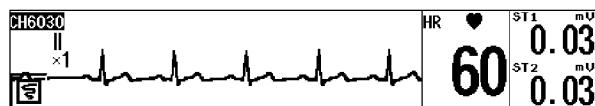
- ▶ The patient information, patient data, monitoring condition, etc. will be initialized.
- ▶ After the discharging procedure, the display will return to the home display.

NOTE

- ♦ Depending on the setup of the "Setup at Discharge" under the Soft Switch menu, the home display will appear differently.



If [Suspend] is selected for "Setup at Discharge":



If [Admit] is selected for "Setup at Discharge":

Setup at Admittance

On the "Admit Setup" under the Pre-Set menu, ON/OFF of each parameter, default value of alarm settings can be set. When a discharge procedure is performed, the alarm setup will be initialized to the value set on this "Admit Setup". If the discharge procedure is performed on the bedside monitor, the alarm setup will be initialized to the value for the bedside monitor.

NOTE

- ♦ The setup at admittance should be performed by our service representative or your system administrator.
(Maintenance Manual "Initial Settings at Admittance" P6-26)

EMR Link Function

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

- ♦ When a patient is admitted on EMR, the same patient will be admitted on the DS-7700 system.
- ♦ When a patient is discharged on EMR, this patient's information on the DS-7700 system will be initialized and allows discharge operation.
- ♦ When a patient information is changed on the EMR, the patient information on the DS-7700 system will also change.

CAUTION

- ♦ If some items are not changed on the central monitor, change those manually on the "Admit/Discharge" screen. Make sure that the settings for the pacemaker usage and patient type are correct as these will affect the monitoring accuracy.
- ♦ The discharge process on EMR will only initialize the patient information on the central monitor. The discharge process on EMR will not initialize the monitoring data and alarm settings on the central monitor. To initialize these data, it is necessary to perform discharge process on the central monitor.

NOTE

- To use the EMR link function, it is necessary to select [Link with EMR] on the "Network Configuration (Patient Data Server)".
( Maintenance Manual "EMR Link Function" P5-1)

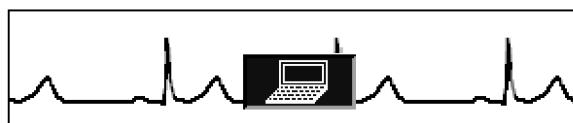
Restrictions of EMR Link Function

There are following restrictions when using the EMR link function.

Functions	Item	EMR Link Function		
		EMR Admitted	EMR Discharged	EMR Offline
"Admit/Discharge"	Displayed Message	Admitted on EMR	Discharged on EMR	EMR Offline
	[ID]	No	No	Yes
	[Search Patient]	No	No	No
	[Name]	No	No	Yes
	[Discharge]	No	Yes	Yes
	[Suspend]	Yes	Yes	Yes
	[Admit Date]	No	No	Yes
	[Bed Name]	Yes	Yes	Yes
"Menu"	Other patient information	Yes	Yes	Yes
	[Discharge]	No	Yes	Yes
	[Bed Transfer]	No	No	Yes
	Change of patient ID	No	No	Yes
	Change of patient name	No	No	Yes
	Change of admit date	No	No	Yes
	Other patient information	Yes	Yes	Yes
	Discharge process	No	Yes	Yes
"Yes": Can display, edit, and change settings.				
"No": Cannot display, edit, and change settings.				

Admit/Discharge on the EMR**When a Patient is Admitted on the EMR**

When a patient is admitted on the EMR, EMR notice icon will be displayed on the DS-7700 system.



- 1 Press the EMR notice icon.

- The "Admit/Discharge" screen will be displayed.

- 1 The patient's admit date/time on the EMR will be displayed.
- 2 Indicates that EMR link function is used.

REFERENCE

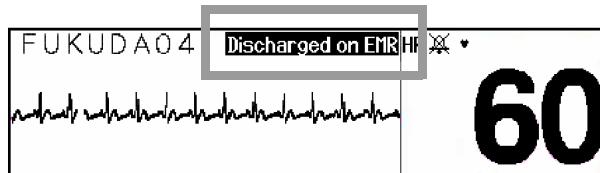
- The patient ID, patient name, and admit date from the EMR cannot be changed on the central monitor, but other patient information can be input on the admit menu.

2 The patient data acquisition from the EMR will be completed.

- The monitoring for the patient will start.

□ When a Patient is Discharged from the EMR

When a patient is discharged from the EMR, "Discharged on EMR" will be displayed on the home display. On the "Admit/Discharge" screen, the [Discharge] key will become effective to allow discharging the patient.



- 1 Press the [Discharge] key on the "Admit/Discharge" screen.

□ To Display the Review Data after EMR Discharge

Setting ON for "Display Data Before Discharging" on the "Network Configuration (Patient Data Server)" menu will allow to display the patient's review data even after the patient is discharged from the EMR. The review data can be displayed until the discharge process is performed on the central monitor.

If OFF is set for "Display Data Before Discharging", this review data will not be displayed.
(☞ "Review Data after EMR Discharge" P8-62)

Chapter 6 Alarm Function

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Chapter 6 Alarm Function

General Description



CAUTION

- On a wired network, the alarm generated on the bedside monitor will be transmitted to this unit with maximum of 2.5 seconds delay.
 - On a TCON network, the alarm generated on the bedside monitor will be transmitted to this unit with maximum of 5 seconds delay.
 - On a wireless network, the alarm generated on the bedside monitor will be transmitted to this unit with maximum of 15 seconds delay.
 - The adjustable alarm limit increment is different between the DS-5000 series and the DS-7000 series monitors. Therefore, the set alarm limit may change to the adjustable value depending on the monitor type constructing the network system and the DS-LANII/III, TCON network specification.
 - The arrhythmia alarm of Slow VT, Couplet, Pause, Trigeminy, Tachy and Brady can not be set for the DS-LANII network bed (BED, LW, LW+T).
 - 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.
 - Depending on the bedside monitor type and software version, the ventilator alarm factor may not be transmitted to the central monitor.
For details, refer to our service representative.
 - 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" alarm generation, alarm for HR, ASYSTOLE, VF, TACHY, BRADY will be generated.
 - If "Suspend Arrhy. Analysis during Noise Interference" under Alarm Related Setup (Preset) is set to [ON], the "Cannot analyze" alarm will generate when analysis suspended duration exceeds 30 seconds.
 - BP7, BP8, TEMP3 to 8, SpMet-2, SpCO-2 alarm will not be generated on the central monitor.
-

NOTE

- On the "Alarm Related Setup" under "Pre-Set Menu", detailed alarm setup can be performed.
This setup should be performed by our service representative or system administrator of each institution.
(Maintenance Manual "Alarm Related Setup" P6-16)
-

Alarm System

The alarm system for this unit can be selected from FUKUDA DENSHI mode or IEC mode.

The default setting is IEC mode.

( Maintenance Manual "Settings for Each Alarm System" P7-10)

REFERENCE

- The alarm system can be set on the "Alarm Related Setup" under "Pre-Set Menu".
( Maintenance Manual "Alarm Related Setup" P6-16)

Alarm Priority and Alarm Sound

Alarm priority according to the urgency can be set for each parameter.

The alarm sound and the display priority of alarm message differ depending on the alarm priority.

REFERENCE

- The alarm system can be set on the "Alarm Related Setup" under "Pre-Set Menu".
( Maintenance Manual "Alarm Related Setup" P6-16)

A different alarm sound can be set by changing the alarm system (IEC/FUKUDA DENSHI).

FUKUDA DENSHI Mode

Alarm Priority	Description	Tone	Displayed Color
Top Priority	Life Threatening Alarm	Continuous and rapid beep tone	Red
High Priority	Life Threatening Alarm	Continuous beep tone	Red
Medium Priority	Cautionary Alarm	Beep tone every 5 seconds	Yellow
Low Priority	Treatment Needed Alarm	Single beep tone	Blue
Notification Alarm		Display Only	White

IEC Mode

Alarm Priority	Description	Tone	Displayed Color
Top Priority	(No corresponding alarm)		
High Priority	Life Threatening Alarm	Continuous beep tone	Red
Medium Priority	Cautionary Alarm	Beep tone every 5 seconds	Yellow
Low Priority	Treatment Needed Alarm	Single beep tone	Blue
Notification Alarm		Display Only	White

⚠ CAUTION

- 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.

Displayed Message

In this section, the displayed messages are described.

Depending on the setting, waveform background will light in red when an alarm generates. (Default: Lighting)

The alarm wave background setting can be performed on the "Alarm Related Setup" under "Pre-Set Menu".

( Maintenance Manual "Alarm Related Setup" P6-16)

Ventilator Alarm

When a ventilator is connected to the bedside monitor, ventilator alarm and connection status alarm can be notified on the central monitor.

If the detailed alarm factor can be specified, a detailed message will be also displayed.

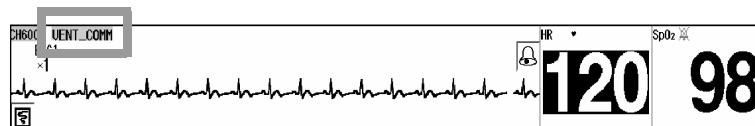
WARNING

- The ventilator alarm on this unit should be used as supplementary function. Check the patient's condition, ventilator alarm sound and message occasionally.

(___: Default)

Displayed Message	Alarm Priority		Note
	FUKUDA DENSHI Mode	IEC Mode	
VENT	Top/High	High	Alarm is generated on the ventilator. Or, connection error with a ventilator is generated.
Alarm Factor			
AWP			Airway Pressure Alarm
MV			Minute Ventilation Alarm
APNEA			Apnea Alarm
CONT. HP			Continuous High Pressure Alarm
Upper FiO ₂			FiO ₂ Upper Limit Alarm
Lower FiO ₂			FiO ₂ Lower Limit Alarm
Upper EtCO ₂			EtCO ₂ Upper Limit Alarm
Lower EtCO ₂			EtCO ₂ Lower Limit Alarm
Upper RR Alarm			RR Upper Limit Alarm
Lower RR Alarm			RR Lower Limit Alarm
PEEP			PEEP Low Alarm
VENT_COMM			Power OFF, cable disconnected, standby condition, etc.
URGENT			Other high level alarm

The ventilator alarm factor will be displayed as indicated in the following example.



Ventilator Alarm Factor

⚠ CAUTION

- Depending on the bedside monitor type and software version, the ventilator alarm factor may not be transmitted to the central monitor.
For details, refer to our service representative.

□ Numeric Data Alarm and Arrhythmia Alarm

When the measurement data exceeds the alarm limit or when arrhythmia is detected, the alarm is notified by message and sound.

- When more than one alarm are generated, the alarm message with the higher priority will be displayed.
- If more than one alarm with the same priority is generated, the message for the newest alarm will be displayed.

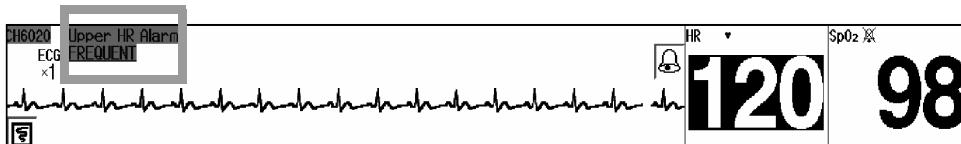
⚠ CAUTION

- For the numeric data alarm, alarm message will disappear and alarm sound will be silenced when the alarm condition dissolves. However, for the NIBP alarm, the alarm sound will continue until the [Alarm Silence] key is pressed, and the alarm sound will not resume even after the set alarm silence duration has elapsed. Also, the alarm for the previously measured NIBP data will be silenced if the next measured NIBP data is within the normal range.

NOTE

- The alarm message for the arrhythmia alarm (except Tachy, Brady) will continue to be displayed for 30 seconds even after the alarm condition dissolves.

The numeric data alarm message will be displayed as indicated in the following example.

*Numeric Data Alarm*

(_: Default)

Parameter	Displayed Message	Alarm Priority		Details	
		FUKUDA DENSHI Mode	IEC Mode		
Alarm	Alarm Suspend	-	-	Alarm is suspended.	
HR	Lower HR Alarm	Top/ <u>High</u> / Medium	<u>High</u> / Medium	The priority is same as TACHY, BRADY.	
	Upper HR Alarm				
SpO ₂ -1 SpO ₂ -2	Lower SpO ₂ Alarm	Top/ <u>High</u> / Medium	<u>High</u> / Medium	When a label is set, it will be displayed as "Upper SpO ₂ -[Label]", "Lower PR-[Label]".	
	Upper SpO ₂ Alarm				
	Lower PR-1 Alarm	<u>High</u> / Medium	<u>High</u> / Medium		
	Upper PR-1 Alarm				
	Lower PR-2 Alarm				
	Upper PR-2 Alarm				

Numeric Data Alarm

(_ : Default)

Parameter	Displayed Message	Alarm Priority		Details
		FUKUDA DENSHI Mode	IEC Mode	
Respiration	Lower RR Alarm	High/Medium	High/Medium	
	Upper RR Alarm			
	APNEA Alarm	Top/High	High	
CO ₂ Concentration	Lower EtCO ₂ Alarm	High/Medium	High/Medium	
	Upper EtCO ₂ Alarm			
Non-Invasive Blood Pressure	Lower NIBP Alarm	High/Medium	High/Medium	
	Upper NIBP Alarm			
Invasive Blood Pressure (BP1)	Lower xxx Alarm	High/Medium	High/Medium	xxx: Label
	Upper xxx Alarm			
Invasive Blood Pressure (BP2 to 6)	Lower xxx Alarm	High/Medium	High/Medium	xxx: Label
	Upper xxx Alarm			
Invasive Blood Pressure (ART)	Lower ART Alarm	High/Medium	High/Medium	
	Upper ART Alarm			
Gas Concentration	Upper CO ₂ -I Alarm	Medium	Medium	
	Lower CO ₂ -E Alarm			
	Upper CO ₂ -E Alarm			
	Lower O ₂ -I Alarm			
	Upper O ₂ -I Alarm			
	Lower O ₂ -E Alarm			
	Upper O ₂ -E Alarm			
	Upper N ₂ O-I Alarm			
	Lower AGT-I Alarm			
	Upper AGT-I Alarm			
	Lower AGT-E Alarm			
	Upper AGT-E Alarm			
Temperature	Upper MAC Alarm			
	Lower Tx Alarm	Medium	Medium	x: 1 or 2
ST Level	Upper Tx Alarm			x: 1 or 2
	Lower STx Alarm	Medium	Medium	
ST Level (12-lead)	Upper STx Alarm		x: I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6	
	Lower STx Alarm	Medium		Medium
MV (Adult)	Upper MV	Medium	Medium	
	Lower MV			
MV (Child/Neonate)	Upper MV	Medium	Medium	
	Lower MV			
PEAK	Upper PEAK	Medium	Medium	
	Lower PEAK			

Numeric Data Alarm

(_: Default)

Parameter	Displayed Message	Alarm Priority		Details
		FUKUDA DENSHI Mode	IEC Mode	
PEEP	Upper PEEP	Medium	Medium	
	Lower PEEP			
SpCO	Upper SpCO	High/ <u>Medium</u>	High/ <u>Medium</u>	When a label is set, it will be displayed as "Upper SpCO-[Label]."
SpMet	Upper SpMet	High/ <u>Medium</u>	High/ <u>Medium</u>	When a label is set, it will be displayed as "Upper SpMet-[Label]."

Arrhythmia Alarm

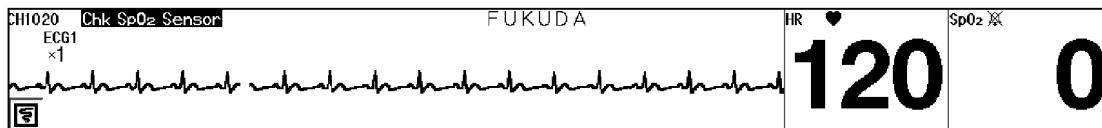
(_: Default)

Displayed Message	Alarm Priority		Notes
	FUKUDA DENSHI Mode	IEC Mode	
Arrhythmia Alarm OFF	-	-	All arrhythmia alarm is set OFF.
LEARN	-	-	Learning arrhythmia
Cannot analyze	Medium	Medium	Cannot analyze arrhythmia due to noise interference.
ASYSTOLE	Top/ <u>High</u>	High	Cardiac Arrest The priority is same as VF, VT.
VF	Top/ <u>High</u>	High	Ventricular Fibrillation The priority is same as ASYSTOLE, VT.
VT	Top/ <u>High</u>	High	Ventricular Tachycardia The priority is same as ASYSTOLE, VF.
SLOW VT	<u>High</u> /Medium	<u>High</u> /Medium	Accelerated Idioventricular Rhythm
RUN	<u>High</u> /Medium	<u>High</u> /Medium	Consecutive VPC
TACHY	Top/ <u>High</u> / Medium	<u>High</u> /Medium	Tachycardia The priority is same as HR, BRADY.
BRADY	Top/ <u>High</u> / Medium	<u>High</u> /Medium	Bradycardia The priority is same as HR, TACHY.
COUPLET	Medium	Medium	Couplet Ventricular Extrasystole
PAUSE	Medium	Medium	Cardiac Pause
BIGEMINY	Medium	Medium	Ventricular Bigeminy
TRIGEMINY	Medium	Medium	Ventricular Trigeminy
FREQUENT	Medium	Medium	Frequent VPC

 **CAUTION**

- 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.
- The "Cannot analyze" alarm generates when "Suspend Arrhy. Analysis during Noise Interference" under "Alarm Related Setup" ("Pre-Set Menu") is set to [ON], and the arrhythmia analysis is suspended for more than 30 seconds.

□ Measurement Status and Arrhythmia Status



The messages are listed in the order of priority.

Measurement Status Message

Parameter	Displayed Message	Alarm Priority	Details
Alarm	Alarm Sound Suspended	Notification	The alarm sound is suspended on the DS-8500 system.* ¹
NIBP	NIBP meas. failed	Medium	NIBP measurement has failed. (Displayed only when connected to the DS-LANIII network.)
ECG	Lead OFF	Medium/Low * ²	More than one leads are detached, or reference electrode is detached.
	Chk Electrode_xx		xx: lead type The electrode is detached for the displayed lead type.
SpO ₂	Check SpO ₂ Sensor	Medium/Low * ³	SpO ₂ pulse wave is small. SpO ₂ sensor attachment is not appropriate, etc SpO ₂ sensor is disconnected on a wireless network bed.
	Check SpO ₂ -xx Sensor		
Respiration	CVA Detect	Low	ECG waveform is superimposed on to the respiration waveform.
CO ₂	Check CO ₂	Low	Failure of CO ₂ unit or filter line.
SPIRO	Check SPIRO function.	Low	SPIRO unit is malfunctioning.
Telemeter	Chk TLM Receive	Medium * ⁴	Cannot receive telemetry signal. Generates when "Too Far Alarm" is set to [ON] and the telemetry signal cannot be received for the set duration (5 to 60 sec.).
	Chk TLM Battery	Top, High, Medium or Notification * ⁵	The remaining battery of the telemetry transmitter is 10% or lower.
	RCV Interference	Notification	Noise from other equipment is present.
DS-LANII/III	Chk DS-LAN Comm	Notification	Communication error with DS-LANII/III. DS-LANII/III connection is cut off. Cannot receive data via DS-LANII/III.
TCON	TCON Interference	Notification	Noise is interfering.
	Chk TCON Receive	Notification	TCON signal cannot be received. Data cannot be received by TCON.
	TCON Set. Changing	Notification	Changing TCON setting.
	TCON Set. Failed	Notification	Failed to change TCON setting.

*1: The message will be displayed on this unit when [ON] is set for "Link Alarm Sound Suspend Setting" ("Alarm Related Setup 5/5" ← "Pre-Set Menu"), and alarm sound is suspended on the DS-8500 system.

*2: Depending on the setting for "During Lead OFF" under "Alarm Related Setup" ("Pre-Set Menu"), the priority will be either medium or low. However, when the priority is medium, the alarm sound will differ from the standard one. (Beep tone every 5 seconds with a different sound)

*3: Depending on the setting for "During Check SpO₂ Sensor" under "Alarm Related Setup" ("Pre-Set Menu"), the priority will be either medium or low.
If the SpO₂ sensor is detached from the LX-5630, LX-7230 transmitter, the alarm priority will be medium.

*4: The alarm sound will differ from the standard medium priority alarm sound. (Beep tone every 5 seconds with a different sound)

*5: The alarm priority will depend on the setting for "Chk TLM Battery Alarm" ("Alarm Related Setup" <- "Pre-Set Menu"). It will be <Notification> if [OFF] is selected, and <Medium> if [ON] is selected. The alarm sound will differ from the standard medium priority alarm sound. (Beep tone every 5 seconds with a different sound)

⚠ WARNING

- When "Chk TLM Receive" is displayed, alarm will not function. Arrhythmia analysis will not be performed either.

NOTE

- If the alarm is silenced for <Chk TLM Battery> alarm, the alarm sound will not resume even after the set alarm silence duration has elapsed.

Arrhythmia Status Message

Displayed Message	Alarm Priority	Details
ECG Artifact	Medium or Notification*	Noise is interfering to the ECG.
ECG Low	Medium or Notification*	Cannot acquire ECG.
ECG1 Low	Notification	Cannot acquire ECG1.
ECG2 Low	Notification	Cannot acquire ECG2.
ECG1 Artifact	Notification	Noise is interfering to the ECG1.
ECG2 Artifact	Notification	Noise is interfering to the ECG2.

*: The alarm priority will depend on the setting for "Suspend Arrhy. Analysis during Noise Interference" ("Alarm Related Setup" <- "Pre-Set Menu"). It will be <Notification> if [OFF] is selected, and <Medium> if [ON] is selected. The alarm sound will differ from the standard medium priority alarm sound. (Beep tone every 5 seconds with a different sound)

□ Recorder Status, System Status, Laser Printer Status

The display area for each status is indicated as follows.



1 Built-in Recorder Status Message Display Area

The built-in recorder status message will be displayed.

2 System Status Message Display Area

The system status message will be displayed.

3 Laser Printer Status Message Display Area

The laser printer status will be displayed.

Built-in Recorder Status Message

Displayed Message	Alarm Priority	Range
Check Recorder	Notification	Thermal head error.
Check Magazine	Notification	Recorder cassette is not properly set.
Paper Out	Notification	No recording paper is present.
Paper Jam	Notification	Recording paper is jammed.
Recorder Busy	Notification	In process of recording.

System Status Message

Displayed Message	Alarm Priority	Range
Central ID is duplicated	Medium	When connected to the wired network, central ID is duplicated with other central monitor.
Check TCON Comm.	Medium	Communication error with TCON.
Check Data Server Comm.	Notification	Communication error with Data Server.
Check Patient Server Comm.	Notification	Communication error with Patient Server.
Check SNTP Comm.	Notification	Communication error with SNTP server.
Check multimonitor conn.	Notification	Communication error with extended display unit. (Only when LC-7019FT is connected)
Check PC/CF Card	Notification	PC/CF card error. Or, the card cannot be identified.
Check Backup Battery	Notification	Backup battery is depleted.
Check EMR comm.	Notification	Communication error with the patient data server.
EMR Offline	Notification	"Offline" is selected for EMR link function.

Laser Printer Status Message (When laser printer is used)

Displayed Message	Alarm Priority	Range
LP Com Error	Notification	Communication error with printer.
xx Printing	Notification	In process of printing on the laser printer. (x: number of stacked data, max. 64 data)
LP Waiting	Notification	Waiting condition for printer output.

Alarm

Alarm Limit Setup

Alarm setup function includes alarm suspend function and alarm ON/OFF setting for each parameter.

When the alarm is suspended, the alarm settings for all the parameters will become ineffective.

 **WARNING**

- When the alarm is suspended, make sure to check the patient's condition frequently. When the alarm is suspended, all alarm function will become ineffective even if the alarm for individual parameter is set to ON. Also, the alarm event will not be stored as recall.
- If the upper/lower alarm limit of the individual parameter is set to OFF, or if arrhythmia alarm is set to OFF, alarm will not function even if the alarm for individual parameter is set to ON. Be cautious when setting them OFF.
- The alarm for the parameter not selected for the "HR/PR Alarm Source" (ECG/SpO₂/BP) on the bedside monitor will be set to OFF on this unit.
Ex.) If SpO₂ is set as the HR/PR alarm source on the bedside monitor, HR alarm will be OFF on this unit. Even if alarm ON/OFF setting or threshold is changed, it will automatically turn OFF after 3 seconds.

Alarm Suspend

Using this function will temporarily suspend all the alarms. During the alarm suspension, "Alarm Susp:xxxx" message will be displayed. Alarms will not generate even if the alarm for individual parameter is set to ON.

All the alarms will automatically turn ON when the suspended time completes.

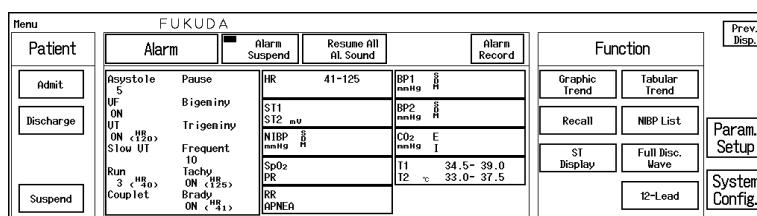
Use this function when replacing the ECG electrodes or sensors to avoid false alarm generation.

1 Press the [Menu] key.

- ▶ The "Menu" screen will be displayed.

2 Press the [Alarm Suspend] ("Alarm") key.

- ▶ The LED on the key will light to indicate that the alarm is suspended.
- ▶ Pressing the [Alarm Suspend] key will alternately switch the function between Alarm ON and Alarm Suspend.



3 Check the message.

- ▶ For the bed in alarm suspended condition, "Alarm Susp:xxxx" message will be displayed.
"xxxx" indicates the remaining time.

NOTE

- If different alarm suspend duration is set for this unit and the bedside monitor on a wired network, the shorter duration will be applied.

REFERENCE

- The alarm suspend duration can be selected from 1 to 5min.
(Default: 3min.) (Maintenance Manual "Alarm Related Setup" P6-16)

Alarm Setup for Each Parameter

ON/OFF of alarm and upper/lower alarm limit for each parameter can be set. When the set limit is exceeded, alarm will generate.

WARNING

- If the upper/lower alarm limit of the individual parameter is set to OFF, alarm will not function even if the individual parameter alarm is set to ON. Be cautious when setting them OFF.
- The alarm for the parameter not selected for the "HR/PR Alarm Source" (ECG/SpO₂/BP) on some wired bedside monitor or bedside monitor with TCON will be set to OFF on this unit. For applicable bedside monitors, contact your nearest representative.
Example:
If SpO₂ is set as the HR/PR alarm source on the bedside monitor, HR alarm will be OFF on this unit.
Even if alarm ON/OFF setting or threshold is changed, it will automatically turn OFF after 3

seconds.

CAUTION

- On a wired network (DS-LANII/DS-LANIII), the alarm generated on the bedside monitor will be transmitted to this unit with maximum of 2.5 seconds delay.
- On a TCON network, the alarm generated on the bedside monitor will be transmitted to this unit with maximum of 5 seconds delay.

NOTE

- The alarm limit of HR and PR-1 will synchronize if "Synchronize the Alarm Limit of HR and PR-1"(Alarm Related Setup 5/5) is set to ON.
Changing the HR alarm limit will also change the PR-1 alarm limit to the same value.
However, ON/OFF of alarm function will not link each other. PR-1 alarm can be set to OFF when the HR alarm is ON.
- The adjustable alarm limit range for this unit and the bedside monitor may differ.
Example:
Upper alarm limit of 300bpm can be set for PR on this unit, but there are some bedside monitors which can measure only up to 250bpm.
In such case, there is a possibility of setting the alarm limit exceeding the measurement range of the bedside monitor. When setting the alarm limit on this unit, make sure to set it within the measurement range of the bedside monitor.

□ Alarm Limit Range for Each Parameter

Parameter	Alarm Limit Range		[Auto] Setting *1
	Lower Limit	Upper Limit	
	Adjustable Increments		
HR	20 to 295bpm 60bpm or lower: 1bpm increments 60bpm or above: 5bpm increments	25 to 300bpm	Upper: current value +40bpm Lower: current value -40bpm*2
ST 12-Lead ST	-2.0 to +1.9mV 0.1mV increments	-1.9 to +2.0mV -20 to +19mm 1mm increments	Upper: current value +0.2mV (+2mm) Lower: current value -0.2mV (-2mm)
RR	5 to 145bpm 5bpm increments	10 to 150bpm	Upper: current value +20bpm Lower: current value -20bpm
APNEA	- 1 sec. increments	5 to 60 sec.	15 sec.

Parameter	Alarm Limit Range		[Auto] Setting *1	
	Lower Limit	Upper Limit		
	Adjustable Increments			
BP1 to 6	0 to 295mmHg	2 to 300mmHg	BP1/ART, NIBP: Upper: current value +40mmHg (+50kPa) Lower: current value -20mmHg (-30kPa) BP other than BP1/ART: Upper: current value +20% Lower: current value -20%	
	0 to 50mmHg: 1mmHg increments 50mmHg or above: 5mmHg increments			
	0 to 39.5kPa	0.2 to 40.0kPa		
	0 to 7.0kPa: 0.2kPa increments 7.0kPa or above: 0.5kPa increments			
CVP	0 to 38cmH ₂ O	2 to 40cmH ₂ O	Upper: current value +20% Lower: current value -20%	
	1cmH ₂ O increments			
NIBP	10 to 295mmHg	15 to 300mmHg	Upper: current value +40mmHg (+50kPa) Lower: current value -20mmHg (-30kPa)	
	0 to 50mmHg: 1mmHg increments 50mmHg or above: 5mmHg increments			
	1.6 to 39.5kPa	1.8 to 40.0kPa		
	1.6 to 7.0kPa: 0.2kPa increments 7.0kPa or above: 0.5kPa increments			
SpO ₂ -1/SpO ₂ -2	50 to 99%	51 to 100%	Upper: OFF Lower: 90%	
	1% increments			
PR-1/PR-2	20 to 295bpm	22 to 300bpm	Upper: current value +40bpm Lower: current value -40bpm*2	
	60bpm or lower: 1bpm increments 60bpm or above: 5bpm increments			
EtCO ₂	1 to 98mmHg	3 to 115mmHg	Upper: current value +10mmHg (+1.3kPa / +1.3%) Lower: current value -10mmHg (-1.3kPa / -1.3%)	
	1mmHg increments			
	0.1 to 13.1kPa	0.3 to 15.0kPa		
	0.1kPa increments			
	0.1 to 13.1%	0.3 to 15.0%		
	0.1% increments			
InspCO ₂	-	1 to 24mmHg	3mmHg (0.3kPa/0.3%)	
	1mmHg increments			
	-	0.1 to 3.0kPa		
	0.1kPa increments			
	-	0.1 to 3.0%		
	0.1% increments			
TEMP	30.0 to 49.0°C	31.0 to 50.0°C	Upper: +2°C (+3°F) Lower: -2°C (-3°F)	
	0.5°C increments			
	86.0 to 120.0°F	88.0 to 122.0°F		
	1.0°F increments			

Parameter	Alarm Limit Range		[Auto] Setting *1
	Lower Limit	Upper Limit	
	Adjustable Increments		
GAS CO ₂ _E, CO ₂ _I, O ₂ _E, O ₂ _I, N ₂ O_I, AGT_E, AGT_I MAC	ON/OFF setting only. Alarm limit cannot be set manually or automatically. (The alarm limit set on the bedside monitor will be applied.)		
MVe (Adult)	2 to 18L/min 0.5L/min increments	4 to 20L/min	N/A
MVe (Child/ Neonate)	0.5 to 4.5L/min 0.5L/min increments	1 to 5L/min	N/A
PEAK	8 to 98cmH ₂ O 1cmH ₂ O increments	10 to 100cmH ₂ O	N/A
PEEP	2 to 48cmH ₂ O 1cmH ₂ O increments	4 to 50cmH ₂ O	N/A
SpCO	- 1% increments	0 to 40%	N/A
SpMet	- 1% increments	0 to 15%	N/A

*1: If the value exceeds the adjustable range, the upper/lower adjustable limit will be set.

The automatic setup will not be performed for the turned OFF limit.

*2: By selecting [30bpm] or [40bpm] for "HR/PR Low Limit during Alarm Auto Setting" (Menu>System Config.>Pre-Set>Alarm Related Setup 5/5), the low limit will not go under 30bpm or 40bpm.

□ To Set the Parameter Alarm

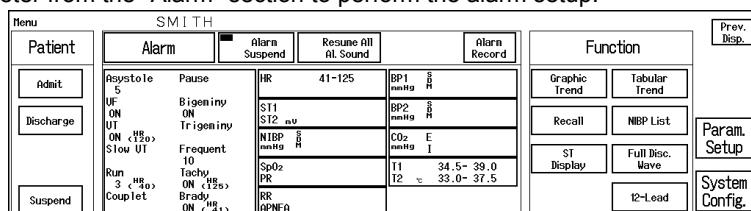
1

Press the [Menu] key.

► The "Menu" screen will be displayed.

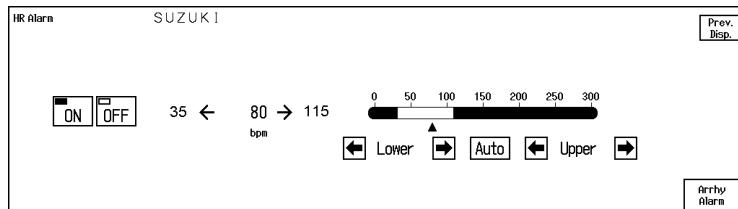
2

Select a parameter from the "Alarm" section to perform the alarm setup.



3

Set ON/OFF of alarm and upper and lower alarm limit for each parameter.



Display	Description
	Displays upper/lower limit and current value. The limits can be adjusted by directly pressing the bar display or using the arrow keys.
	Displays lower limit < current value → upper limit.

Key	Parameter	Description
	Individual Alarm	Selecting ON will generate the alarm. Selecting OFF will not generate the alarm.
	Lower Alarm Limit	Sets the lower alarm limit. The lower limit will be turned OFF when a value below the range is selected. In this case, alarm will not generate.
	Upper Alarm Limit	Sets the upper alarm limit. The upper limit will be turned OFF when a value above the range is selected. In this case, alarm will not generate.
	Automatic Setup	Automatically sets the limits corresponding to the current value. If the upper or lower limit is OFF, the limits will remain to be OFF.

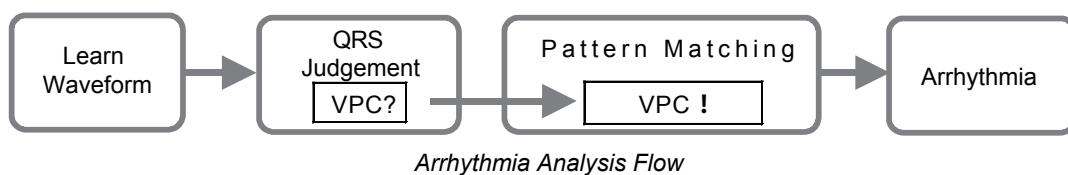
CAUTION

- The adjustable alarm limit increment is different between the DS-5000 series and the DS-7000 series monitors. Therefore, the set alarm limit may change to the adjustable value depending on the monitor type and the network construction.

To Set the Arrhythmia Alarm

The arrhythmia alarm can be turned ON or OFF, and arrhythmia detection level can be set.
When all arrhythmia alarm is set OFF, "ARRHY OFF" message will be displayed.

About the Arrhythmia Analysis



The arrhythmia detection is performed by learning the normal waveform of the patient and determines the VPC by comparing the waveform (QRS pattern) and R-R interval for each heartbeat. It compares the QRS amplitude, QRS width, QRS polarity, RR interval with the normal waveform, and extracts the abnormal QRS. Then, the QRS with suspected VPC is pattern matched. The noise and VPC will be distinguished to determine the VPC and generates the arrhythmia alarm.

WARNING

- Objective and constant arrhythmia detection is possible through the fixed algorithm incorporated in this unit. 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 recording, alarm recording and recall waveform for evaluation.

CAUTION

- The arrhythmia detection level corresponds with the displayed waveform size. Set a proper waveform size for monitoring.
- When the ECG waveform size is x1/4, x1/2, or x1, the detection threshold is 250 µV.
- When the ECG waveform size is x2 or x4, the detection threshold is 150 µV.

QRS Classification

Each QRS will be classified to the following pattern.

N (Normal)	Normal QRS beat
V (VPC)	Ventricular extrasystole
P (Pacing beat)	Pacing beat
F (Fusion beat)	Fusion beat of pacing and spontaneous beat.
? (Undetermined beat)	Learning arrhythmia, or unmatched beat

Arrhythmia Type

Using the QRS judgment and waveform analysis explained in the "About the Arrhythmia Analysis", the following 12 types of arrhythmia alarm can be generated.

CAUTION

- The arrhythmia alarm of Slow VT, Couplet, Pause, Trigeminy, Tachy and Brady can not be set for the DS-LANII network bed (BED, LW, LW+T)
- The criteria for arrhythmia detection may differ between the devices connected to the network depending on the model type and software version.

Arrhythmia	Setting	Detection Criteria
Asystole	ON, OFF 3 to 10 sec.*1	Cardiac arrest is detected for more than preprogrammed time.
VF	ON, OFF	A random, rapid electrical activity of the heart is detected.
VT(Ventricular Tachycardia)	ON, OFF	9 or more continuous ventricular beats are detected.*2 (For the DS-5000 series LW beds and wired beds, HR is 120bpm or over.)
Slow VT	ON, OFF	9 or more continuous ventricular beats are detected.*3
Run(Consecutive VPC)	ON, OFF 2 to 8 beats	Continuous VPC exceeding the preprogrammed value (2 to 8 beats) is detected.*4
Couplet(Couplet Ventricular Extrasystole)	ON, OFF	2 continuous VPC beats are detected.
Pause	ON, OFF 1.5 to 5.0 sec.	Cardiac arrest exceeding the preprogrammed duration is detected.
Bigeminy(Ventricular Bigeminy)	ON, OFF	QRS pattern of V- * -V- * -V- * is detected. (* is beat other than V.)
Trigeminy	ON, OFF	QRS pattern of * - * -V- * - * - V is detected. (* is beat other than V.)
Frequent(Frequent VPC)	ON, OFF 1 to 50 beats/min.	VPC exceeding the preprogrammed value is detected within 1 minute.
Tachy(Tachycardia)	ON, OFF	The upper HR alarm limit is exceeded.
Brady(Bradycardia)	ON, OFF	The lower HR alarm limit is exceeded.

*1: 3 to 8 sec. for DS-LANII network beds (BED, LW).

*2: HR: 140bpm / 120bpm or over

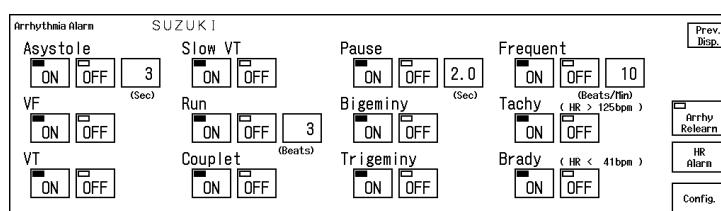
*3: HR: 100 to 140bpm or 100 to 120bpm

*4: HR Low Limit for RUN (0 to 100bpm)

□ Arrhythmia Alarm

1 Press the [Menu], arrhythmia alarm setup keys.

- ▶ The "Arrhythmia Alarm" screen will be displayed.



[Arrhythmia Alarm] Screen

2 Set each arrhythmia alarm.

- ▶ [ON]: Generates the alarm.
- ▶ [OFF]: Alarm will not generate.

NOTE

- ♦ For "Asystole", "Run", "Pause", "Frequent" alarms, set the threshold level.

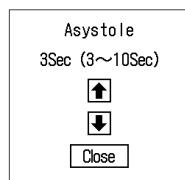
REFERENCE

- When all arrhythmia alarm is set OFF, "ARRHY OFF" message will be displayed.

3

Press the threshold level key for "Asystole", "Run", "Pause", "Frequent".

- The threshold level setup window will be displayed.



- | | |
|----------|---|
| Asystole | : Set the Asystole time from 3 to 10 sec. (Default: 5 sec.) |
| Run | : Set the Run continuous beat from 2 to 8 beats. (Default: 3 beats) |
| Pause | : Set the Pause time from 1.5 to 5 sec. (Default: 2 sec.) |
| Frequent | : Set the Frequent beats from 1 to 50 beats/min. (Default: 10 beats/min.) |

NOTE

- If ON is set for "Asystole/ VF/ VT Alarm Setup" under "Alarm-related Setup", "Asystole", "VF", "V'T", "Slow VT" alarm cannot be turned OFF.
(Maintenance Manual "Alarm Related Setup" P6-16)

4

Press / to set the threshold level.

5

After the setting, press the [Close] key.

- The threshold level setup window will close.

□ HR Low Limit for VT and RUN

On the "Arrhythmia Alarm Setup" screen, HR low limit for VT and RUN can be set.

CAUTION

- The settings for the "HR Low Limit for VT" and "HR Low Limit for RUN" will be compared with the average HR of continuous VPC. Therefore, the displayed HR value at alarm generation may be lower than the settings if it is just after the VT detection, or if RUN with few continuous VPC is detected.

NOTE

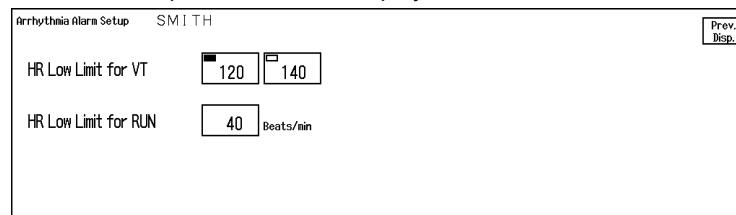
- For the DS-5000 series beds and the beds using the telemetry receiver (LW-5560N), this setting is not possible. The "Arrhythmia Alarm Setup" screen will not be displayed.

1

Press the [Config.] key on the "Arrhythmia Alarm" screen.

("To Set the Arrhythmia Alarm" P6-14)

- The "Arrhythmia Alarm Setup" screen will be displayed.



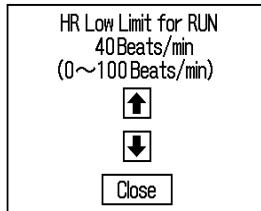
2 Set the VT analyzing condition ([120] / [140]) for the arrhythmia analysis.

REFERENCE

- When the HR exceeds the set value of [120] or [140] bpm, VT will generate.
- If the HR is 100bpm or over, and below the set value, Slow_VT will generate.

3 Press the detection level key ([40]) for "HR Low Limit for RUN".

- The detection level setup window will be displayed.



4 Press **↑**/**↓** to set the detection level in the range of 0 to 100bpm.

5 After the setting, press the [Close] key.

- The detection level setup window will close.

To Perform Arrhythmia Learning

Learning of normal ECG largely affects the accuracy of arrhythmia analysis.

When arrhythmia or QRS is misjudged, using the arrhythmia learn function will recover the original accuracy. Arrhythmia learning will be performed for about 20 beats for the normal ECG, but it may take longer if the heartbeat is unstable.

During the arrhythmia learn procedure, arrhythmia alarm other than asystole, VF, tachycardia, bradycardia will not generate.

The arrhythmia learn can be performed from the "ECG" screen or from the [Arrhy. Relearn] key preprogrammed as user key.

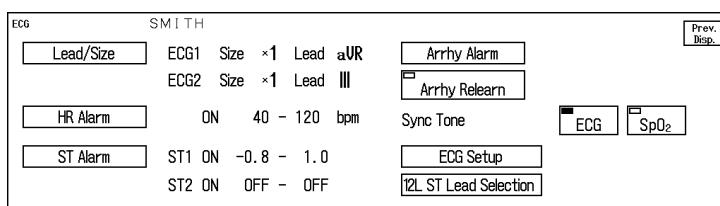
(Maintenance Manual "User Key" P6-14)

Procedure from the "ECG" Screen:

1 Select the patient to perform the arrhythmia learn process by pressing the bed selection area.

2 Press the ECG parameter key.

- The "ECG" screen will be displayed.



3 Press the [Arrhy Relearn] key.

- Arrhythmia learning will start.
► If the LED is lighted, it indicates that the arrhythmia learning is in process. Pressing the key while learning

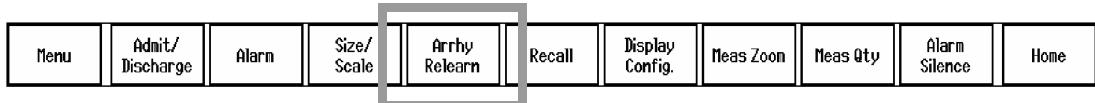
arrhythmia will not stop the learning.



- ▶ During arrhythmia learning, a message will be displayed.
- ▶ When the learn process is completed, the message will disappear.

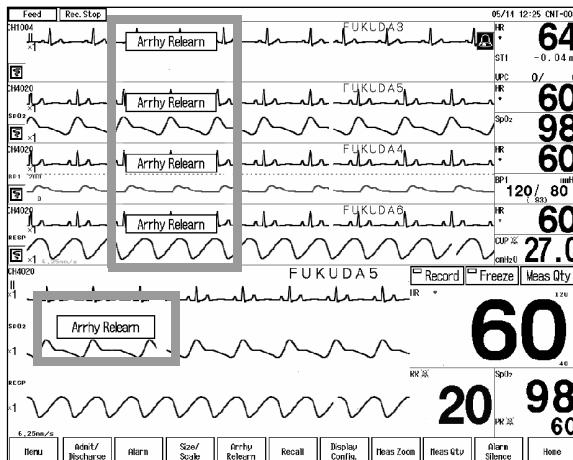


Procedure from the User Key:



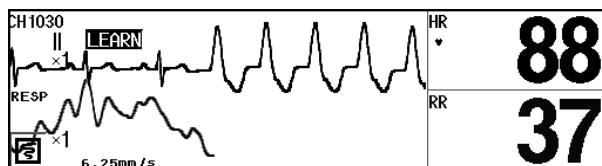
- 1** Press the [Arrhy Relearn] key on the user key area.

- ▶ [Arrhy Relearn] will be displayed on the all bed display area and individual bed display area.



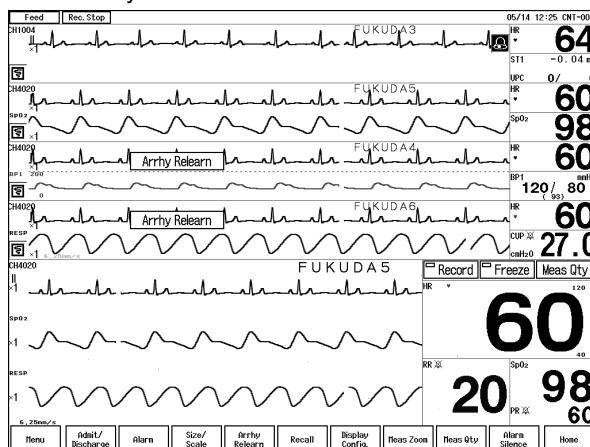
- 2** Press the [Arrhy Relearn] on the all bed display area or individual bed display area.

- ▶ Arrhythmia learning for that bed will start.
- ▶ During arrhythmia learning, a message will be displayed.
- ▶ When the learn process is completed, the message will disappear.



3

To clear the [Arrhy. Relearn] key for the bed which arrhythmia learning was not performed, press again the [Arrhy. Relearn] key on the user key area.

**□ Asystole, VF, VT, Slow VT Alarm**

To not miss any life-threatening alarm, Asystole, VF, VT, Slow VT alarm can be set so that they cannot be turned OFF. (Default: ON)

This setup should be performed by our service representative or system administrator of each institution.
(Maintenance Manual "Alarm Related Setup" P6-16)

Alarm Silence

The alarm sound can be silenced for fixed amount of time. This function will not affect the alarm message.

If the alarm cause still remains at completion of silence time, the alarm sound will generate again. Also, if another alarm with the same or higher priority occurs during the alarm silence time, the alarm sound for the new alarm will generate.

If an alarm condition is resolved for a moment but is generated again during the alarm silence time:	
FUKUDA DENSHI Mode	Alarm sound will not generate. The recall and alarm recording will not be performed.
IEC Mode	Alarm sound will generate, and recall, alarm recording will be performed.

If another alarm with lower priority occurs during the alarm silence time:	
FUKUDA DENSHI Mode	Alarm sound will not generate. The recall data will be stored, but alarm recording will not be performed.
IEC Mode	Alarm sound will generate, and recall, alarm recording will be performed.

NOTE

- ♦ If the (event) key or [Alarm Silence] key (user key) is pressed for another alarm which occurred during the alarm silence time, the alarm silence time for the first alarm will not be extended.

REFERENCE

- The alarm suspend duration can be selected from 1 to 5min.
- Whether to display the (event) key or not at alarm generation can be selected.
(Maintenance Manual "Alarm Related Setup" P6-16)

To Resume the Alarm Sound for All Parameters

The alarm silence state will cease in the event of any of the following.

- ♦ When the power is turned ON.
- ♦ When the alarm suspend status is changed. (ON/Alarm Suspend)
- ♦ When the monitoring is suspended on the "Admit/Discharge" screen.
- ♦ When the patient is discharged.
- ♦ When the [Resume All Alm. Sound] is pressed.

To Resume the Alarm Sound for Each Parameter

The alarm silence state will cease in the event of any of the following.

- ♦ When automatic alarm is set for the parameter.
- ♦ When the alarm is turned OFF for the parameter.

The Displayed Event Key

A different event key icon will be displayed depending on the alarm system (FUKUDA DENSHI/IEC) and alarm status.

Status	Event Key Icon	
	When the alarm system is FUKUDA DENSHI	When the alarm system is IEC
During Alarm Generation (If no parameter is in alarm silence condition)		
During Alarm Generation (If parameter in alarm silence condition is present)		
End of Alarm Generation (Unchecked) Monitor Suspend Timer Too Far Alarm Check SpO ₂ Sensor Alarm (When the SpO ₂ measurement is disabled for the wireless network bed due to the sensor been disconnected, etc.)		
Alarm Suspend	No display (Only "Alarm Susp: xxxx" message will be displayed.)	

Alarm Factor Display on the Event List

On the event list, the following abbreviation will be used for each alarm factor.



Alarm Factor	Abbreviation
Asystole	Asys
VF	VF
VT	VT
Slow VT	SLVT
Run	Run
Couplet	Cplt
Pause	Paus

Alarm Factor	Abbreviation
APNEA	APN
EtCO ₂	CO ₂
InspCO ₂	CO ₂
xxx (xxx = TEMP label)	xxx
Ventilator	VENT
NIBP_SYS	NIBP

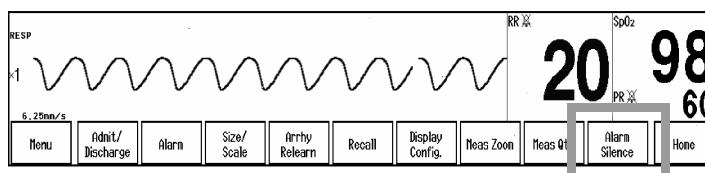
Alarm Factor	Abbreviation	
Bigeminy	Bigm	
Trigeminy	Trgm	
Frequent	Freq	
Tachy	Tach	
Brady	Brad	
HR	HR	
ST1	ST	
ST2	ST	
SpO ₂ -1	SpO ₂	
SpO ₂ -2		
PR-1	PR	
PR-2		
RESP	RR	
MVe (Adult)	MVe	
MVe (Child/Neonate)		

Alarm Factor	Abbreviation
NIBP_DIA	NIBP
NIBP_MAP	NIBP
xxx_SYS (xxx = BP label)	xxx
xxx_DIA (xxx = BP label)	xxx
xxx_MEAN (xxx = BP label)	xxx
Telemeter	TELE
Periodic Recording*	AUTO
PEAK	PEAK
PEEP	PEEP
SpCO	SpCO
SpMet	SpMt

*: Periodic recording is not an alarm factor, but will be displayed on the event list.

If [OFF] is selected for "Event Key" under "Alarm Related Setup":

- 1 When the alarm generates, press the [Alarm Silence] key (user key).

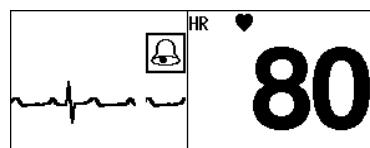


REFERENCE

- When the alarm system is IEC, icon will be displayed for the parameter in alarm silence condition.
- When the alarm system is FUKUDA DENSHI, this icon will not be displayed.

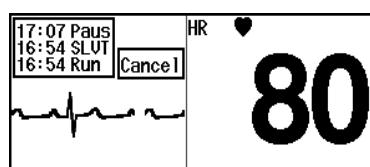
If [Event key] or [Recall] is selected for "Event Key" under "Alarm Related Setup":

- When an alarm is generated, icon will be displayed on the home display.



- 1 Press the icon.

- Event list will be displayed.

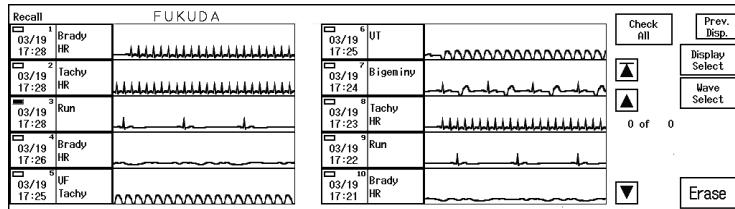


REFERENCE

- The alarm will be silenced for only the bed which  icon was pressed.

2 Press the event list area.

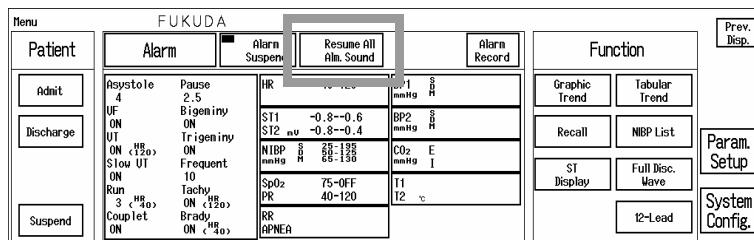
► The "Recall" screen will be displayed.



To Cancel the Alarm Silence Condition

The alarm silence condition can be cancelled.

Pressing the [Resume All Alm. Sound] key will cancel the alarm silence condition and resumes the alarm sound if alarm factor exists.



To Suspend the Alarm Sound

On the DS-8500 system patient monitor, the alarm sound can be suspended.

The "Alarm Sound Suspend" function suspends the alarm generation for a preprogrammed duration (1/2/5/10/30/60/90/120/240/360 min.) at a time such as during operation when the alarm generation is expected.

When the alarm sound is suspended on the DS-8500 system which is connected to this unit by DS-LAN II/III network, the alarm sound will be also suspended on this unit, and <Alarm Sound Suspended> message will be displayed.

Even when the alarm sound is suspended, alarm judgement, message display, recall, and alarm printing will be performed as usual.

The alarm sound on this unit will resume when the alarm sound on the DS-8500 system resumes.

NOTE

- During the alarm sound suspended duration, alarm sound will not be generated for the preprogrammed duration.

REFERENCE

- ON/OFF of "Link 'Alarm Sound Suspend' Setting" can be set on the "Alarm Related Setup" under the "Pre-Set" menu.

(Maintenance Manual "Alarm Related Setup" P6-16)

Too-Far Alarm

If [ON] is selected for "Too Far Alarm" under the "Alarm Related Setup" ("Pre-Set Menu"), and if telemetry transmitter is outside the transmission range for preprogrammed duration (5 to 60 sec.), "Chk TLM Receive" message will be displayed and alarm sound will generate in 5 seconds interval.

At this time, icon will be also displayed on the home display.

Regardless of the setting for "Event Key" under "Alarm Related Setup", icon will be displayed when the too far alarm generates.



1 Press the icon.

- ▶ The alarm sound will be silenced and [Too Far Alarm Silence] will be displayed.



2 Press the [Too Far Alarm Silence]/[Cancel] key.

When [Too Far Alarm Silence] is pressed:

- ▶ Too-Far Alarm will be ceased.

When [Cancel] is pressed:

- ▶ Too-Far Alarm will be suspended.
- ▶ If the too-far condition still remains after the pre-programmed time (duration to generate the alarm: 5 to 60 sec.), alarm will generate again.

Check SpO₂ Sensor

If the SpO₂ measurement is disabled due to the sensor been disconnected from the wireless network bed, etc., the <Check SpO₂ Sensor> message will be displayed and an alarm sound will generate in 5 seconds interval.

At this time, icon will be also displayed on the home display.

Regardless of the setting for "Event Key" under "Alarm Related Setup", icon will be displayed when the <Check SpO₂ Sensor> alarm generates.

1 Press the icon.

- ▶ The alarm sound will be silenced and the event list will be displayed.

2 On the 3rd row of the event list, "SpO₂ Sens" will be displayed indicating that the <Check SpO₂ Sensor> alarm has been generated.



- By pressing the event list or the [Cancel] key displayed on the left, the <Check SpO₂ Sensor> message will disappear.

ECG Alarm at Lead-Off Condition

When ECG lead is detached, some waveforms may become immeasurable depending on the detached lead.

In such case, ECG waveform or respiration waveform will be displayed as baseline, and ECG related alarm will generate.

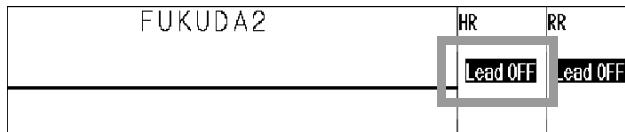
ECG related alarms are as follows.

- 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" under "Alarm Related Setup"("Pre-Set Menu") will not generate the ECG related alarm during lead-off condition.

For the alarm function during lead-off condition, the following setup can be performed on the "Alarm-Related Setup".

- ON/OFF of Alarm Judgement
- ON/OFF of Alarm Recording
- ON/OFF of Lead-Off Message



- Lead-Off Alarm Interval (5/30/60 sec.)

WARNING

- If the "Alarm Judgement" is set 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. Check the ECG leads condition frequently.

NOTE

- These setups should be performed by our service representative or system administrator of your institution.
(Maintenance Manual "Alarm Related Setup" P6-16)

Other Alarm Function

Alarm Recording

At alarm generation, the waveform or numeric data of the alarm factor can be recorded automatically. When the recorder is in "Paper Out" or "Check Magazine" condition, alarm recording will be cancelled and will be stored as recall data. Also, if alarm generates simultaneously at more than one bed, the data that could not be recorded will be stored as recall data.

NOTE

- The alarm recording setup can be performed on the "Record" setup.
(☞"Alarm Recording Setup" P9-3)
-

Storing the Alarm Factor as Recall Data

At alarm generation, the waveform or numeric data of the alarm factor can be stored as recall data and can be used for later review.
(☞"Recall" P8-11)

Chapter 7 Monitoring

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Chapter 7 Monitoring

Monitoring on the Home Display

Waveforms and numeric data are displayed by receiving signals of each parameter from the telemetry transmitter or bedside monitor.

WARNING

- 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. In addition, alarm for that parameter will not generate. Make sure that the connector is securely connected. If a waveform/numeric data is not displayed for the monitored parameter, check the patient's condition and pay attention not to miss the connector-off condition.

CAUTION

- For the following case, monitoring for the corresponding parameter will not be performed on this unit. Waveforms and numeric data will not be displayed.
 - When the measurement unit setting for BP (mmHg/kPa) is different between the bedside monitor and central monitor connected to the DS-LAN network.
 - When the measurement unit setting for temperature is °F on the bedside monitor connected to the DS-LANII network.
 - When the measurement unit setting for temperature (°C/°F) is different between the bedside monitor and the central monitor connected to the DS-LANIII network.
 - For the LW bed and RF bed, as the HR and RR are measured on the central monitor, the displayed data may differ from the bedside monitor depending on the situation.

NOTE

- The waveform and numeric data to be displayed on the home display can be set on the "Display Configuration" screen.
- Set the waveform size and sweep speed as required.

ECG Monitoring

- HR measurement, arrhythmia analysis, ST measurement can be performed.
- Waveform size and position can be adjusted.
- ECG lead can be selected.
- Alarm for HR and arrhythmia can be set.
- AC Filter can be set.
- Drift filter can be set.
- ON/OFF for QRS pace mask can be set.
- Pacemaker artificial pulse can be displayed overlapped to ECG waveform.
- Number of ECG channel (ECG1/ECG1+2) for QRS detection can be selected.

CAUTION

- There are some cases when the pacemaker pulse can not be detected depending on the

pacemaker type, pulse voltage, pulse width, electrode lead type (unipolar, bipolar), or electrode placement which causes the pacemaker pulse amplitude to decrease and disables the pacemaker pulse detection.

- ♦ If signals similar to a pacemaker pulse are present, such as electric blanket noise or excessive AC frequency noise, these may be erroneously detected and displayed as a pacemaker pulse.
- ♦ Depending on the electric signal condition under transmission, noise may interfere and incorrectly display the pacemaker pulse.
- ♦ When a spontaneous QRS and pacemaker pulse overlap (ex. fusion beat, etc.), QRS detection cannot be performed properly. In this case, the heart rate is degraded.
- ♦ When continuously detecting AC noise artifact as pacemaker pulses, QRS detection stops and heart rate decreases. Also, arrhythmia will not be detected.

Respiration (RESP) Monitoring

- ♦ Waveform size can be adjusted.
- ♦ RR and apnea time measurement can be performed.
- ♦ Alarm for RR and apnea can be set.
- ♦ Respiration detection is performed automatically.
- ♦ ON/OFF of CVA detection can be selected.

Blood Pressure (BP1 to 6) Monitoring

- ♦ Systolic, diastolic, and mean BP can be displayed.
- ♦ Alarms for systolic, diastolic, mean BP can be set.
- ♦ BP waveform scale can be adjusted.
- ♦ The BP label can be displayed. (Corresponding to the label set on each bedside monitor.)

Arterial Oxygen Saturation (SpO₂-1/SpO₂-2) Monitoring

- ♦ Pulse waveform size can be set.
- ♦ Alarm for SpO₂ can be set.
- ♦ Alarm for pulse rate can be set.
- ♦ SpO₂ sensor check alarm can be set.
- ♦ SpO₂, PR, SpMet (methemoglobin concentration), SpCO (carboxyhemoglobin concentration), PVI (Pleth Variability Index), PI (perfusion index) can be displayed.
- ♦ Alarm for SpCO, SpMet can be set.

NOTE

- ♦ The SpO₂-2, PR-2, SpMet, SpCO, PI-1, PI-2, PVI-1 can be monitored on this unit only for the DS-LANIII network bed (BED).

Non-invasive Blood Pressure (NIBP) Monitoring

- ♦ Systolic, diastolic, mean NIBP, measurement time can be displayed.
- ♦ Alarms for systolic, diastolic, mean NIBP can be set.
- ♦ The latest 120 data can be displayed on the NIBP list.

NOTE

- ♦ The NIBP measurement time is the time measured on the bedside monitor. Make sure the

same time is set for the central monitor and the bedside monitor.

Temperature (TEMP) Monitoring

- ♦ The temperature measurement data can be displayed.
- ♦ Alarm for temperature measurement data can be set.

CO₂ Concentration Monitoring

- ♦ End-tidal CO₂ concentration (EtCO₂), inspiratory CO₂ concentration (InspCO₂) can be displayed.
- ♦ The measurement unit can be selected from mmHg/kPa/%.
- ♦ CO₂ waveform scale can be set.
- ♦ EtCO₂, InspCO₂ alarm can be set.
- ♦ "Check CO₂" message will be displayed during warmup, airway adapter zeroing, zero error, measurement error, sensor error, etc.

CAUTION

- ♦ For the following case, CO₂ concentration monitoring cannot be performed on this unit.
 - ♦ If the bedside monitor is DS-5300.
 - ♦ If the bedside monitor is DS-5400 with the software version V03-02 or prior.
 - ♦ If the software version of the HLX-561 is V01-07 or prior.

Gas Concentration Monitoring

- ♦ Carbon dioxide (CO₂_E, CO₂_I), oxygen (O₂_E, O₂_I), nitrous oxide (N₂O_E, N₂O_I), anesthetic gas (AGT_E, AGT_I) can be displayed.
- ♦ Scales for O₂ waveform and anesthetic waveform can be set.
- ♦ ON/OFF of anesthetic gas alarm can be set.
- ♦ MAC value can be monitored if set to ON on the bedside monitor.

NOTE

- ♦ Gas concentration can be monitored only for the DS-LANIII network bed.
- ♦ The settings on the bedside monitor cannot be changed.

SPIRO Monitoring

- ♦ Expiratory minute volume, inspiratory/expiratory tidal volume, PEAK/PEEP internal pressure can be displayed.
- ♦ MVe/PEAK/PEEP alarm can be set.
- ♦ Scales for AWP, AWF, AWV waveforms can be set.

NOTE

- ♦ Monitoring is possible only for the DS-LANIII network bed.

INVOS Monitoring

- ♦ Regional oxygen saturation (Lt-rSO₂, Rt-rSO₂) can be displayed.

NOTE

- ♦ Monitoring is possible only for the DS-LANIII network bed.
-

SvO₂/CCO Monitoring

- ♦ SvO₂/ScvO₂, CCO, CCI, BT can be displayed.

NOTE

- ♦ ScvO₂ can be monitored only for the DS-LANIII network bed.
-

BIS Monitoring

- ♦ BIS, SQI, EMG, SR can be displayed.

NOTE

- ♦ Monitoring is possible only for the DS-LANIII network bed.
-

Display according to the Network Construction

The display on the DS-7700 System Central Monitor differs depending on the system construction.

		Wired Network (BED)		Wireless Network		TCON System
		DS-LANII	DS-LANIII	(LW)	(RF)	(TCON)
Numeric Data	HR	Displays data of bedside monitor.			Measured on central monitor or telemetry receiver from ECG waveform. (Averaged value over 6 sec. calculated from R-R interval. Averaged value over 3 sec. for neonate.)	Displays data of bedside monitor.
	ST				Measured on central monitor from ST reference waveform.	Displays only ST1 data of bedside monitor.
	VPC				Measured on central monitor or telemetry receiver.	Displays VPC per minute and per 24 hours of bedside monitor.
	RR				Impedance respiration: Measured on central monitor or telemetry receiver. Other than impedance respiration: Displays data of bedside monitor.	Displays data of bedside monitor.
	APNEA				none	
	BP1 to BP6				Only BP1, BP2 Displays data of transmitter and bedside monitor.	Displays only BP1 data of bedside monitor.
	SpO ₂ -1				Displays data of bedside monitor.	
	PR-1				Displays only T1 data of bedside monitor.	
	NIBP				Displays data of bedside monitor.	
	TEMP				Not displayed.	
	EtCO ₂				Not displayed.	
Waveform	InspCO ₂				Not displayed.	
	SvO ₂ /CCO				Not displayed.	
	12-Lead ST				Not displayed.	
	SpO ₂ -2	Not displayed.	Displays data of bedside monitor.	Not displayed.		
	PR-2					
	GAS					
	BIS					
	SPIRO					
	SpCO					
	SpMet					
	INVOS					
	ScvO ₂					
Each Waveform		Displayed			Not displayed.	

		Wired Network (BED)		Wireless Network		TCON System
		DS-LANII	DS-LANIII	(LW)	(RF)	(TCON)
Arrhythmia	Asystole	Yes	Yes	Yes	Yes	Yes
	VF	Yes	Yes	Yes	Yes	Yes
	VT	Yes	Yes	Yes	Yes	Yes
	Slow VT	No	Yes	No*	Yes	Yes
	Run	Yes	Yes	Yes	Yes	Yes
	Tachy	Yes	Yes	Yes	Yes	Yes
	Brady	Yes	Yes	Yes	Yes	Yes
	Couplet	No	Yes	No*	Yes	Yes
	Pause	No	Yes	No*	Yes	Yes
	Bigeminy	Yes	Yes	Yes	Yes	Yes
	Trigeminy	No	Yes	No*	Yes	Yes
	Frequent	Yes	Yes	Yes	Yes	Yes

Yes: Setup can be performed. Alarm will generate.

No: Setup cannot be performed. Alarm will not generate.

*: Only for the LW-7080 on the DS-LANIII network, setup can be performed. Alarm will also generate.

Lead-Off Condition

When ECG lead is detached, some waveforms may become immeasurable depending on the detached lead. In such case, ECG waveform or respiration waveform will be displayed as baseline, and ECG related alarm will generate.

ECG related alarms are as follows.

- ♦ HR Alarm
- ♦ Arrhythmia Alarm
- ♦ ST Alarm
- ♦ RR Alarm of Impedance Respiration
- ♦ APNEA Alarm of Impedance Respiration

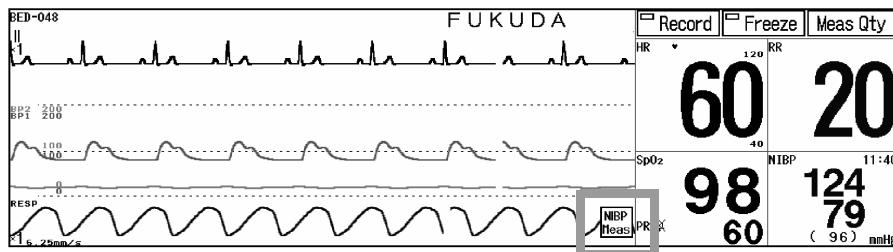
If the alarm generated during lead-off condition is considered not reliable, selecting [OFF] for "Alarm Judgement" under "Alarm Related Setup"("Pre-Set Menu") will not generate the ECG related alarm during lead-off condition. For the alarm function during lead-off condition, the following setup can be performed on the "Alarm-Related Setup".

(☞ "ECG Alarm at Lead-Off Condition" P6-25)

- ♦ ON/OFF of Alarm Judgement
- ♦ ON/OFF of Alarm Recording
- ♦ ON/OFF of Lead-Off Message
- ♦ Lead-Off Alarm Interval (5/30/60 sec.)

NIBP Manual Measurement

[NIBP Meas] key will be displayed in the individual display area for the DS-LANIII bed and the TCON bed.



- 1 Press the **[NIBP Meas]** icon for more than 1 second.

► The NIBP measurement will start.

NIBP Periodic Measurement

NIBP periodic measurement can be performed automatically at selected time interval or at selected time. This function is available only for the DS-LANIII bed and the TCON bed.

⚠ WARNING

- Depending on the software version of the bedside monitor, NIBP periodic measurement interval will not synchronize between the central monitor and bedside monitor.
If performing NIBP periodic measurement from the central monitor in such case, do not set the NIBP periodic measurement on the bedside monitor.
- For details of the software version, contact our service representative.

- 1 Select the patient to perform the NIBP periodic measurement by pressing the bed selection area.

► The individual bed display for the selected patient will be displayed.

- 2 Press the [Menu], [Param. Setup], [NIBP] keys.

► The "NIBP" screen will be displayed.

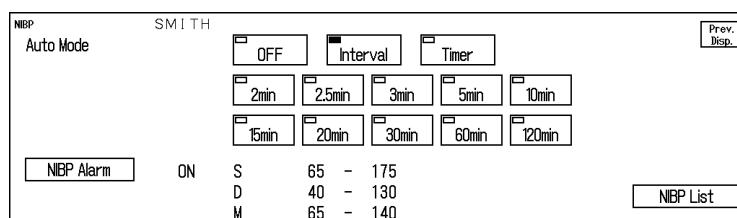
- 3 Press the [Interval]/[Timer] key.

REFERENCE

- Select [OFF] if not performing the periodic measurement.

When [Interval] is selected:

► The measurement interval keys from [2min] to [120min] will be displayed.



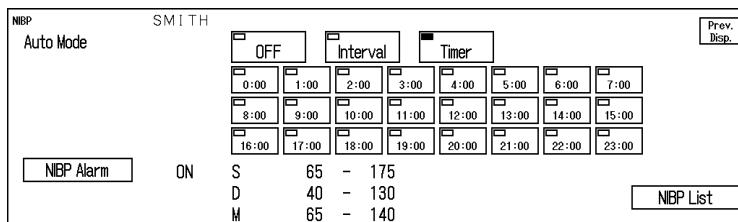
1 Select the measurement interval.

REFERENCE

- ◆ The measurement time will be integral multiple of the selected interval time starting from 0 minute.
- Ex.) If the current time is 13:14, the measurement time will be as follows for each interval time.
 - ◆ 2 min.:13:16, 13:18, 13:20, ...
 - ◆ 2.5 min.:13:15, 13:17:30, 13:20, ...
 - ◆ 3 min.:13:15, 13:18, 13:21, ...

When [Timer] is selected:

- ▶ The measurement time keys from [0:00] to [23:00] will be displayed.



1 Select the measurement time. (More than one selection is possible.)

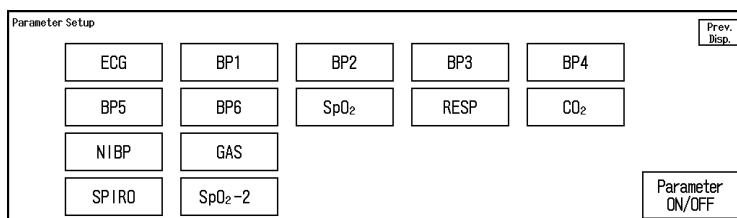
Parameter ON/OFF Setup

Whether or not to monitor each parameter can be set.

1 Select the patient to set the parameter ON/OFF by pressing the bed selection area.

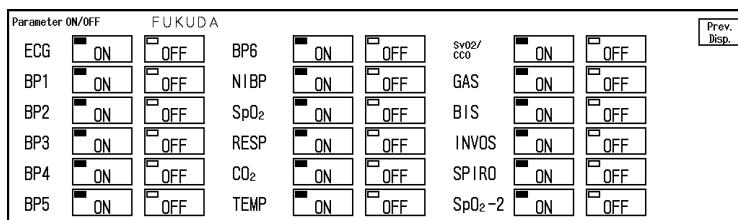
2 Press the [Menu], [Param. Setup] keys.

- ▶ The "Parameter Setup" screen will be displayed.



3 Press the [Parameter ON/OFF] key.

- ▶ The "Parameter ON/OFF" screen will be displayed.



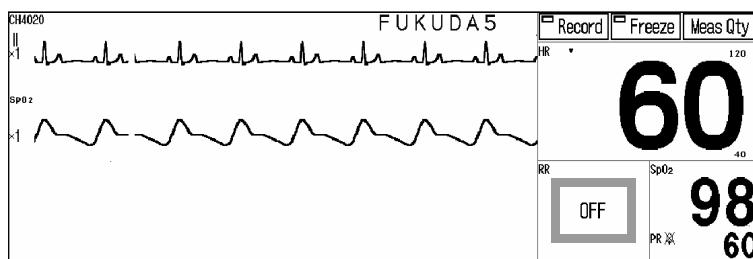
REFERENCE

- Pressing the [Param. ON/OFF] key set as user key will also display the "Parameter ON/OFF" screen.

4 Select [ON]/[OFF] of monitoring for each parameter.

5 Press the [Home] key, and then the bed selection area of the set patient.

- For the parameter which [OFF] is selected, "OFF" will be displayed inside the corresponded parameter key (numeric data box).

**REFERENCE**

- Pressing the parameter key where "OFF" is displayed will display the "Parameter ON/OFF" screen.

Numeric Data on the Home Display

To Change the Quantity of Displayed Numeric Data

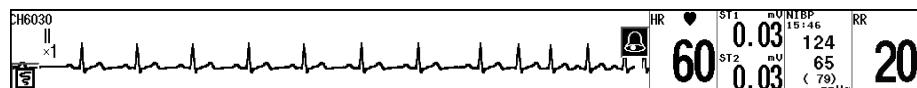
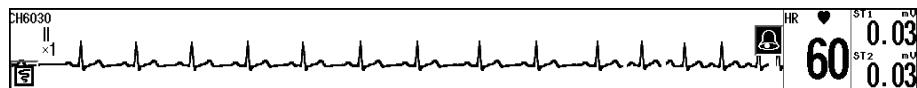
When the display configuration is 1bed8waves, 2beds4waves, 4beds2waves, 6beds1wave, or 8beds1wave, the quantity of displayed numeric data can be changed.

1 Press the [Meas Qty] key set as user key.

- Pressing this key will sequentially change the quantity of displayed numeric data.

REFERENCE

- The quantity of numeric data can be also changed on the "Display Configuration" screen. (☞ "Display Configuration" P10-2)



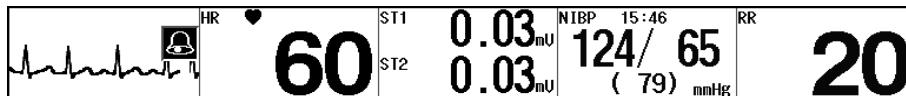
For "8Beds 1Wave" configuration

To Change the Size of Numeric Data Box

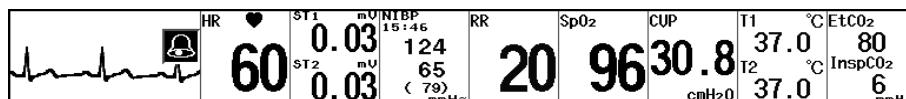
1 Press the [Meas Zoom] key set as user key.

(☞ Maintenance Manual "Procedure to Start Monitoring" P1-2)

- ▶ The numeric data box size will be enlarged/reduced. (The size of the whole numeric data display area will not change.)
- ▶ Pressing the [Meas Zoom] key will sequentially enlarge/reduce the numeric data box size.
- ▶ If the numeric data box size is enlarged, the quantity of displayed numeric data will decrease.



- ▶ If the numeric data box size is reduced, the quantity of displayed numeric data will increase.

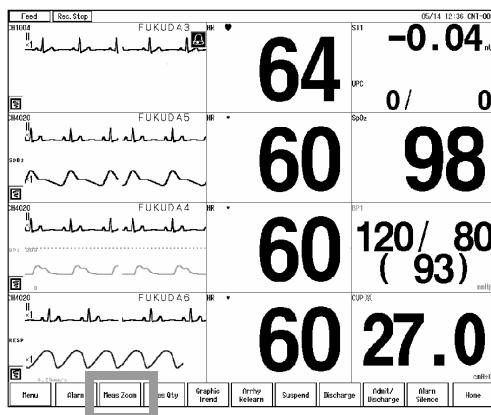


REFERENCE

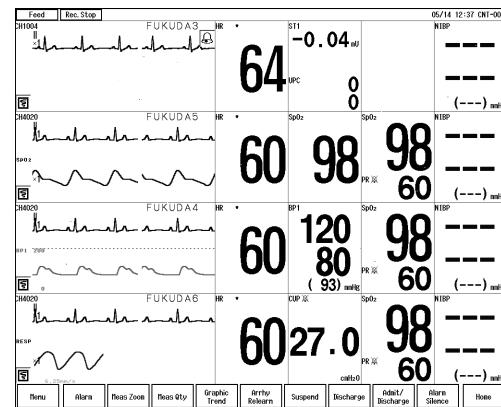
- ♦ The numeric data box size can be also enlarged/reduced on the "Display Configuration" screen.
(☞ "Display Configuration" P10-2)
- ♦ Depending on the setting, enlarging/reducing the numeric data box size can be either applied to all beds or to individual bed.
- ♦ This setting can be performed by selecting [All Beds]/[Each Bed] for "Meas Zoom" on the "Display Configuration" screen.
(☞ "Home Display Layout" P10-3)

When [All Beds] is selected for "Meas Zoom":

- ▶ The numeric data box will be enlarged/reduced for all beds.



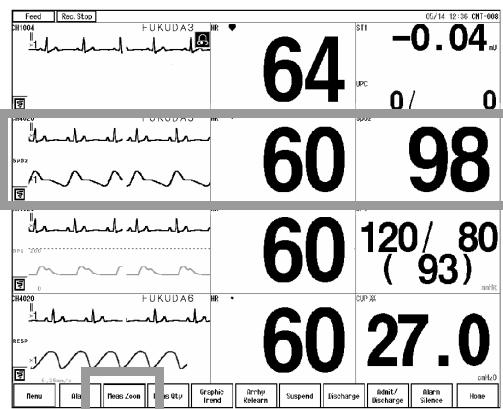
Enlarged Numeric Data Box



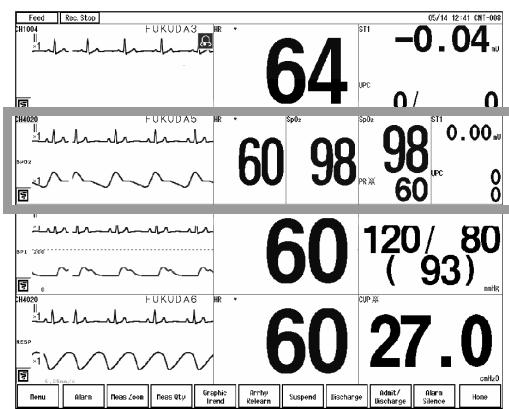
Reduced Numeric Data Box

When [Each Beds] is selected for "Meas Zoom":

- The numeric data box will be enlarged/reduced for the selected bed.



Enlarged Numeric Data Box



Reduced Numeric Data Box

REFERENCE

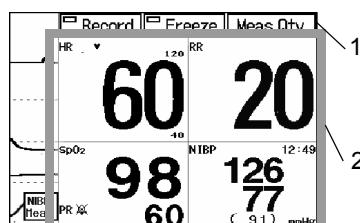
- For the selected bed, the background color of the channel no., bed ID, etc. will be displayed in blue.

Numeric Data on the Individual Bed Display

Pressing the [Meas Qty] key will sequentially change the quantity of displayed numeric data on the individual bed display.

The selections will depend upon the display layout (2 to 10 areas) set on the "Meas Area Selection" for the individual bed display configuration.

(☞ "Waveforms/Numeric Data Selection (Individual Bed Display)" P10-8)



Ex.) 4 Numeric Data

1 [Meas Qty] Key

2 Numeric Data

Adjusting the Size/Scale/Baseline Position

There are two ways to set the waveform size and scale.

- Adjusting from each parameter setup screen
- Adjusting from the User Key

The baseline position can be adjusted only for ECG.

CAUTION

- The threshold level for QRS and arrhythmia detection changes with the ECG waveform size.

Set a proper waveform size for monitoring.

- ♦ When the ECG waveform size is x1/4, x1/2, or x1, the detection threshold is 250 μ V.
- ♦ When the ECG waveform size is x2 or x4, the detection threshold is 150 μ V.

To Adjust from Each Parameter Setup Screen

1

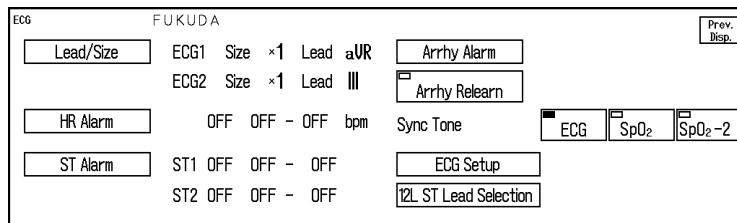
Select the patient to perform the parameter setup by pressing the bed selection area.

- The individual bed display for the selected patient will be displayed.

2

Press the ECG parameter key (HR numeric data box).

- The "ECG" screen will be displayed.



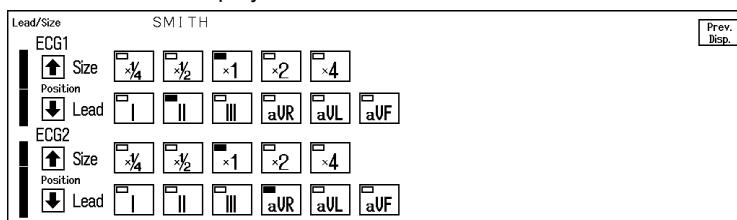
REFERENCE

- ♦ The procedure is the same for other parameters.

3

Press the [Lead/Size] key.

- The "Lead/Size" screen will be displayed.



4

Select the size from [x1/4]/[x1/2]/[x1]/[x2]/[x4].

REFERENCE

- ♦ For BP, CO₂, GAS, and SPIRO waveform, scale can be adjusted.
- ♦ For BP waveform
Selection can be made from 20/50/75/100/150/200/250/300 (mmHg) or 4/8/12/16/20/24/32/40 (kPa). If the BP label is CVP, 20/40 (cmH₂O) can be also selected.
- ♦ For CO₂ waveform
Selection can be made from 50/100 (mmHg), 4/8/10 (kPa), or 4/8/10 (%).
- ♦ For GAS waveform
For O₂ scale, selection can be made from 18-30/18-100/0-30/0-60/0-100 (%).
For AGT scale, selection can be made from 4/8/16(%).
- ♦ For SPIRO waveform
For AWP scale, selection can be made from 10/20/30/50/120cmH₂O.
For AWF scale, selection can be made from $\pm 5/\pm 10/\pm 20/\pm 50/\pm 180$ L/min.

For AWV scale selection can be made from 50/250/500/1000/3000mL.

5 Press / to adjust the baseline position.

- ▶ The baseline position of the ECG waveform will move up or down.

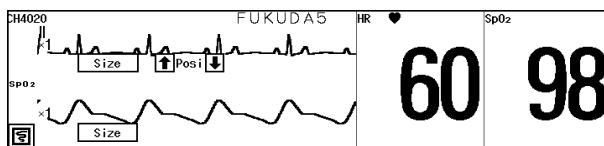
To Adjust from the User Key

1 Press the [Size/Scale] key set as user key.

NOTE

- ◆ To use the user key, assign it in advance.
(Maintenance Manual "User Key" P6-14)

- ▶ The keys to adjust the waveform size/scale and baseline position will be displayed on the home display.



2 Press the [Size] key.

- ▶ Pressing this key will sequentially change the waveform size in the order of x1/4, x1/2, x1, x2, x4.
For BP, CO₂, GAS (CO₂, O₂, AGT), SPIRO (AWF, AWP, AWV) waveform, scale can be adjusted.

3 To adjust the baseline position of the ECG waveform, press / .

- ▶ The waveform will move up or down.

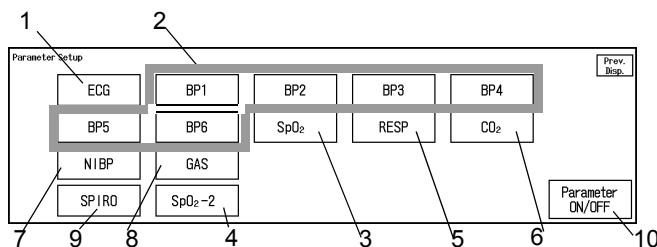
Parameter Setup

The monitoring condition for each parameter can be set.

Press the [Menu], [Param. Setup] key to display the "Parameter Setup" screen.
(Refer to the figure on the next section.)

Setup Item for Each Parameter

The items that can be set for each parameter are explained below.



1 ECG

Lead/Size	Size and lead of ECG waveform
HR Alarm	ON/OFF of HR alarm, alarm limit
ST Alarm	ON/OFF of ST level alarm, alarm limit
Arrhythmia Alarm	ON/OFF of each arrhythmia alarm, alarm limit (Asystole, Run, Pause, Frequent)
Arrhy Relearn	When arrhythmia or QRS is misjudged, performing arrhythmia learning will recover the original accuracy.
Synchronized Tone	The tone can be selected to synchronize to heartbeat (ECG) or pulse (SpO_2 -1, SpO_2 -2).
ECG Setup	AC Filter (ON/OFF) Drift Filter (ON/OFF) QRS Pace Mask (ON/OFF) QRS Detect (ECG/ECG1+2) Pace Pulse (ON/OFF/Distinct Color)
12L ST Lead Selection	The leads to display inside the 12-lead ST box can be selected.

2 BP

Scale	BP waveform scale
BP Alarm	ON/OFF of BP alarm Alarm limit for SYS (systolic BP), DIA (diastolic BP), MEAN (mean BP).

3 SpO_2 -1

Size	SpO_2 waveform size
SpO_2 -1 Alarm	ON/OFF of SpO_2 -1 alarm, PR-1 alarm, SpCO alarm, SpMet alarm, alarm limit
Synchronized Tone	The tone can be selected to synchronize to heartbeat (ECG), pulse 1 (SpO_2 -1), or pulse 2 (SpO_2 -2).

4 SpO_2 -2

Size	SpO_2 waveform size
SpO_2 -2 Alarm	ON/OFF of SpO_2 -2 alarm, PR-2 alarm, alarm limit
Synchronized Tone	The tone can be selected to synchronize to heartbeat (ECG), pulse 1 (SpO_2 -1), or pulse 2 (SpO_2 -2).

5 RESP

Size	Respiration waveform size
RESP Alarm	ON/OFF of RR alarm, APNEA alarm, alarm limit
CVA Detect	ON/OFF of CVA detection

⚠ WARNING

- The purpose of this apnea alarm is to alert the user to evaluate for the possible occurrence of apnea events by identifying the absence of respiration. It is not intended to be classified as an "Apnea Monitor" and will not identify the condition creating the possible event. (Central, Obstructive or Mixed.).

6 CO_2

Scale	CO_2 waveform scale
CO_2	ON/OFF of Et CO_2 alarm, Insp CO_2 alarm, alarm limit
Unit	CO_2 measurement unit

7 NIBP

Auto Mode	Measurement interval, time (only for DS-LANIII bed)
NIBP Alarm	ON/OFF of NIBP alarm, alarm limit for systolic (SYS), diastolic (DIA), mean (MAP) blood pressure
NIBP List	Displays NIBP data in tabular format.

8 GAS

O ₂ Scale	O ₂ waveform scale
AGT Scale	Anesthetic gas waveform scale
GAS Alarm	ON/OFF of GAS alarm

9 SPIRO

AWP Scale	AWP waveform scale
AWF Scale	AWF waveform scale
AWV Scale	AWV waveform scale
MVe Alarm	ON/OFF of MVe alarm, alarm limit
PEAK Alarm	ON/OFF of PEAK alarm, alarm limit
PEEP Alarm	ON/OFF of PEEP alarm, alarm limit

10 Parameter ON/OFF

ON/OFF of each parameter monitoring

To Display the Parameter Setup Screen

There are two ways to display each parameter setup screen.

- To Display from the Parameter Key
- To Display from the "Menu" screen.

To Display from the Parameter Key

On the individual bed display, numeric data are displayed. Each numeric data display area functions as a parameter key.

Pressing the parameter key will display the setup menu for the corresponding parameter.

For example, pressing the ECG parameter key (area where HR data is displayed) will display the "ECG" screen.

REFERENCE

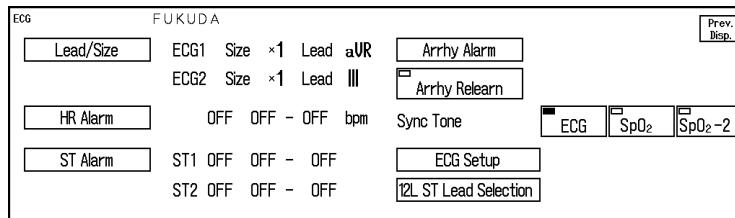
- The setup screen for each parameter can be accessed from the [Menu] key. Using the parameter key allows quick access to the desired setup screen.

1 Select the patient to perform the parameter setup by pressing the bed selection area.

- ▶ The individual bed display for the selected patient will be displayed.

2 For example, press the ECG parameter key (area where HR data is displayed).

- The "ECG" screen will be displayed.



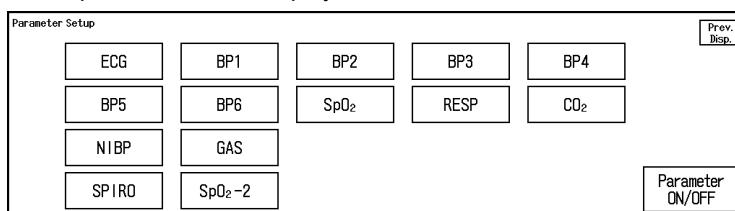
□ To Display from the Menu Screen

- 1** Select the patient to perform the parameter setup by pressing the bed selection area.

- The individual bed display for the selected patient will be displayed.

- 2** Press the [Menu], [Param. Setup] keys.

- The "Parameter Setup" screen will be displayed.



- 3** Select the parameter to perform the setup.

- The parameter setup screen for the selected parameter will be displayed.

[ECG] Lead Selection

The displayed ECG leads can be changed. The selectable leads will depend on the lead cable type.

Selectable Lead

	Wired Network (BED)	Wired Network (LW) / Wireless Network (RF)		TCON System (TCON)	
		Transmitter			
		HLX	LX		
3-electrode	I, II, III	(not selectable) Display: One from I, II, III	(not selectable) Display: Only ECG		
4-electrode			I, II, III, aVR, aVL, aVF		
5-electrode	I, II, III, aVR, aVL, aVF, V, MCL*	(not selectable) Display: One from I, II, III, aVR, aVL, aVF, V, MCL*, V, ECG1, ECG2	(not selectable) Display: One from ECG1, ECG2	(Not selectable as waveforms are not displayed.)	
10-electrode	I, III, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6			(not supported)	

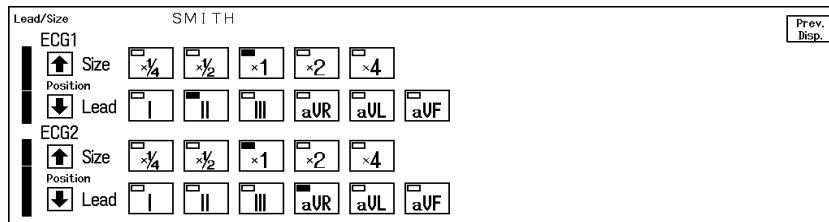
*: MCL lead can be selected only for the DS-5000 series bedside monitors.

- 1** Select the patient to change the lead by pressing the bed selection area.

- 2** Press the ECG parameter key.

- 3** Press the [Lead/Size] key.

- The "Lead/Size" screen will be displayed.



- 4** Select the lead type from the displayed selection.

NOTE

- The display will differ according to the used lead cable.

[ECG/SpO₂] Synchronized Tone

The synchronized tone can be selected to synchronize to heartbeat (ECG) or pulse (SpO₂).
(Default: ECG)

NOTE

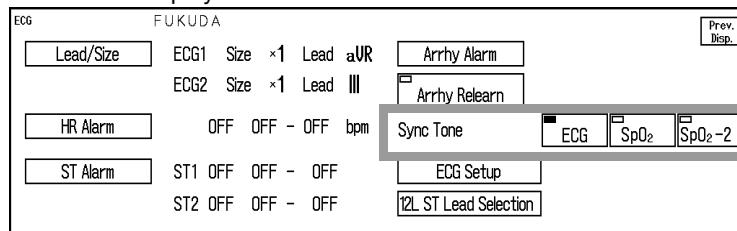
- The preset menu should be set by our service representative or system administrator before starting monitoring.
(Maintenance Manual "Soft Switch" P6-8)

The display will differ depending on the "Sync Tone Bed Selection" setting (Selected Bed / ECG/SpO₂ Menu) of the soft switch menu.

- 1** Press the ECG parameter key (HR numeric data box).

Or, press the [Menu], [Param. Setup], [ECG] / [SpO₂] / [SpO₂-2] keys.

- The "ECG" screen will be displayed.



- 2** Set the synchronizing tone.

If [Selected Bed] is set for "Sync Tone Bed Selection" on the "Soft Switch" screen:

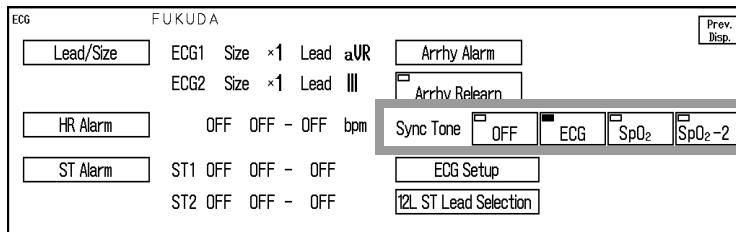
- 1** Set the "Sync Tone".

- The selected synchronizing tone will be generated for the selected bed.
- [ECG]: A tone synchronized to ECG heartbeat will generate.
- [SpO₂-1]: A tone synchronized to SpO₂-1 will generate. The tone will change according to the SpO₂-1 value.
- [SpO₂-2]: A tone synchronized to SpO₂-2 will generate. The tone will change according to the SpO₂-2 value.

If [ECG/SpO₂] is set for "Sync Tone Bed Selection" on the "Soft Switch" screen:

REFERENCE

- The synchronizing tone will be generated only for the bed which synchronized tone selection (ECG or SpO₂) is made.



1 Set the "Sync Tone".

- ▶ [OFF]: A synchronizing tone will not be generated for this bed.
- ▶ [ECG]: A tone synchronized to ECG heartbeat will generate only for this bed.
- ▶ [SpO₂-1]: A tone synchronized to SpO₂-1 will generate only for this bed. The tone will change according to the SpO₂-1 value.
- ▶ [SpO₂-2]: A tone synchronized to SpO₂-2 will generate only for this bed. The tone will change according to the SpO₂-2 value.

NOTE

- Only one bed can be set to generate the synchronizing tone. When one bed is set, [OFF] will be automatically set for all other beds.

[ECG] AC Filter

When noise from the AC power is interfering with the ECG, turning ON the AC filter will remove the 50Hz or 60Hz frequency component.(Default: ON)

NOTE

- However, as the QRS complex of the ECG contains frequency components around 50 to 60Hz, turning ON the AC filter may reduce and distort the QRS amplitude.

When AC interference occurs, first check the following:

- Ground of the monitor and any connected device are firmly connected.
- Power cable is away from the patient.
- Electrodes are firmly attached.
- Electrodes are not dry.
- Electrode, lead cable is firmly connected.
- Lead cable is not disconnected.
- Noise source, such as an electric blanket is not placed near the patient.

CAUTION

- Before setting ON/OFF of AC filter, set the correct AC filter frequency (50Hz/60Hz). Unless the correct power frequency is set, the AC filter will not properly function.
(Maintenance Manual "Soft Switch" P6-8)

NOTE

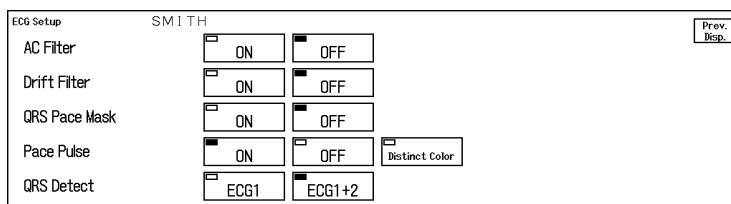
- The AC filter can be set only for the telemetry beds. (RF, RF+T, LW, LW+T)
- For the RF, RF+T beds using the HLX-501 or HLX-801, the filter setting on the DS-7700 will become invalid as it may double the filter and affect the ECG waveform if the filter is set on the bedside monitor.

1 Select the patient to perform the AC filter setup by pressing the bed selection area.

2 Press the ECG parameter key.

3 Press the [ECG Setup] key.

- ▶ The "ECG Setup" screen will be displayed.



4 Set the "AC Filter".

- ▶ [ON]: AC filter will eliminate the AC frequency component (50Hz or 60Hz).
- ▶ [OFF]: AC filter will not be set.

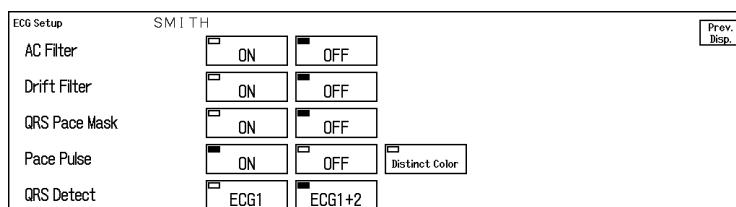
[ECG] Drift Filter

By setting the drift filter ON, only the amplitude with frequency component under 1Hz will be attenuated to prevent the ECG baseline drift.(Default: ON)

NOTE

- To set ON/OFF of drift filer, [Each Bed] should be selected for "Drift Filter" on the Soft Switch menu.
If [All Beds ON] or [All Beds OFF] is selected, drift filter cannot be set on the "ECG Setup" screen.
(Maintenance Manual "Soft Switch" P6-8)
- The drift filter can be set only for the telemetry beds. (RF, RF+T, LW, LW+T)
- For the RF, RF+T beds using the HLX-501 or HLX-801, the filter setting on the DS-7700 will become invalid as it may double the filter and affect the ECG waveform if the filter is set on the bedside monitor.

1 Set the "Drift Filter" on the "ECG Setup" screen.



- ▶ [ON]: Turns ON the drift filter

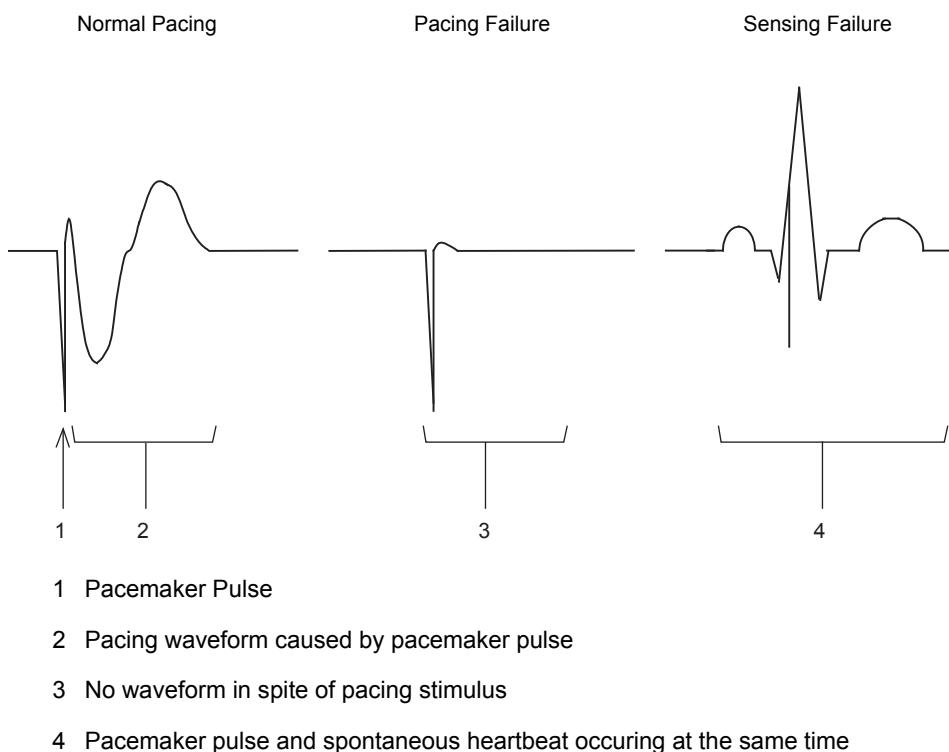
- ▶ [OFF]: Turns OFF the drift filter.

[ECG] QRS Pace Mask

For the patients using pacemakers, there are cases when the pacing waveform may not occur in spite of the pacing stimulus. This condition is called "pacing failure". To avoid detecting pacemaker pulses as a QRS complex, this unit suspends QRS detection for 40 ms starting from the detection of the pacing stimulus. This function is called "pace mask".

But if the pacemaker does not detect the patient's spontaneous heartbeat (sensing failure), and the pacing stimulus is applied at the same timing as QRS, this pace mask function may erroneously mask the QRS and cause the heart rate measurement to decrease.

To avoid this, QRS pace mask function can be set to [OFF] to correctly measure the heart rate when QRS and pacemaker pulse occurs at the same time. (Default: ON)



⚠ WARNING

- When setting [OFF] the QRS pace mask, check the following items.
 - Pacing failure will not occur.
 - The patient can be constantly monitored.
- If the QRS pace mask function is set to [OFF], a decrease in heart rate may not generate HR or asystole alarms due to erroneously detected QRS.

NOTE

- The QRS pace mask can be set only for the telemetry beds. (RF, RF+T, LW, LW+T)

ECG Setup	SMITH		Prev. Disp.
AC Filter	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF	
Drift Filter	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF	
QRS Pace Mask	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF	
Pace Pulse	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	<input type="checkbox"/> Distinct Color
QRS Detect	<input type="checkbox"/> ECG1	<input checked="" type="checkbox"/> ECG1+2	

- 1 Set the "QRS Pace Mask" on the "ECG Setup" screen.

- ▶ [ON]: QRS detection will be masked for fixed amount of time after pacemaker pulse is detected.
- ▶ [OFF]: Turns OFF the QRS pace mask function.

[ECG] Artificial Pace Pulse

The artificial pacemaker pulse can be displayed superimposed on the ECG waveform.
(Default: Distinct Color)

ECG Setup	SMITH		Prev. Disp.
AC Filter	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF	
Drift Filter	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF	
QRS Pace Mask	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF	
Pace Pulse	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	<input type="checkbox"/> Distinct Color
QRS Detect	<input type="checkbox"/> ECG1	<input checked="" type="checkbox"/> ECG1+2	

- 1 Set the "Pace Pulse" on the "ECG Setup" screen.

- ▶ [ON]: Displays the artificial pace pulse with the same color as ECG waveform.
- ▶ [OFF]: Artificial pace pulse will not be displayed.
- ▶ [Distinct Color]: Displays the artificial pace pulse in yellow.

NOTE

- When [Used] is set for "Pacemaker" on the "Admit/Discharge" screen, [Distinct Color] will be automatically set.

[ECG] ECG Channels for QRS Detection

The ECG channels to use for QRS detection can be selected. (Default: ECG1+2)

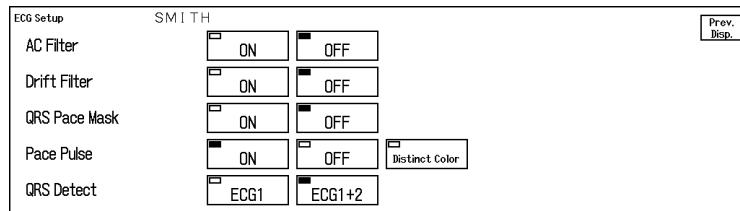
NOTE

- The "QRS Detect" can be set only for the telemetry beds. (RF, RF+T, LW, LW+T)
- QRS may not be detected for ECG waveform with amplitude 0.3mV or below.
- When only one ECG waveform is measured, QRS detection will be performed only for ECG1, regardless of the setting.
- The QRS detection for the wired network bed (BED) will be according to the setting made on the bedside monitor.

REFERENCE

- If [ECG1+2] is selected and an artifact is detected on one of the waveforms, one of the following can be set.

- Detect QRS by merging ECG1 and ECG2.
- Detect QRS only for the waveform without the artifact.
(Maintenance Manual "Soft Switch" P6-8)

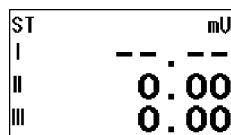


- 1** Set the "QRS Detect" on the "ECG Setup" screen.

- ▶ [ECG1]: Detects the QRS only for ECG1.
- ▶ [ECG1+2]: Detects the QRS of either ECG1 or ECG2 with the larger amplitude.

[ECG] 12L ST Lead Selection

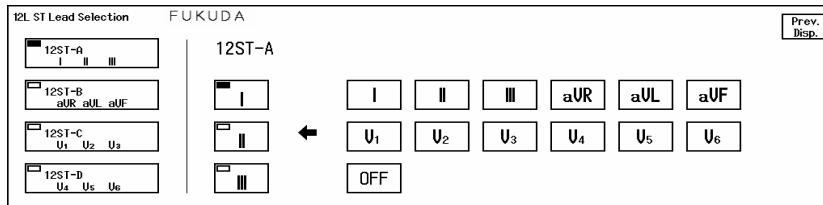
When monitoring 12-lead waveform, ST value of 3 leads can be displayed inside the ST numeric data box. 4 types of lead combination (A, B, C, D) can be registered. The registered combination will be applied for both home display and individual bed display.



- 1** Select the patient to set the 12-lead ST lead by pressing the bed selection area.

- 2** Press the ECG parameter key, then [12L ST Lead Selection] key.

- ▶ The "12L ST Lead Selection" screen will be displayed.



- 3** Register the leads for 4 groups.

- 1 Select the group (A to D) to register from left side of the screen.
- 2 Select the lead display position (upper, middle, lower) from the keys on the middle of the screen.
- 3 Select the lead from the right side of the screen to display for each position.

[RESP] CVA Detection

When the amplitude of the respiration waveform decreases due to causes such as respiratory pause, the ECG waveform may be superimposed on to the respiration waveform, making the RR equal to the HR. This condition is called CVA (Cardio-Vascular Artifact), and is detected using the CVA detection function.

If the following factors occur at the same time, the "CVA Detect" message will be displayed and an alarm sound will be generated.

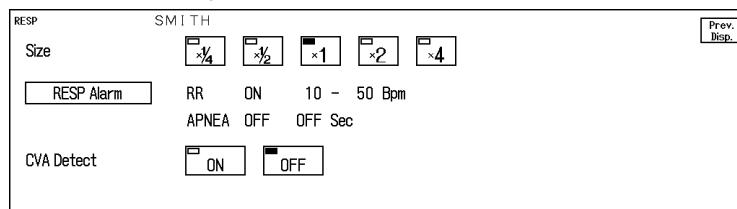
- ♦ ECG waveform is superimposed on the respiration waveform.
- ♦ HR (RR) is 30bpm or above
- ♦ The superimposed duration is 20 seconds or longer (10 seconds or longer for neonate)
- ♦ CVA detection function is set to ON (Default: OFF)

1 Select the patient to set the CVA detection by pressing the bed selection area.

2 Press the RESP parameter key (RR numeric data box).

Or, press the [Menu], [Param. Setup], [RESP] keys.

► The "RESP" screen will be displayed.



3 Select [ON] or [OFF] for "CVA Detect".

[CO₂] Measurement Unit

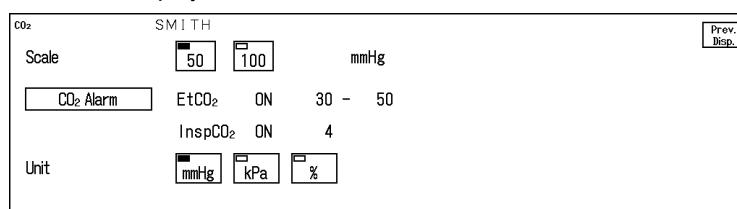
The CO₂ measurement unit can be selected from mmHg/kPa/%. (Default: mmHg)

1 Select the patient to set the CO₂ measurement unit by pressing the bed selection area.

2 Press the CO₂ parameter key (CO₂ numeric data box).

Or, press the [Menu], [Param. Setup], [CO₂] keys.

► The "CO₂" screen will be displayed.



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

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Chapter 8 Review Function

Graphic Trend

This section describes about the "Graphic Trend" function and its printing procedure.

The measured data stored every minute for 48 hours can be graphically displayed in time span of maximum 24 hours.

To Display the Graphic Trend

There are two ways to display the "Graphic Trend" screen.

Operation from the Menu:

- 1** Select the patient by pressing the bed selection area, and press the [Menu], [Graphic Trend] key.
 - ▶ The "Graphic Trend" screen will be displayed.

Operation from the Preprogrammed User Key:

- 1** Press the [Graphic Trend] key on the user key area.
 - ▶ The "Graphic Trend" screen will be displayed.

NOTE

- The previously displayed graphic trend will be displayed the next time the graphic trend screen is opened. The data and cursor at the current date/time will be displayed.

Description of the "Graphic Trend" Screen

The graphic trend of 3 parameters can be displayed simultaneously.

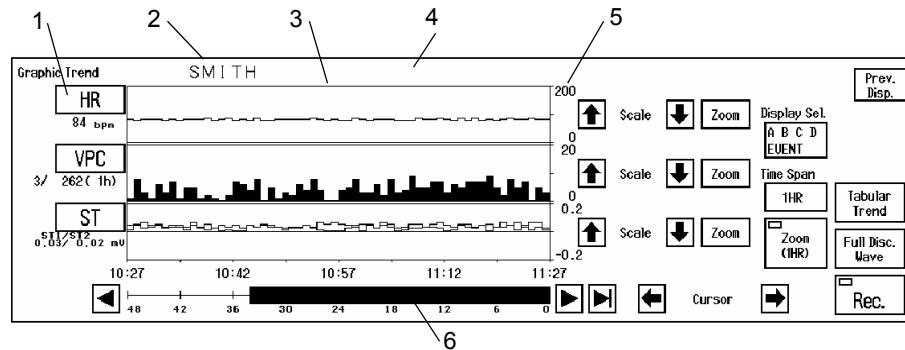
The combination of displaying parameters needs to be preprogrammed.

The time and measurement value at cursor position will be always displayed. As the cursor moves, the time and measurement value will also change.

The displaying time span can be selected from 1hr/2hrs/4hrs/8hrs/12hrs/24hrs.

The graph at cursor position can be enlarged to 1-hour time scale.

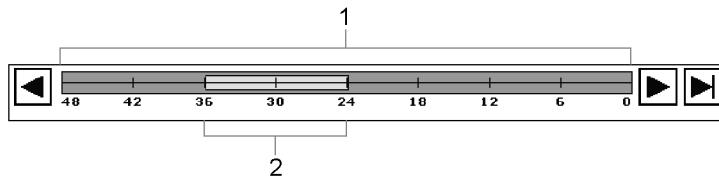
☞ "The Displayed Value for Each Time Span" P8-3

*"Graphic Trend" Screen*

- 1 Displayed Parameter
- 2 Patient Name
- 3 Cursor
- 4 Time/date at cursor position
- 5 Graphic Scale
- 6 Time Bar
(Refer to the next section.)

□ Time Bar

The location of displayed trend data among the whole stored trend data is indicated on the time bar.



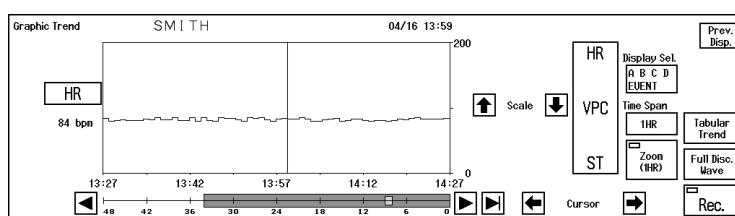
- 1 Whole Stored Trend Data
- 2 Displayed Trend Data

□ Various Graphic Trend Displays

On the "Graphic Trend" screen, enlarged graphic trend and alarm event trend can be viewed.

Enlarged Graphic Trend

- 1 On the "Graphic Trend" screen, press the [Zoom] key for one of the parameters.
(☞ "To Display the Graphic Trend" P8-1)
- ▶ The graphic trend for the selected parameter will be enlarged.

*Enlarged Graphic Trend*

Alarm Event Trend

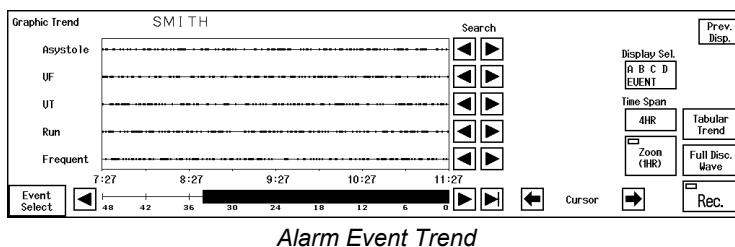
1 On the "Graphic Trend" screen, press the [Display Sel.] key.

(☞ "To Display the Graphic Trend" P8-1)

► The "Display Selection" window will be displayed.

2 Press the [EVENT] key.

► The [Event Select] key will be displayed on the "Graphic Trend" screen.



REFERENCE

- Pressing the [Event Select] key will display the "Graph Trend Event Sel." screen which allows to select the event to be displayed.

□The Displayed Value for Each Time Span

The displaying time span can be selected from 1hr/2hrs/4hrs/8hrs/12hrs/24hrs.

The displayed value and cursor interval of each parameter differs depending on the time span.

Parameter

Parameter	Time Span	1hr, 2hrs, 4hrs, 8hrs	12hrs, 24hrs
HR, ST, RR, SpO ₂ -1, PR-1, IBP, TEMP, CO ₂ , SvO ₂ , CCO, CCI, BT, GAS_CO ₂ , GAS_O ₂ , O ₂ , GAS_N ₂ O, GAS_AGT, MAC, ScvO ₂ , SpO ₂ -2, PR-2, PI-1, PVI, PI-2, SpCO, SpMet, BIS		The value at that time.	The average value of the past 3 min.
APNEA		Maximum value of the past 1 min. (0 sec. if apnea duration is 4 sec. or less.)	Maximum value of the past 3 min. (0 sec. if apnea duration is 4 sec. or less.)
VPC		Total VPC of past 1 minute, Total displayed VPC*	Maximum VPC of 1 min. interval for the past 3 min., and total displayed VPC.*
NIBP		Latest Value	Latest Value

*: "Total displayed VPC" indicates the total value within the displayed time span.
(For example, the value will be total VPC of 12 hrs if the time span is "12 hrs".)

Cursor Interval:

The cursor interval differs according to the time span.

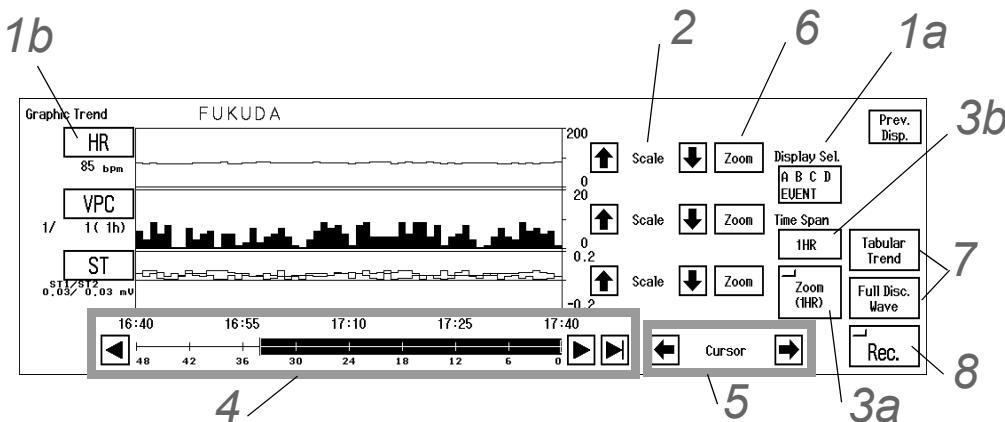
Time Span	1hr, 2hrs, 4hrs, 8hrs	12hrs, 24hrs
Cursor Interval	1 min.	3 min.

To View the Graphic Trend Data

NOTE

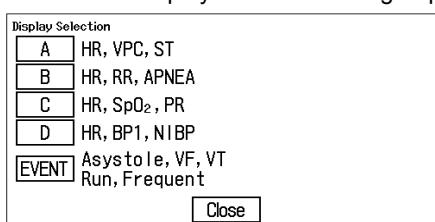
- Use the procedure 2 to 9 explained below as necessary.

- 1** On the "Graphic Trend" screen, select the parameter to be displayed.
 (☞ "To Display the Graphic Trend" P8-1)



To Select by Group:

- 1** Press the key for "Display Sel." key.
- The "Display Selection" window will be displayed.
 - The programmed parameters will be displayed beside each group key.



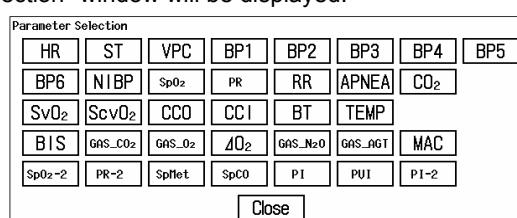
- 2** Select a group from [A]/[B]/[C]/[D]/[EVENT].

REFERENCE

- After the selection, press the [Close] key.

To Select a Parameter

- 1** Press the key located at left.
- The "Parameter Selection" window will be displayed.



REFERENCE

- Changing the parameter will also change the programmed parameter for the currently selected group (A/B/C/D).
- After the selection, press the [Close] key.

2 To change the displaying scale, adjust it using the / key.

NOTE

- The scale will differ according to the parameter.
- For scale and unit for each parameter, refer to the table on the following page.
(☞ "Review Function Setup" P12-3)

3 Select the displaying time span using one of the procedure below.

To Display in One-hour Span

1 Press the [Zoom (1HR)] key.

- ▶ Enlarged one-hour data with cursor time at center will be displayed.
- ▶ The key LED will light.

REFERENCE

- Pressing the [Zoom (1HR)] key again will turn OFF the key LED and the graphic trend will be displayed with the original scale.

To Select by Time Span

1 Press the key for "Time Span".

- ▶ The "Time Span Selection" window will be displayed.

2 Select the time span from [1HR]/[2HR]/[4HR]/[8HR]/[12HR]/[24HR].

REFERENCE

- After the selection, press the [Close] key.

4 Use the // keys beside the time bar to scroll the display.

- ▶ : Scrolls half page to older data.
- ▶ : Scrolls half page to newer data.
- ▶ : Displays the latest data.

REFERENCE

- Pressing the time bar will also scroll the display to the pressed time.

5 Use the / keys for "Cursor" to move the cursor.

- ▶ The measured data at the time of cursor position will be read.

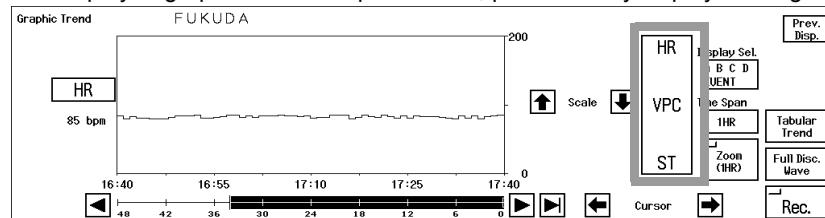
6 Enlarge the graphic trend of selected parameter.

- 1 Press the [Zoom] key.



► The graphic trend for the selected parameter will be enlarged with the current time span.

- 2 To return the display to graphic trend of 3 parameters, press the key displayed at right.



- 7 Press the [Tabular Trend] or [Full Disc. Wave] key to view each screen.

- 8 Print the graphic trend.

When the output recorder is built-in recorder:

- 1 Press the [Rec.] key.

► The currently displayed trend data will be output on the built-in recorder.

When the output recorder is laser printer:

- 1 Press the [Rec. x] key.

► The currently displayed trend data will be output on the laser printer.

► The quantity of stacked data will be displayed inside the key.

NOTE

- When the stacked data reaches maximum quantity, the key will turn to gray which indicates the printing cannot be performed.

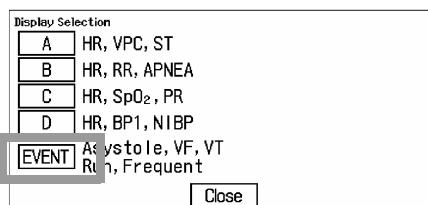
To View the Alarm Event Trend

- 1 Display the alarm event trend.

- 1 On the "Graphic Trend" screen, press the key for "Display Sel.".

(☞ "To Display the Graphic Trend" P8-1)

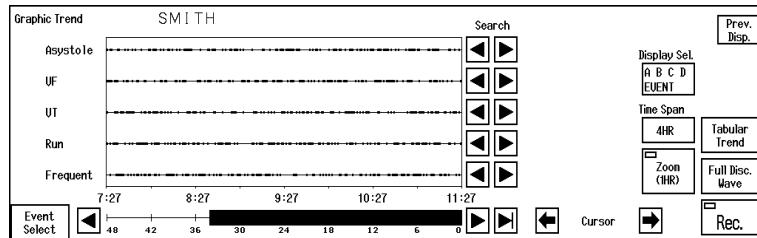
► The "Display Selection" window will be displayed.



- 2 Press the [EVENT] key.

► The alarm event trend will be displayed.

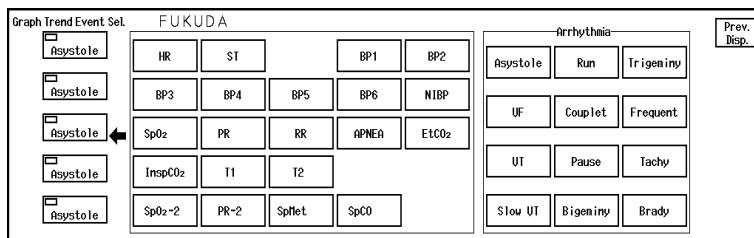
- The time where the numeric data alarm or arrhythmia alarm has generated will be indicated by point.



2 Select the event to display.

- 1 Press the [Event Select] key.

- The "Graph Trend Event Sel." screen will be displayed.



- 2 Select the position at the left to register the event.

- 3 Select the event from the list displayed on the right.

- 4 After the selection, press the [Prev. Disp.] key.

- The alarm event trend will be displayed.

NOTE

- Changing the displaying event will also change the programmed EVENT group for "Display Selection".

3 Use the / keys for "Search" to search the event occurrence point.

- : Searches the event occurrence point to past direction.
 ► : Searches the event occurrence point to present direction.

REFERENCE

- The following keys can be used as explained in the previous section, "To View the Graphic Trend".
 (☞ "To View the Graphic Trend Data" P8-4)
 - "Time Span" [xHR]
 - Time Bar
 - [Zoom (1HR)]
 - Cursor
 - [Rec.]
 - [Rec. x]
 - [Tabular Trend]
 - [Full Disc. Wave]

Tabular Trend

This section describes about the "Tabular Trend" function and its printing procedure.

Maximum of 48 hours of monitored data can be displayed in tabular format with a time interval of 1 minute to 1 hour.

To Display the Tabular Trend

There are two ways to display the "Tabular Trend" screen.

Operation from the Menu:

- 1** Select the patient by pressing the bed selection area, and press the [Menu], [Tabular Trend] key.
▶ The "Tabular Trend" screen will be displayed.

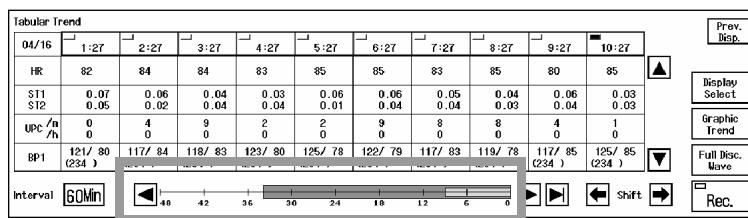
Operation from the Preprogrammed User Key:

- 1** Press the [Tabular Trend] key on the user key area.
▶ The "Tabular Trend" screen will be displayed.

Description of the "Tabular Trend" Screen

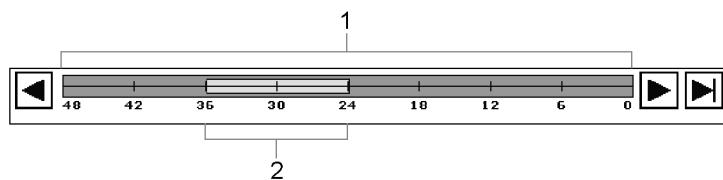
4 parameters can be displayed on one display.

The parameter not monitored will be displayed as "---".



"Tabular Trend" Screen

A time bar will be displayed on the lower part of the display. The location of displayed trend data among the whole stored trend data is indicated on the time bar.



1 Whole Stored Trend Data

2 Displayed Trend Data

The displayed value for each parameter is as follows.

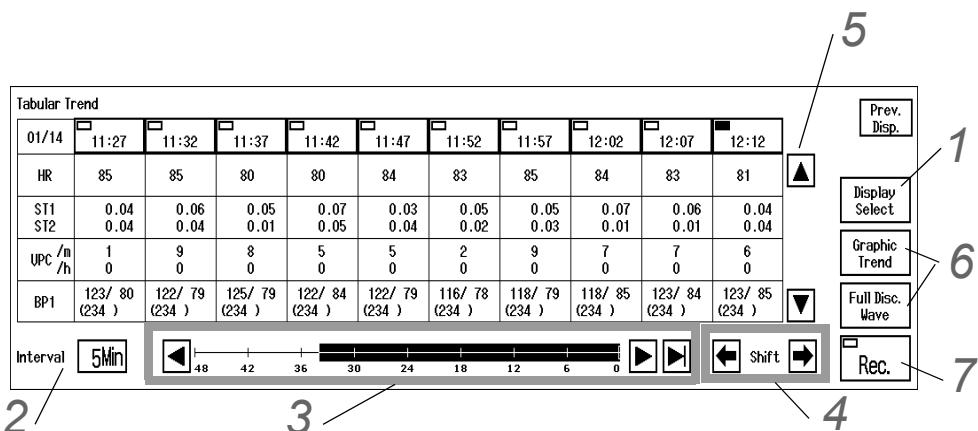
HR, ST, RR, SpO ₂ -1, PR-1, BP1 to 6, TEMP, CO ₂ , SvO ₂ , CCO, CCI, BT, GAS_CO ₂ , GAS_O ₂ , GAS_N ₂ O, GAS_AGT, MAC, BIS, BIS_SQI, BIS_EMG, BIS_SR, ScvO ₂ , SpO ₂ -2, PR-2, PI-1, PI-2, PVI, SpCO, SpMet	The value at that time.
APNEA	Maximum value of the past 1 min.
VPC	VPC of the past 1 minute and the past 1 hour.

To View the Tabular Trend Data

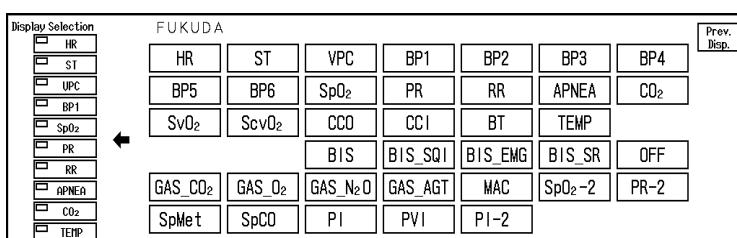
NOTE

- Use the procedure 2 to 7 explained below as necessary.

- 1** On the "Tabular Trend" screen, select the parameter to be displayed.
(☞"To Display the Tabular Trend" P8-8)



- 1** Press the [Display Select] key.
► The "Display Selection" screen will be displayed.



- 2** Select the position at the left to register the parameter.
3 Select the event from the list displayed on the right.
4 Press the [Prev. Disp.] key.
► The "Tabular Trend" screen will be displayed.

- 2** Select the display interval.

- 1** Press the [x Min] key for "Interval".
► The "Time Interval Selection" window will be displayed.

2 Select from [1Min]/[2Min]/[3Min]/[5Min]/[10Min]/[30Min]/[60Min].

- ▶ The selected time interval will be displayed in yellow green inside the key.

REFERENCE

- ♦ If [5Min] is selected, the time will be displayed in real time such as 10:00, 10:05, ...10:25. If [60Min] is selected, it will be displayed as 10:00, 11:00, 12:00. If the tabular trend is displayed at 10:35, the data from 10:00 will be displayed.

3 Use the // keys beside the time bar to scroll the display.

- ▶ : Scrolls half page to older data.
- ▶ : Scrolls half page to newer data.
- ▶ : Displays the latest data.

REFERENCE

- ♦ Pressing the time bar will also scroll the display to the pressed time.

4 Press the / keys for "Shift" to shift the table by one column.

- ▶ : Shifts the table by one column to older data.
- ▶ : Shifts the table by one column to newer data.

5 Use the / keys to scroll the table up or down to view other parameters.

- ▶ The table will scroll up or down and the displayed parameters will change.

6 The graphic trend data and full disclosure waveform data of the cursor position can be displayed.

- 1 Select the time/date to display the graphic trend or full disclosure waveform.
 - 2 Press the [Graphic Trend]/[Full Disc. Wave] key.
- ▶ The "Graphic Trend" or "Full Disc. Wave" of the selected time/date will be displayed.

REFERENCE

- ♦ The "Full Disc. Wave" screen can be displayed only when the optional CF card is used for full disclosure waveform recording.

7 Print the tabular trend.

When the output recorder is built-in recorder:

- 1 Press the [Rec.] key.
- ▶ The currently displayed tabular trend data will be output on the built-in recorder.

When the output recorder is laser printer:

- 1 Press the [Rec. x] key.
- ▶ The currently displayed trend data will be output on the laser printer.

NOTE

- ♦ If the stacked data reaches maximum, the key will turn to gray which indicates the

printing cannot be performed.

REFERENCE

- The quantity of stacked data for the bed is displayed inside the key.

Recall

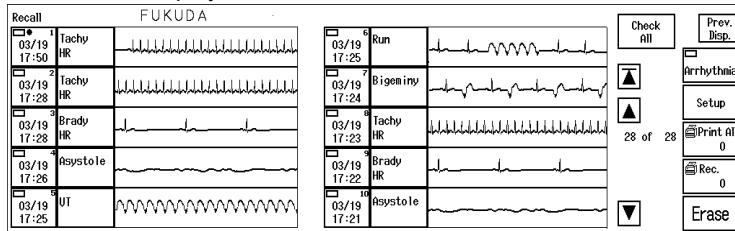
The waveform (12-seconds) and numeric data at alarm occurrence can be stored in recall memory. Total of 200 waveforms can be stored as recall data. If storing 1 waveform per bed, maximum of 200 data, if storing 2 waveforms per bed, maximum of 100 data can be stored. From the stored recall data, the recall factor to be displayed can be selected.

Recall Condition Setup

Set the recall condition before displaying the recall waveform.

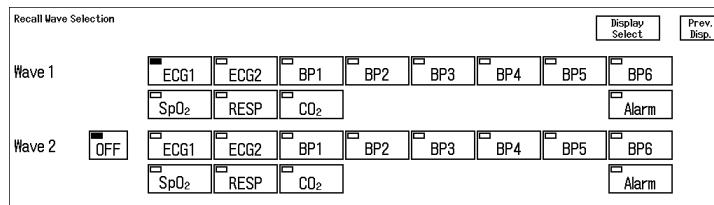
- Select the patient to set the recall condition by pressing the bed selection area.
- Press the [Menu], [Recall] keys.

► The "Recall" screen will be displayed.



- Press the [Wave Select] key, and select the waveforms to be stored.

► The "Recall Wave Selection" screen will be displayed.



REFERENCE

- Up to 2 waveforms can be selected for recall waveform.
- The LED on the key will turn ON for the selected waveform.

To Display the Recall Waveform

There are three ways to display the "Recall" screen.

Operation from the Menu:

- 1** Select the patient by pressing the bed selection area, and press the [Menu], [Recall] keys.
▶ The "Recall" screen will be displayed.

Operation from the Preprogrammed User Key:

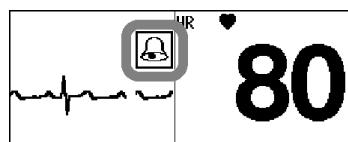
- 1** Press the [Recall] key on the user key area.
▶ The "Recall" screen will be displayed.

Operation from the Event Key:

- 1** When an alarm generates, press the or (Event) on the home display.
▶ The "Recall" screen will be displayed.

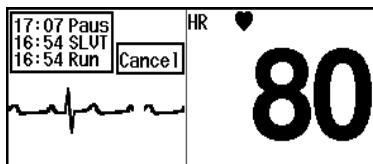
NOTE

will be displayed only if [Event key] or [Recall] is selected for "Event Key" under "Alarm Related Setup".



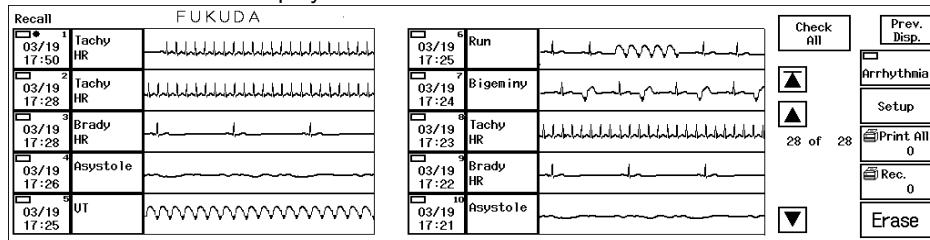
- 2** When an alarm generates, press the key.

▶ The alarm will be silenced and the event list will be displayed.



- 3** Press the event list area.

▶ The "Recall" screen will be displayed.



Description of the "Recall" Screen

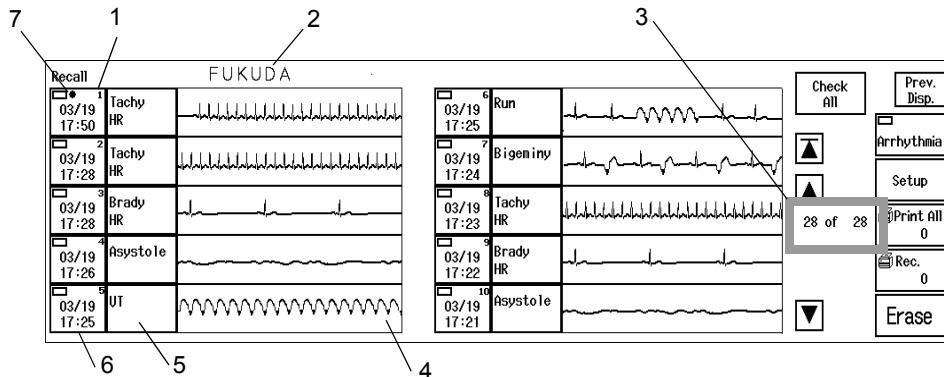
On the "Recall" screen, 10 compressed recall waveforms will be displayed. By pressing one of the data on the display, the enlarged recall waveform for that data can be displayed.

The 12-seconds recall waveform with the alarm occurrence point at the 7 to 8 seconds area will be displayed.

Recall List Display

10 recall data can be displayed simultaneously on the recall list display.

Pressing the recall factor or waveform area will display the [Recall Zoom] screen.

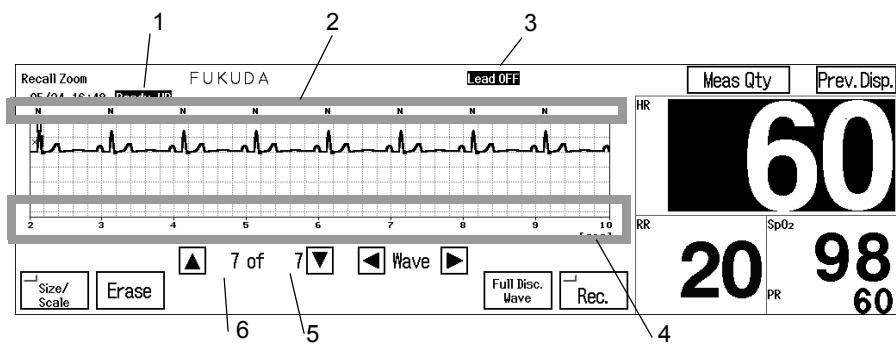


Example on DS-7700 Series

- 1 Sequential number starting from No.1
- 2 Patient Name
- 3 Quantity of displayable data / Total quantity of recall data
- 4 Compressed Waveform
- 5 Major recall factor
- 6 Date/time of alarm occurrence
- 7 A circle mark
Displayed for new recall data.

Recall Enlarged Display

The waveform display duration is 8 seconds for the DS-7700 series, and 10 seconds for the DS-7700W series.



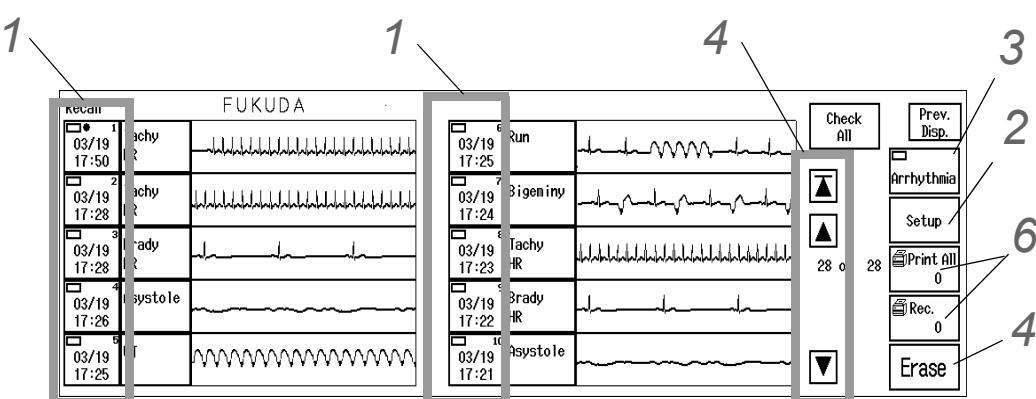
Example on DS-7700 Series

- 1 Recall Factor
- 2 QRS Classification
- 3 Measurement Status
- 4 Scale in seconds
- 5 Quantity of displayable data
- 6 Sequential number starting from No.1

To View the Recall List

1 "The newly generated alarm can be verified on the "Recall" screen.

(☞ "To Display the Recall Waveform" P8-12)



REFERENCE

- ♦ For the new recall data, a circle mark will be displayed in the date/time display area.

1 Press the date/time display area.

Or, display the "Recall Zoom" screen.

(☞ "To Enlarge the Recall Waveform" P8-16)

- ▶ The circle mark will disappear to indicate that the new alarm has been checked.

REFERENCE

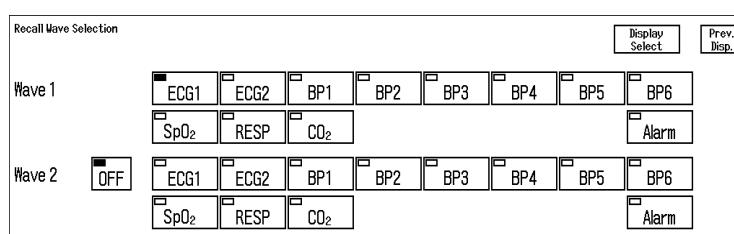
- ♦ By pressing the [Check All] key, all the circle marks can be deleted at once.

2 If the "Recall Zoom" screen is displayed, press the [Prev. Disp.] key.

2 Select the alarm factor to display on the recall list.

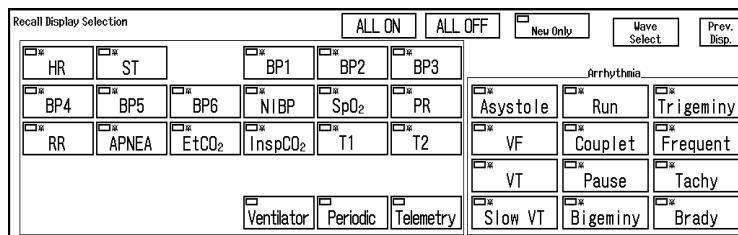
1 Press the [Setup] key.

- ▶ The "Recall Wave Selection" screen will be displayed.



2 Press the [Display Select] key.

- The "Recall Display Selection" screen will be displayed.



3 Select the alarm factor.

- If the key LED is lighted, recall data will be displayed.

NOTE

- If the parameter not selected generates an alarm, the display selection will automatically turn ON for that parameter.
- If the key LED is not lighted, recall data will not be displayed.

REFERENCE

- [ALL ON]: All parameters will be selected.
- [ALL OFF]: All selections will be cancelled.
- [New Only]: Only the new recall data will be displayed.
- [Telemetry]: Data that could not be recorded on the recorder will be stored as recall waveform and displayed on the "Recall" screen.
This function can be used when telemetry remote recording is not possible due to paper out or recorder busy conditions.
- [Periodic]: If [Recall] is selected for periodic recording, the data will be stored as recall waveform and displayed on the "Recall" screen.
Or, if [Recorder] is selected for periodic recording, and recording could not be performed due to paper out or recorder busy condition, the data will be stored as recall waveform and displayed on the "Recall" screen.

3

Press the [Arrhythmia] key on the "Recall" screen to switch the alarm factors to be displayed on the recall list.
The alarm factors that can be displayed will be according to the recall display selection performed on procedure 2.

- When the key LED is turned ON, only the arrhythmia alarm factors will be displayed on the recall list.
- When the key LED is turned OFF, alarm factors for numeric data and arrhythmia will be displayed on the recall list.

4

Use the **▲**/**▼**/**◀**/**▶** keys to switch the pages.

- **▲**: 10 latest data will be displayed.
- **▼**: 10 data of previous page (newer data) will be displayed.
- **▶**: 10 data of next page (older data) will be displayed.

5

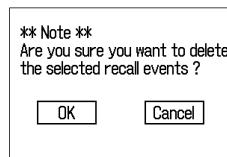
Unnecessary recall data can be deleted.

- 1 Select the recall data to delete by pressing the date/time display area. (More than one selection is possible.)

- The LED will light in green.

2 Press the [Erase] key.

► A confirmation message will be displayed.



3 Press the [OK] key.

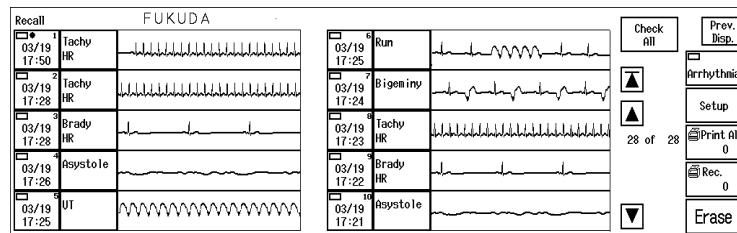
► The selected recall data will be deleted.

NOTE

- ♦ Be cautious when selecting more than one data as the selected data will be deleted all at once.

6

Press the [Print All x]/[Rec. x] key to print the recall data.



NOTE

- ♦ It can be printed only if laser printer is selected as the output recorder for the recall waveform.

► [Print All x]: All stored recall data will be output on the laser printer.

NOTE

- ♦ When the stacked data reaches maximum quantity, the key will turn to gray which indicates the printing cannot be performed.

► [Rec. x]: Currently displayed recall data will be output on the laser printer.

REFERENCE

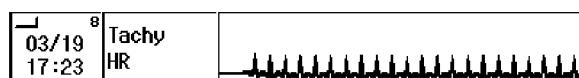
- ♦ The quantity of stacked data for the bed is displayed inside the key.

To Enlarge the Recall Waveform

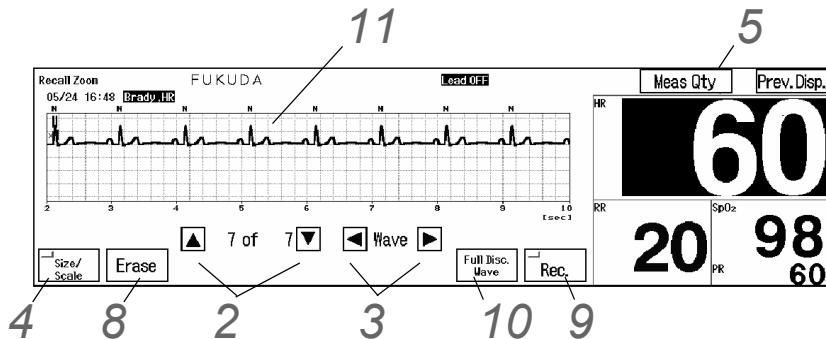
On the "Recall Zoom" screen, the recall waveform will be displayed in 25mm/s, and the waveform before and after the alarm occurrence can be verified using the cursor.

1

Press the recall factor or waveform area on the "Recall" screen.



- The "Recall Zoom" screen will be displayed.



2 Use the **▲/▼** keys to view other recall data.

- The recall waveforms for the factors selected on the "Recall Display Selection" screen will be displayed.
- **▲**: Displays the newer data.
- **▼**: Displays the older data.

3 Press the **◀/▶** keys for "Wave" to scroll the waveform display.

- The recall waveform display will be scrolled to left or right.
- **◀**: Displays the older data.
- **▶**: Displays the newer data.

NOTE

- The interval to scroll the waveform can be selected from [1sec.] / [4sec.] / [6sec] for "Scroll Interval". (Menu>System Config.>Pre-Set>Soft Switch 2/3)
([Maintenance Manual "Soft Switch" P6-8](#))

4 Press the [Size/Scale] key to adjust the size/scale of the waveform.

- The key to adjust the size/scale will be displayed on the waveform area.
- Pressing this key will sequentially change the waveform size in the order of x1/4, x1/2, x1, x2, x4.

REFERENCE

- For BP, CO₂, and SPIRO waveform, scale can be adjusted.

5 Press the [Meas Qty] key.

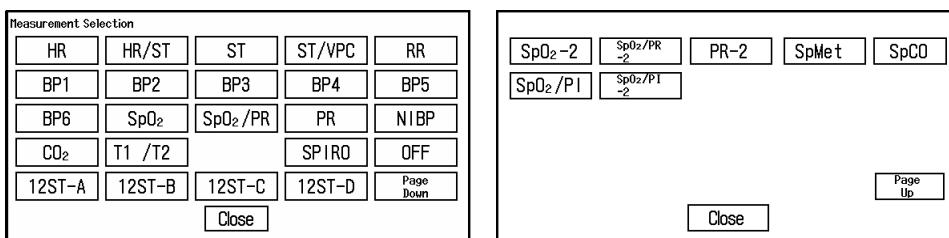
- Pressing the [Meas. Qty] will sequentially change the quantity of displayed parameters to 3, 5, 7, 10, 3,

6 The parameters to be displayed can be selected.

- 1** Press the numeric data area.



- The "Measurement Selection" screen will be displayed.

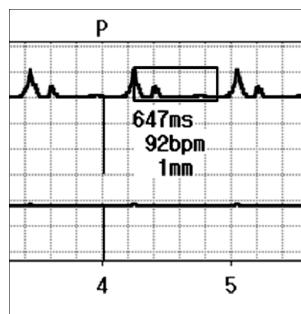


- 2** Select a parameter.
- 7** For the ECG waveform, PR, RR, PP interval, R-wave height can be measured.

NOTE

- ♦ The caliper function can be used only when a mouse is connected.

- 1** On the recall enlarged waveform, left-click on the starting point of measurement.
- The caliper mode will become active.
- During the caliper mode, a cross shape cursor and a red box will be displayed.



NOTE

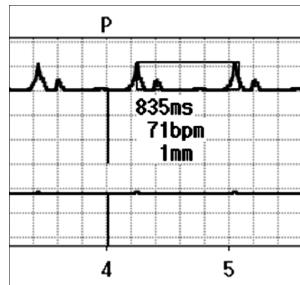
- ♦ When the cursor is outside the waveform area, the red box and measurement value will not be displayed.
- ♦ When the size/scale key is displayed, caliper function cannot be used.

REFERENCE

- ♦ The box will be created by dragging the cursor.
The following values will be displayed inside the waveform area.x-axis value (waveform interval) in "ms"
conversion value in "bpm"
y-axis value (wave height) in "mm"

- 2** Click the measuring interval point to finalize the caliper display.

- ▶ The color of the caliper box will change to blue.



3 After finalizing the caliper display, click again.

- ▶ The previous caliper display will disappear and a new caliper display will appear.

4 Click outside the waveform area.

- ▶ The caliper mode will cease, and caliper display will disappear.

8 To delete the displayed recall data, press the [Erase] key.

- ▶ The selected recall data will be deleted.

9 The displayed recall waveform can be output on the built-in recorder/laser printer.

When the output recorder is the built-in recorder:

1 Press the [Rec.] key.

- ▶ The currently displayed recall waveform will be output on the built-in recorder.

When the output recorder is the laser printer:

1 Press the [Print x] key.

- ▶ The currently displayed recall waveform will be output on the laser printer.

NOTE

- When the stacked data reaches the maximum quantity, the key will turn to gray which indicates that the printing cannot be performed.

REFERENCE

- The quantity of stacked data for the bed is displayed inside the key.

10 Press the [Full Disc. Wave] key

- ▶ The full disclosure waveform data for the selected date/time will be displayed.

REFERENCE

- The "Full Disc. Wave" screen can be displayed only when the optional CF card is used for full disclosure waveform recording.

11 Press the waveform area.

- ▶ The display will return to recall list.

REFERENCE

- By using a mouse, the caliper mode will become active.

To Display the Full Disclosure Waveform from the Recall Screen

From the recall screen, full disclosure waveform can be displayed.

NOTE

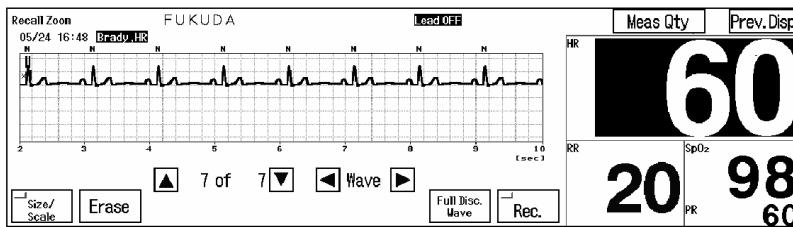
- To display the full disclosure waveform from the recall screen, select [ON] for "Link Recall/Full Disc. Wave" (Menu>System Config.>Pre-Set>Soft Switch).
( Maintenance Manual "Soft Switch" P6-8)

1

Press the recall factor or waveform area on the "Recall" screen.



- The "Recall Zoom" screen for the selected date/time will be displayed.

**NOTE**

- If the selected date/time is outside the full disclosure waveform recording range, enlarged recall waveform will be displayed.
- The waveform will be displayed according to the full disclosure waveform recording setting.

REFERENCE

- The operation procedure is the same with the "Full Disc. Wave Zoom" screen (Menu > Full Disc. Wave).
( "To View the Enlarged Full Disclosure Waveform" P8-45)

NIBP List

The NIBP data of latest 120 measurements can be displayed in tabular format. The displayed parameters are systolic/diastolic/mean NIBP data, HR, SpO₂, and PR.

To Display the NIBP List

There are three ways to display the "NIBP List" screen.

Operation from the Menu:

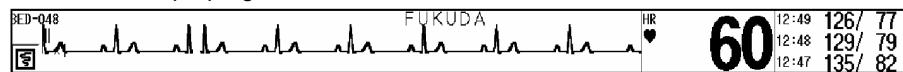
- 1 Select the patient by pressing the bed selection area, and press the [Menu], [NIBP List] keys.

Operation from the Preprogrammed User Key:

- 1 Press the [NIBP List] key on the user key area.

Operation from the Numeric Data Area:

- 1 Press the NIBP list area preprogrammed on the numeric data area.



For the DS-7700 Series:

- 10 data will be displayed for each screen.

NIBP List SMITH									
No.	Date Time	NIBP		mmHg	HR	SpO ₂	PR		
1	04/16 11:11	60/	60(60)	60	60	60	Shift	▲
2	04/16 11:10	61/	61(61)	61	61	61		▼
3	04/16 11:09	62/	62(62)	62	62	62		▲
4	04/16 11:08	63/	63(63)	63	63	63		▼
5	04/16 11:07	64/	64(64)	64	64	64		▲
6	04/16 11:06	65/	65(65)	65	65	65		▼
7	04/16 11:05	66/	66(66)	66	66	66		▲
8	04/16 11:04	67/	67(67)	67	67	67		▼
9	04/16 11:03	68/	68(68)	68	68	68		▲
10	04/16 11:02	69/	69(69)	69	69	69		▼

Prev. Disp.

Graphic Trend

Full Disc. Wave

All Rec.

Rec.

For the DS-7700W Series:

- 20 data will be displayed for each screen.

NIBP List SMITH									
No.	Date Time	NIBP		mmHg	HR	SpO ₂	PR		
1	04/16 11:16	60/	60(60)	60	60	60	Shift	▲
2	04/16 11:15	61/	61(61)	61	61	61		▼
3	04/16 11:14	62/	62(62)	62	62	62		▲
4	04/16 11:13	63/	63(63)	63	63	63		▼
5	04/16 11:12	64/	64(64)	64	64	64		▲
6	04/16 11:11	65/	65(65)	65	65	65		▼
7	04/16 11:10	66/	66(66)	66	66	66		▲
8	04/16 11:09	67/	67(67)	67	67	67		▼
9	04/16 11:08	68/	68(68)	68	68	68		▲
10	04/16 11:07	69/	69(69)	69	69	69		▼
11	04/16 11:06	70/	70(70)	70	70	70	Page	▲
12	04/16 11:05	71/	71(71)	71	71	71		▼
13	04/16 11:04	72/	72(72)	72	72	72		▲
14	04/16 11:03	73/	73(73)	73	73	73		▼
15	04/16 11:02	74/	74(74)	74	74	74		▲
16	04/16 11:01	75/	75(75)	75	75	75		▼
17	04/16 11:00	76/	76(76)	76	76	76		▲
18	04/16 10:59	77/	77(77)	77	77	77		▼
19	04/16 10:58	78/	78(78)	78	78	78		▲
20	04/16 10:57	79/	79(79)	79	79	79		▼

Prev. Disp.

Graphic Trend

Full Disc. Wave

Print All

Rec.

REFERENCE

- Programming the NIBP list on the numeric data area can be performed on the "Display Configuration" screen.
- Select [NIBP List] on the "Measurement Selection" for the display configuration of home display or individual bed display.
- (☞ "Display Configuration" P10-2)

Description of the "NIBP List" Screen

On the NIBP list, 120 data of NIBP, and HR, SpO₂, PR value at the time of NIBP measurement will be displayed.

No.	Date Time	NIBP	mnts	HR	SpO ₂	PR
1	04/16 11:11	60/ 60(60)	60	60	60	60
2	04/16 11:10	61/ 61(61)	61	61	61	61
3	04/16 11:09	62/ 62(62)	62	62	62	62
4	04/16 11:08	63/ 63(63)	63	63	63	63
5	04/16 11:07	64/ 64(64)	64	64	64	64
6	04/16 11:06	65/ 65(65)	65	65	65	65
7	04/16 11:05	66/ 66(66)	66	66	66	66
8	04/16 11:04	67/ 67(67)	67	67	67	67
9	04/16 11:03	68/ 68(68)	68	68	68	68
10	04/16 11:02	69/ 69(69)	69	69	69	69

CAUTION

- Set the date/time before monitoring. If the date/time is changed during monitoring, the displayed measured date/time will be inaccurate.
- If the time/date is changed during monitoring (manually or by time synchronization), the time/date of past measurement data will not be corrected. In such case, the time/date of NIBP list, 12-lead analysis result, etc. will differ between the central monitor and the bedside monitor.
- The HR, SpO₂, PR value of the NIBP list may differ between this unit and the bedside monitor.

NOTE

- The Quick SYS data on the bedside monitor will not be displayed on the NIBP list.

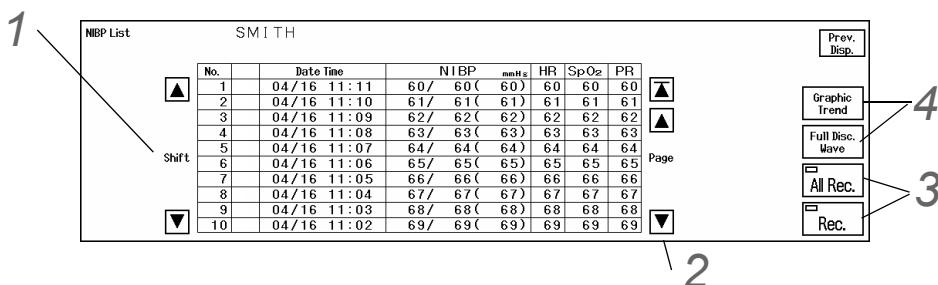
REFERENCE

- The erroneous NIBP data can be set to not display on the NIBP list with the soft switch setup ("Display measurement error on NIBP list"). (Default: ON)
When "ON" is selected, erroneous data will be included in the NIBP list.
(Maintenance Manual "Soft Switch" P6-8)

To View the NIBP List

1 Use the / keys for "Shift" to shift the displayed lines.

("To Display the NIBP List" P8-21)



► : Shifts the NIBP list upwards to one newer data.

► : Shifts the NIBP list downwards to one older data.

2 Use the / keys beside the time bar to scroll the display.

- ▶ : Displays the latest data.
- ▶ : Shifts the NIBP list one page upwards to newer data.
- ▶ : Shifts the NIBP list downwards to one older data.

3 Press the [All Rec.]/[Rec.] key to print the NIBP list data.

When the output recorder is built-in recorder:

- ▶ [All Rec.]: Outputs all NIBP list data on the built-in recorder.
- ▶ [Rec.]: Outputs currently displayed NIBP list data on the built-in recorder.

When the output recorder is laser printer:

- ▶ [All Rec. x]: All stored NIBP list data will be output on the laser printer.

NOTE

- ♦ When the stacked data reaches maximum quantity, the key will turn to gray which indicates the printing cannot be performed.

REFERENCE

- ♦ The quantity of stacked data for the bed is displayed inside the key.

4 The graphic trend data and full disclosure waveform data of the specified date/time can be displayed.

1 Select the data number to display the graphic trend or full disclosure waveform.

2 Press the [Graphic Trend]/[Full Disc. Wave] key.

- ▶ The "Graphic Trend" or "Full Disc. Wave" of the selected time/date will be displayed.

NOTE

- ♦ For the following case, pressing the [Graphic Trend] key or [Full Disc. Wave] key will not display the data.
If the [Graphic Trend] key is pressed for the date/time which is more than 48 hours prior to the current time.
(The trend data can be stored only up to 48 hours.)
If the [Full Disc. Wave] key is pressed for the date/time which full disclosure waveform recording was not performed.
- ♦ The date/time of searched data may slightly differ from the specified date/time depending on the graphic trend display interval or discrepancy of time.

REFERENCE

- ♦ The "Full Disc. Wave" screen can be displayed only when the optional CF card is used for full disclosure waveform recording.

ST Measurement

The ST level measurement can be performed for the monitoring ECG.

To Display the ST Measurement Display

"There are two ways to display the "ST Display" screen.

Operation from the Menu:

- 1** Select the patient by pressing the bed selection area, and press the [Menu], [ST Display] keys.

Operation from the Preprogrammed User Key:

- 1** Press the [ST Display] key set as user key.

► The "ST Display" screen will be displayed.

NOTE

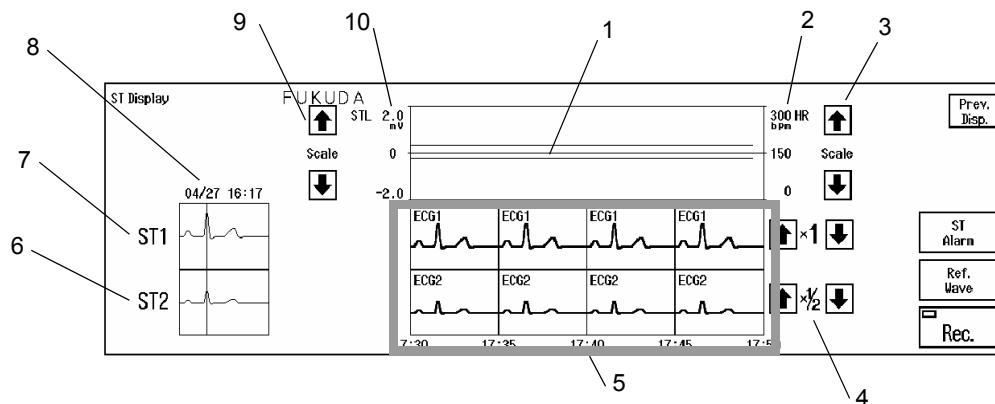
- To perform the ST measurement, first set the reference waveform.
(☞ "Reference Waveform Setup" P8-25)

Description of the "ST Display" Screen

"On the ST display, the averaged ECG waveform will be superimposed for 5 minutes. HR and ST level data will be simultaneously displayed in graphic trend. This graphic trend is an instant trend of every 5 seconds.

The ST reference point and measurement point are set based on reference ECG waveform. ST1 and ST2 is measured from ECG1 and ECG2 respectively.

For the DS-7700 Series:



1 Graphic Trend

Orange: ST Level

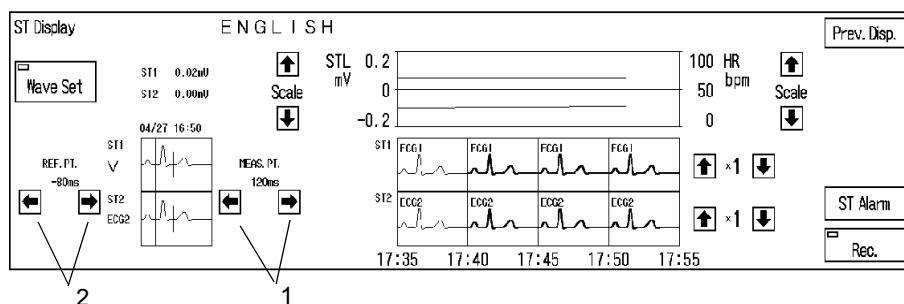
Green: HR

2 HR Scale

3 HR Level Scale Adjustment Key

- 4 Waveform Size
- 5 Averaged waveform of every 5 minutes
- 6 ST2 Reference Waveform
- 7 ST1 Reference Waveform
- 8 Date/Time of Reference Waveform Setup
- 9 ST Level Scale Adjustment Key
- 10 ST Level Scale

For the DS-7700W Series:



- 1 Measurement Point Adjustment Keys
- 2 Reference Point Adjustment Keys

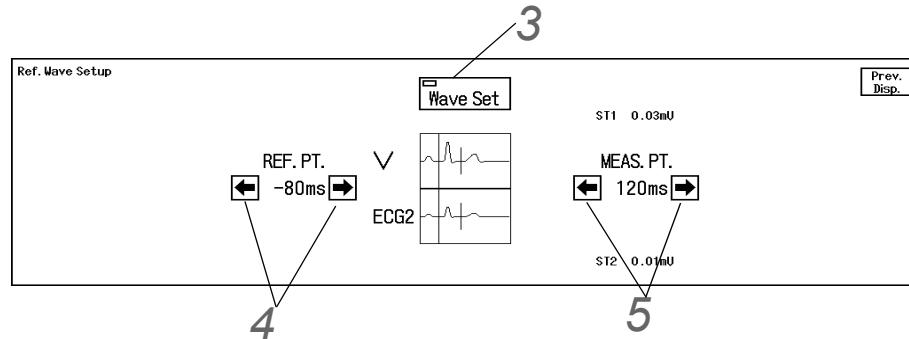
Reference Waveform Setup

Set the reference point and measurement point to measure the ST level.

The reference point and measurement point are common for ECG1 and ECG2.

- 1** Display the "ST Display" screen.
(☞ "To Display the ST Measurement Display" P8-24)
- 2** For the DS-7700 series, press the [Ref. Wave] key on the "ST Display" screen.

► The "Ref. Wave Setup" screen will be displayed.



REFERENCE

- For the DS-7700W series, the reference waveform can be set on the "ST Display" screen.

- 3** Press the [Wave Set] key to set the reference waveform.

- During the reference waveform setup, the LED on the key will light.

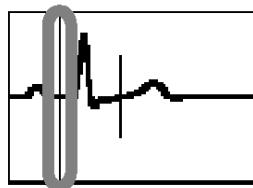
NOTE

- The ST reference waveform cannot be set unless the arrhythmia learn process is performed. First, perform the arrhythmia learn process. (☞ "To Perform Arrhythmia Learning" P6-18)

REFERENCE

- As the average ECG is calculated only with normal QRS beat, the reference waveform setup may take time for patient with ventricular extrasystole or frequent pacing beat.
- Pressing the [Wave Set] key will set the reference waveform by averaging the waveform for 16 beats.

4 Use the / keys of "REF. PT." to set the reference point.

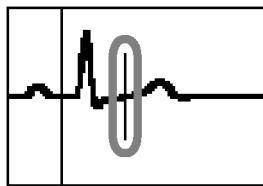


- The reference point cursor will move and sets the reference point from the R wave peak to the P wave direction.

REFERENCE

- The reference point will be set in the range of -240 to 0ms in 10ms increments.
- The default value is 80ms prior to the R wave peak (0ms).

5 Use the / keys of "MEAS. PT." to set the measurement point.



- The measurement point cursor will move and sets the measurement point from the R wave peak to the T wave direction.

REFERENCE

- The measurement point will be set in the range of 0 to 560ms in 10ms increments.
- Moving the cursor will display the currently measured ST value.
- The default value is 120ms after the R wave peak (0ms).

To View the ST Data

1 Press the / keys for "Scale".

(☞ "To Display the ST Measurement Display" P8-24)

- ▶ The displaying trend scale will change.

NOTE

- Changing the scale will simultaneously change the HR scale and ST scale on the "Graphic Trend" screen.

The scales for each parameter are as follows.

Trend	Scale	Unit
HR	100, 200, 300	bpm
ST	±0.2, ±0.5, ±1.0, ±2.0	mV
	±2, ±5, ±10, ±20	mm

2 Use the / keys to change the waveform size.

- ▶ Pressing this key will sequentially change the waveform size in the order of x1/4, x1/2, x1, x2, x4.

NOTE

- This waveform size selection synchronizes with the ECG waveform size on the home display.

3 Press the [Rec.] key.

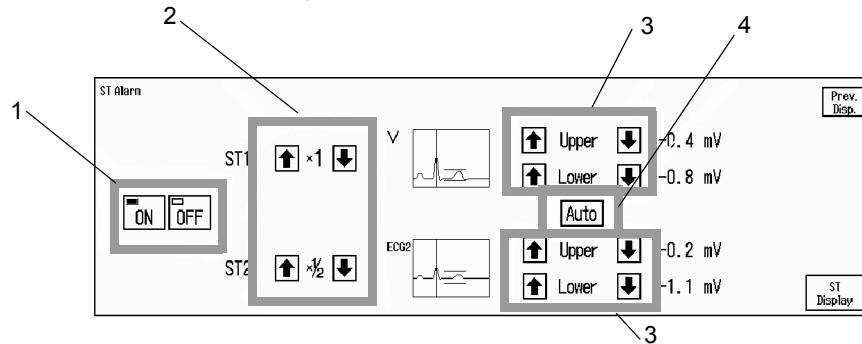
- ▶ ST level and HR graphic trend (20 minutes), ST reference waveform, 5-minute ECG waveform (20 minutes) will be output.
- ▶ If the output recorder is laser printer, the quantity of stacked data will be displayed inside the key.

NOTE

- When the stacked data reaches maximum quantity, the key will turn to gray which indicates the printing cannot be performed.

4 Press the [ST Alarm] key.

- ▶ The "ST Alarm" screen will be displayed.



- 1 [ON]/[OFF] key
[ON]: Alarm will generate.
[OFF]: Alarm will not generate.
- 2 [ST1]/[ST2]key
Set the waveform size for reference waveform.
- 3 / key for "Upper", "Lower"
Use these keys to set the upper and lower limit.
If it exceeds the adjustable range, the threshold will be set to OFF.
- 4 [Auto]
The limits will be automatically set as follows.
Upper Limit: Current ST data+0.2mV (+2mm)
Lower Limit: Current ST data-0.2mV (-2mm)
When the limit is automatically set, ST alarm will be automatically set to ON. If the upper or lower limit is OFF, the limits will remain to be OFF.

12-Lead Waveform

For the bed monitoring 12-lead ECG, 12-lead waveform display and ST measurement can be performed. The "12-Lead Wave" and "12-Lead ST" screen can be displayed only for the wired bedside monitors monitoring 12-lead ECG.

NOTE

- To monitor/record the 12-lead waveform, select ON for "12-Lead" under "Soft Switch".
(Maintenance Manual "Soft Switch" P6-8)
- The "12-Lead ST" screen can be displayed only for the DynaScope 5000 series wired bedside monitors. It cannot be displayed for the DynaScope 7000 series bedside monitors.

To Display the 12-Lead Waveform

There are two ways to display the "12-Lead" screen.

Operation from the Menu:

- 1 Select the patient by pressing the bed selection area, and press the [Menu], [12-Lead] key.
 - ▶ The "12-Lead" or "12-Lead ST" screen will be displayed depending on which screen was previously displayed.

Operation from the Preprogrammed User Key:

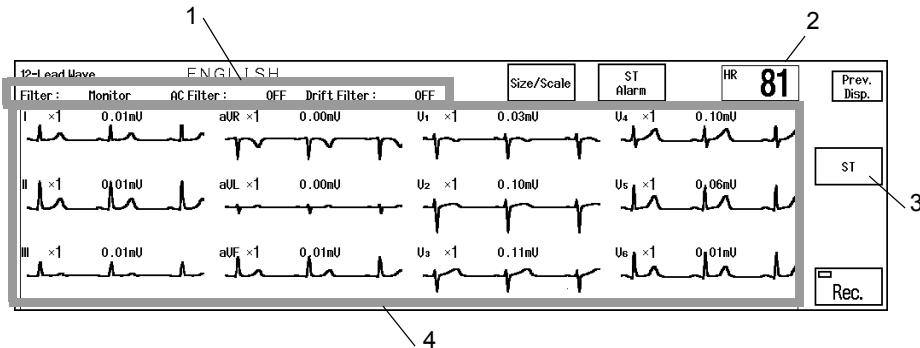
- 1 Press the [12-Lead]/[12-Lead ST] key on the user key area.
 - ▶ The "12-Lead"/"12-Lead ST" screen will be displayed.

NOTE

- To perform the 12-lead ST measurement, first set the reference waveform.
("To Set the Reference Waveform" P8-30)

Description of the "12-Lead ST" Screen

□ 12-Lead Waveform Display



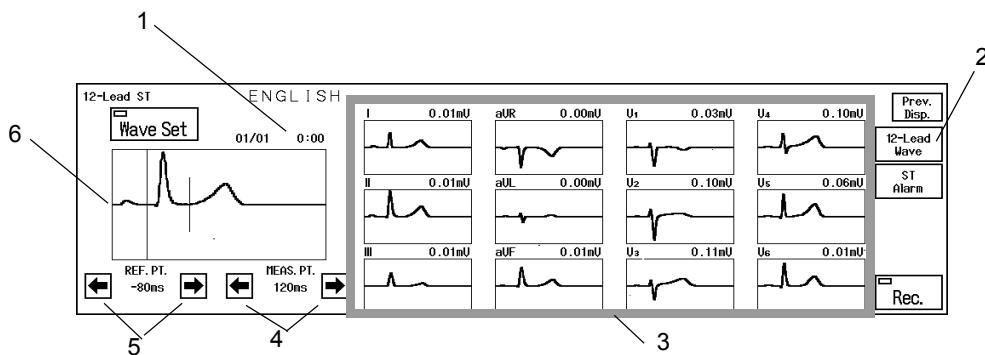
- 1 Current Setup
- 2 Current Heart Rate
- 3 [ST] key
Press this key to display the "12-Lead ST" screen.
- 4 ECG Waveform of Each Lead

□ 12-Lead ST Display

The "12-Lead ST" screen can be displayed by pressing the [ST] key on the "12-Lead" screen.

On the "12-Lead ST" screen, ST waveform for each lead will be displayed.

The reference point and measurement point for ST measurement are common for all leads.

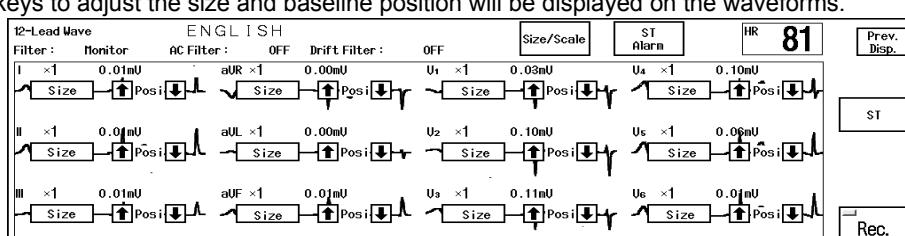


- 1 Date/Time of Reference Waveform Setup
- 2 [12-Lead Wave] key
Press this key to display the "12-Lead Wave" screen.
- 3 ST waveform for each lead (1 sec., 25mm/sec)
The selected lead is indicated by red frame.
- 4 Measurement Point Adjustment Keys
- 5 Reference Point Adjustment Keys
- 6 Reference Waveform for the Selected Lead
The reference waveform for the selected lead (with red frame) is displayed.

To View the 12-Lead Waveform

- 1** Press the [Size/Scale] key on the "12-Lead Wave" screen.
 (☞ "To Display the 12-Lead Waveform" P8-28)

► The keys to adjust the size and baseline position will be displayed on the waveforms.



- 2** Press the [Size] key.
 ► The waveform size will sequentially change in the order of x1/4, x1/2, x1, x2, x4.

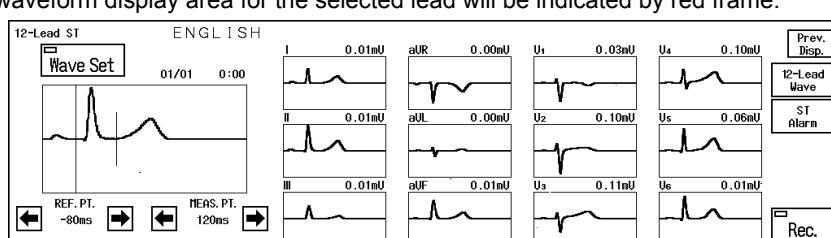
- 3** Press the / keys to adjust the baseline position of the waveform.

To Set the Reference Waveform

Set the reference point and measurement point to measure the 12-lead ST level.

- 1** Press the [ST] key on the "12-Lead Wave" screen.
 (☞ "To Display the 12-Lead Waveform" P8-28)
 ► The "12-Lead ST" screen will be displayed.

- 2** Select the lead to set the reference waveform.
1 Press the waveform display area for each lead on the right side of the screen.
 ► The waveform display area for the selected lead will be indicated by red frame.



- 3** Press the [Wave Set] key.
 ► The reference waveform will be set by averaging the normal QRS waveform for 16 beats.
 ► During the reference waveform setup, the LED on the key will light.

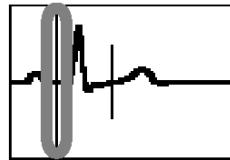
NOTE

- The ST reference waveform cannot be set unless the arrhythmia learn process is performed. First, perform the arrhythmia learn process.
 (☞ "Alarm Limit Setup" P6-9)
- As the average ECG is calculated only with normal QRS beat, the reference waveform setup may take time for patient with ventricular extrasystole or frequent pacing beat.

4

Use the / keys of "REF. PT." to set the reference point.

- The reference point cursor will move and sets the reference point from the R wave peak to the P wave direction.



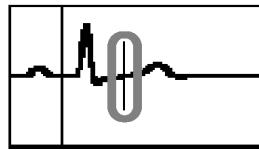
REFERENCE

- The reference point will be set in the range of -240 to 0ms in 10ms increments.
- The default value is 80ms prior to the R wave peak (0ms).

5

Use the / keys for "MEAS. PT." to set the measurement point.

- The measurement point cursor will move and sets the measurement point from the R wave peak to the T wave direction.



REFERENCE

- The measurement point will be set in the range of 0 to 560ms in 10ms increments.
- The default value is 120ms after the R wave peak (0ms).

To View the 12-Lead ST Data

1

On the "12-Lead ST" screen, press the [Rec.] key.

("Description of the "12-Lead ST" Screen" P8-29)

- The displayed 12-lead ST waveform will be output.
- If the output recorder is laser printer, the quantity of stacked data will be displayed inside the key.

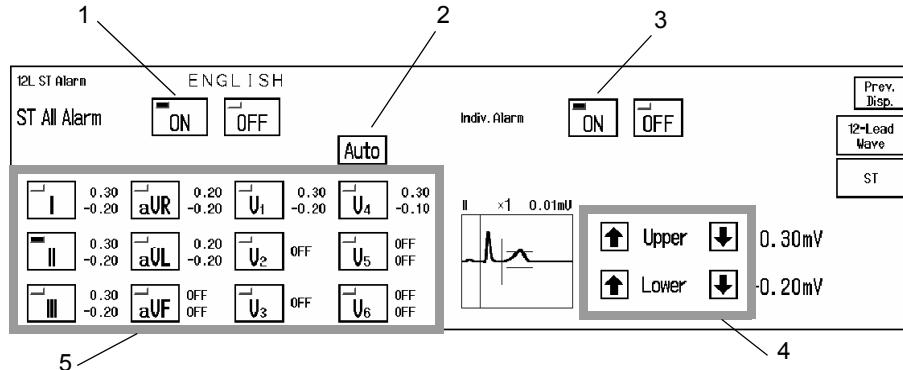
NOTE

- When the stacked data reaches maximum quantity, the key will turn to gray which indicates the printing cannot be performed.

2

Press the [ST Alarm] key.

► The "12L ST Alarm" screen will be displayed.



1 ON/OFF of ST All Alarm

[ON]: 12-lead ST alarm will generate. However, the alarm will not generate for the lead which individual alarm is set to OFF

[OFF]: 12-lead ST alarm will not generate.

2 [Auto]

The limits will be automatically set as follows.

Upper Limit: Current ST data+0.2mV (+2mm)

Lower Limit: Current ST data–0.2mV (-2mm)

When the limit is automatically set, ST alarm will be automatically set to ON. If the upper or lower limit is OFF, the limits will remain to be OFF.

3 ON/OFF of "Indiv. Alarm"

[ON]: 12-lead ST alarm for the selected lead will generate.

[OFF]: 12-lead ST alarm for the selected lead will not generate.

4 / key for "Upper", "Lower"

Set the upper and lower limit.

If it exceeds the adjustable range, the threshold will be set to OFF.

5 Lead Key

The lead to set the alarm can be selected.

Full Disclosure Waveform Recording (Optional Function)

By using the optional CF card (FCF-1000: 1GB, FCF-16GA:16GB), full disclosure waveform can be recorded. The recordable duration is as follows.

When using the FCF-1000:

- ♦ 32 waveforms 24-hours
- ♦ 16 waveforms 48-hours
- ♦ 8 waveforms 96-hours

When using the FCF-16GA:

- ♦ 32 waveforms 96-hours

The parameters for full disclosure waveform recording are as follows.

FCF-1000: Max. 3 waveforms per bed:

ECG1, ECG2, BP1, BP2, SpO₂, RESP, CO₂(except GAS CO₂)

FCF-16GA:

ECG1, ECG2, BP1 to 6, SpO₂-1, RESP, CO₂, GAS O₂, GAS CO₂, GAS AGT, SpO₂-2, AWP(SPIRO), AWF(SPIRO), AWV(SPIRO)

The alarm event and time will be also recorded which allows to search the waveform by each factor.
(However, alarm event search cannot be performed for GAS O₂, GAS CO₂, GAS AGT)

The full disclosure waveform can be also displayed on the optional slave monitor (DS-7700 series) or extended display unit (DS-7700W series) if used.

CAUTION

- Use only the specified CF card (FCF-1000, FCF-16GA).
- Turn OFF the power when inserting/removing the CF card.
- Check that the CF card indicator is not lighted in red when turning OFF the power.
- The CF card can be used only on the unit where it was formatted.
 - The CF card used for full disclosure waveform recording cannot be used for data transfer.
 - The CF card used for full disclosure waveform recording on other central monitors cannot be used on this unit.
- The full disclosure waveform recording function is not available for the TCON bed.

NOTE

- When the recordable duration of the CF card is exceeded, the data will be deleted from the old one.
To delete the full disclosure waveform data, perform the discharge procedure.
( "Discharge" P5-18)

To Format the CF Card

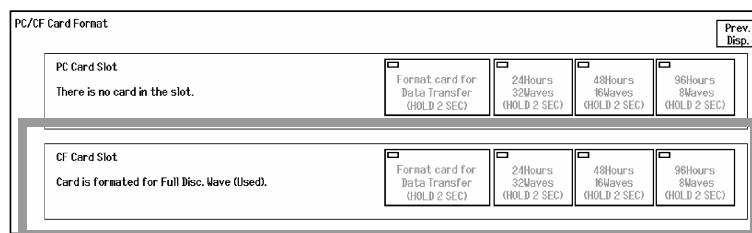
1 Insert the CF card (FCF-1000, FCF-16GA) into the card slot.

2 Press the [Menu], [System Config.], [Pre-Set] keys, enter password, and press the [PC/CF Card], [Format] keys.

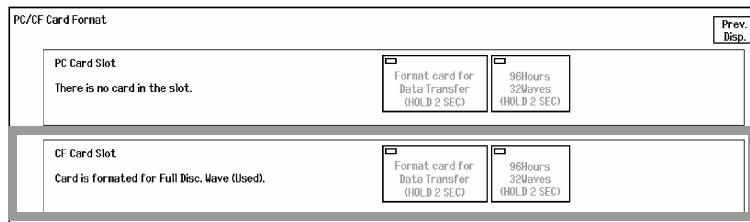
- The "PC/CF Card" screen will be displayed.

REFERENCE

- The "PC/CF Card" screen will be also displayed when unformatted card is inserted into the slot.



When FCF-1000 is used



When FCF-16GA is used

3 Select the duration for recording.

When using the FCF-1000:

- 1 Press one of the [24Hours 32Waves]/[48Hours 16Waves]/[96Hours 8Waves] key for more than 2 seconds.

When using the FCF-16GA:

- 1 Press the [96Hours 32Waves] key for more than 2 seconds.

► A beep tone generates and the display returns to the previous display (or home display).

NOTE

- The recordable number of waveforms (32 waveforms/16 waveforms/8 waveforms) indicate the total number for this unit and not for each bed.

To Select the Waveform for Recording

For the recording waveform, ECG1 will be automatically assigned for Waveform 1 of the displayed beds. In case of [96Hours 8Waves], waveforms for only up to 8 beds can be recorded.

REFERENCE

- The waveforms and beds to be recorded can be set on the "Wave Select" screen.
Maximum of 3 waveforms can be recorded for each bed.

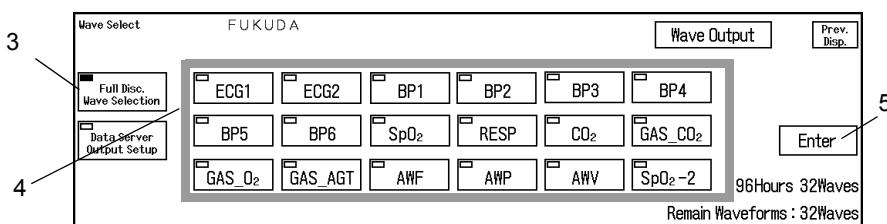
1 Press the [Menu], [Admit] ("Patient") keys.

► The "Admit/Discharge" screen will be displayed.

2 Select the waveform to store.

- 1 Press the [Wave Set] key.

► The "Full Disc. Wave Selection" screen will be displayed.



- 2 Select a bed to perform the setup by pressing the bed selection area.

- 3 Press the [Full Disc. Wave Selection] key.

- 4** Select the parameters.
- 5** Press the [Enter] key.
► The settings will be finalized.

REFERENCE

- At the lower right of the display, the remaining quantity of recordable waveforms will be displayed. Using this quantity as a guideline, repeat procedure 2 to 4 to set the waveforms for other beds.

To Display the Compressed Full Disclosure Waveform

There are two ways to display the compressed full disclosure waveform.

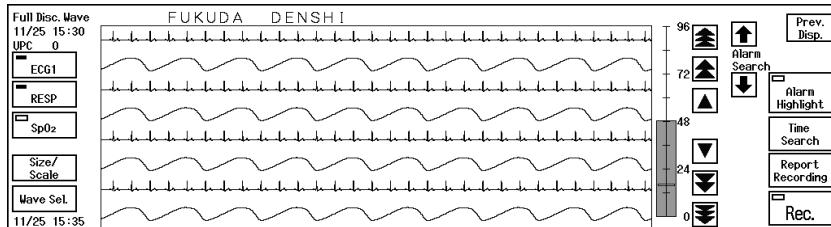
Operation from the Menu:

- 1** Select the patient by pressing the bed selection area, and press the [Menu], [Full Disc. Wave] keys.

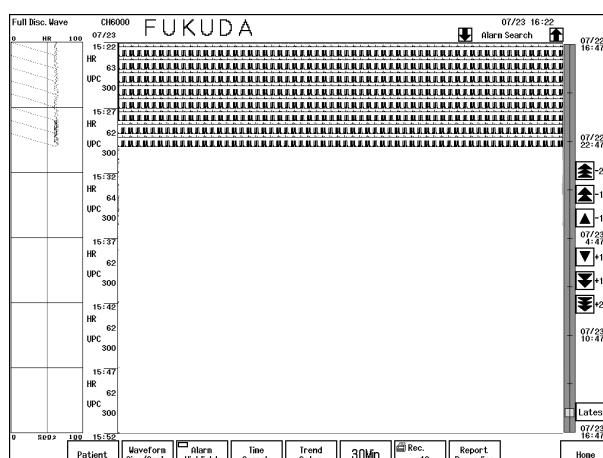
Operation from the Preprogrammed User Key:

- 1** Press the [Full Disc. Wave] key on the user key area.

► The "Full Disc. Wave" screen will be displayed.



*Compressed Full Disclosure Waveform Display on the Main Unit
(The following example is DS-7700 series : 2 waveforms display)*



*Compressed Full Disclosure Waveform Display on the Slave Monitor/Extended Display Unit
(The following example is 2 waveforms display)*

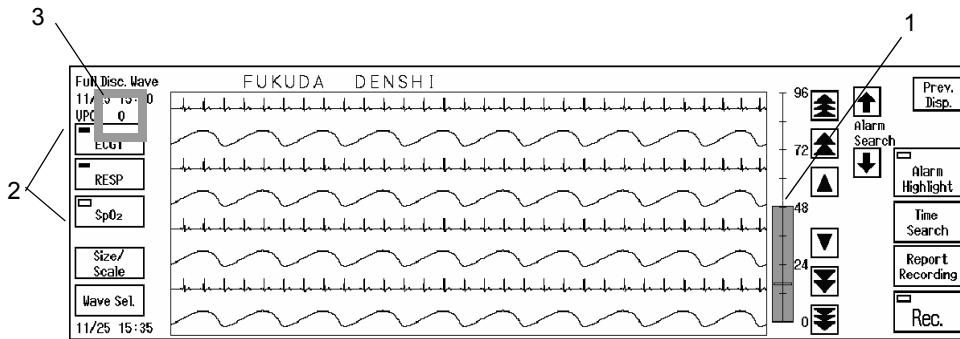
(Maintenance Manual "Using the Slave Monitor" P2-8)

Description of the Compressed Full Disclosure Waveform

There are 2 types of full disclosure waveform display. One is a compressed full disclosure waveform display, and the other is an enlarged full disclosure waveform display which can display the precise data of the specified date/time.

Display on the Main Unit

Compressed Full Disclosure Waveform Display:



The example is DS-7700 series: 2 waveforms display

- 1 Time Bar
- 2 Parameter Selection Key
- 3 Quantity of VPC occurred during the displayed duration

Maximum of 2 waveforms can be displayed on this display.

The waveform display duration is as follows.

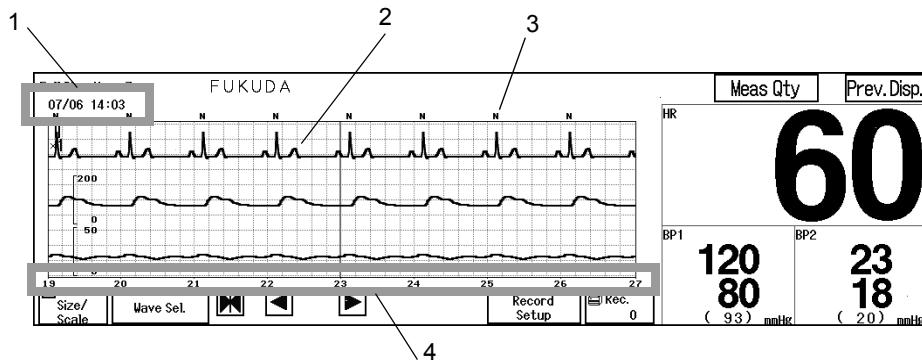
	DS-7700 Series	DS-7700W Series
1 Waveform Display	5 minutes (30sec/line x 10 lines)	15 minutes (1min/line x 15 lines)
2 Waveforms Display	2 minutes (30sec/line x 2 waves x 4 lines/wave)	5 minutes (1min/line x 2 waves x 5 lines/wave)

A time bar is displayed at the right side of the display. The location of displayed data among the whole stored data is indicated on the time bar.

Pressing the waveform area will display the enlarged full disclosure waveform display.

Enlarged Full Disclosure Waveform Display:

The waveform display duration is 8 seconds for the DS-7700 series, and 10 seconds for the DS-7700W series.



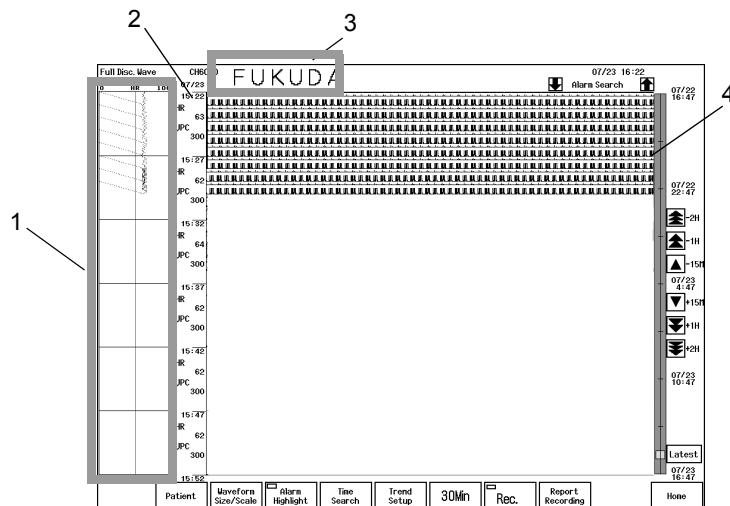
(The following example is DS-7700 series.)

- 1 Time/date at cursor position
- 2 Cursor
- 3 QRS Classification
- 4 Scale in seconds

□ Display on the Slave Monitor/Extended Display Unit

(Maintenance Manual "Using the Slave Monitor" P2-8)

Compressed Full Disclosure Waveform+Trend:



- 1 Graphic Trend
Numeric data trend or event trend can be displayed.
- 2 Parameter
The displayed data will differ depending on which parameter is set as Waveform 1.
The displayed numeric data will be the instant value at the section starting point. However, for the VPC, the integrated value of the section will be displayed.

Parameter for Waveform 1	Displayed Data
ECG	HR, VPC However, for the VPC, the integrated value of the section will be displayed.
BP*	BP*(S/D/M or CVP)
SpO ₂ -1	SpO ₂ -1, PR-1
RESP	RR, APNEA
CO ₂	EtCO ₂ , InspCO ₂
GAS_O ₂	O ₂ -E, O ₂ -I
GAS_CO ₂	CO ₂ -E, CO ₂ -I
GAS_AGT	AGT-E, AGT-I
SpO ₂ -2	SpO ₂ -2, PR-2
AWP	PEAK, PEEP
AWF	MVe, Tve
AWV	MVe, Tve

- 3 Patient Name

- 4 Time Bar

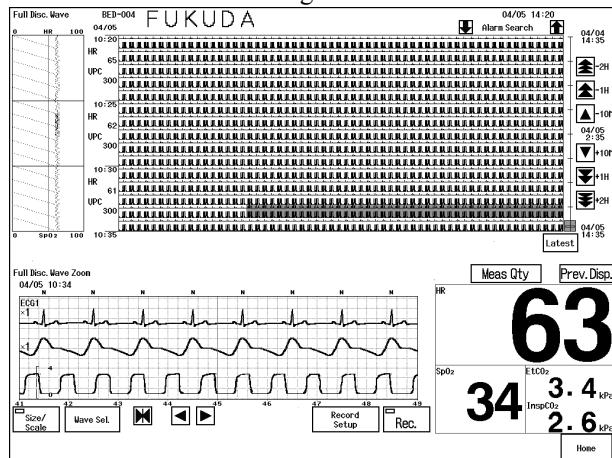
The waveform display duration is as follows.

	Compressed Waveform Display	Compressed + Enlarged Waveform Display
1 Waveform Display	60 minutes (1min/line x 60 lines)	30 minutes (1min/line x 30 lines)
	30 minutes (1min/line x 30 lines)	15 minutes (1min/line x 15 lines)
	8 minutes (20sec./line x 24 lines)*	4 minutes (20sec./line x 12 lines)*
	2 minutes (10sec./line x 12 lines)*	1 minute (10sec./line x 6 lines)*
2 Waveforms Display	30 minutes (1min/line x 2 waves x 30 lines/wave)	15 minutes (1min/line x 2 waves x 15 lines/wave)
	15 minutes (1min/line x 2 waves x 15 lines/wave)	7 minutes (1min/line x 2 waves x 7 lines/wave)
	4 minutes (20sec./line x 12 lines)*	2 minutes (20sec./line x 6 lines)*
	1 minute (10sec./line x 6 lines)*	30 seconds (10sec./line x 3 lines)*

*Only for the DS-7700W series

Pressing the waveform area will display the enlarged full disclosure waveform display.

Compressed Full Disclosure Waveform+Trend+Enlarged Full Disclosure Waveform:



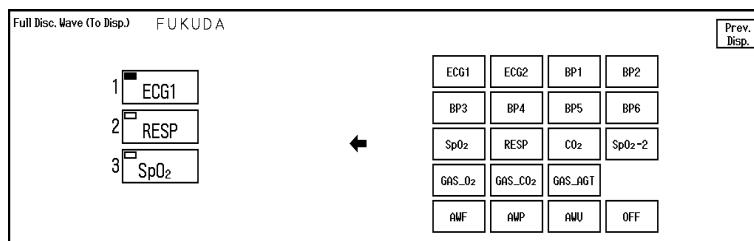
To View the Compressed Full Disclosure Waveform on This Unit

1 Display the compressed full disclosure waveform.

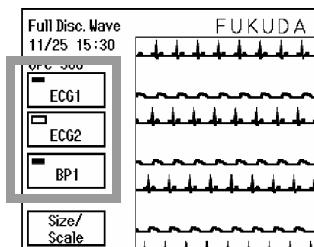
(☞ "To Display the Compressed Full Disclosure Waveform" P8-35)

2 Press the [Wave Sel.] key.

► The full disclosure waveform selection screen will be displayed.



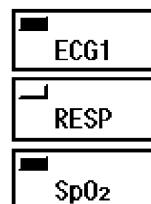
3 Select the 3 waveforms to be displayed.



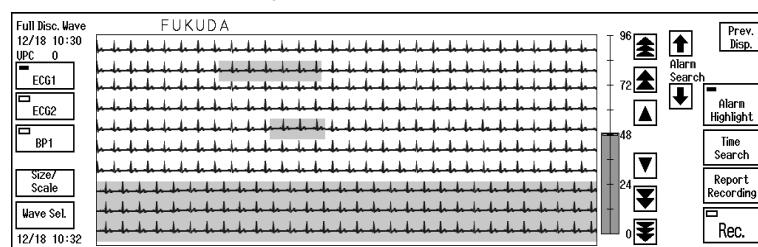
4 Press the [Prev. Disp.] key.

► The compressed full disclosure waveform screen will be displayed.

5 Select the waveforms to display on the compressed full disclosure waveform display.



► The selected waveforms will be displayed.



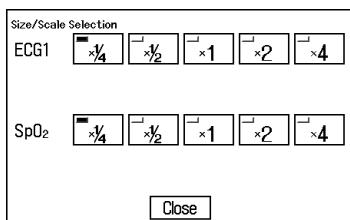
REFERENCE

- On the compressed full disclosure waveform display, 2 from these 3 waveforms can be displayed.

6 Adjust the waveform size.

1 Press the [Size/Scale] key.

- The "Size/Scale Selection" window will be displayed.



2 Select the size/scale for each waveform.

3 Press the [Close] key.

7 Scroll the display.

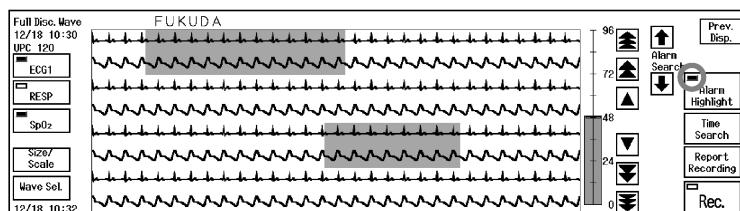
- Scrolls the waveform display 2 hours backward.
- Scrolls the waveform display 1 hour backward.
- Scrolls the waveform one screen (5 min. for 1 waveform display on the DS-7700 series) backward.
- Scrolls the waveform one screen (5 min. for 1 waveform display on the DS-7700 series) forward.
- Scrolls the waveform display 1 hour forward.
- Scrolls the waveform display 2 hours forward.

REFERENCE

- ♦ Pressing the time bar will jump to the desired position on the compressed full disclosure waveform display.

8 Press the [Alarm Highlight] key to highlight the alarm-generated point on the waveform.

- The waveform background at alarm occurrence will be displayed in red.

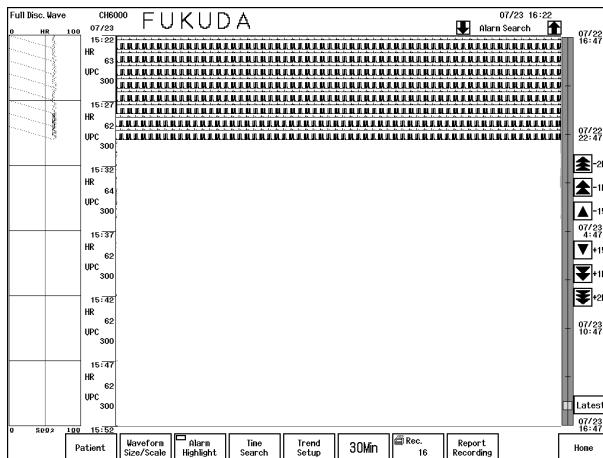


To View the Compressed Full Disclosure Waveform on the Slave Monitor/Extended Display Unit

(Maintenance Manual "Using the Slave Monitor" P2-8)

1 Display the compressed full disclosure waveform.

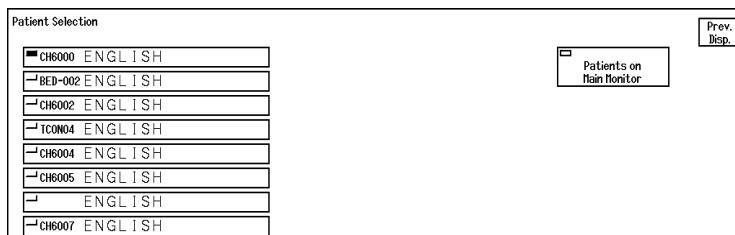
("To Display the Compressed Full Disclosure Waveform" P8-35)



2 Select the patient to be displayed.

1 Press the [Patient] key.

► The "Patient Selection" window will be displayed.



2 Select the patient from the list.

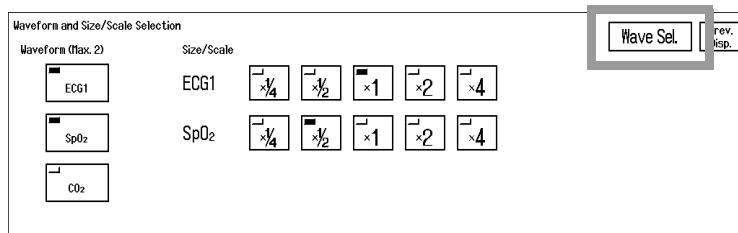
REFERENCE

- [Patients on Main Monitor] will display the full disclosure waveform for the patients displayed on the main unit.
If the displayed patient is changed on the main unit, the patient on the slave monitor/multimonitor will also change.

3 Select the waveform to be displayed.

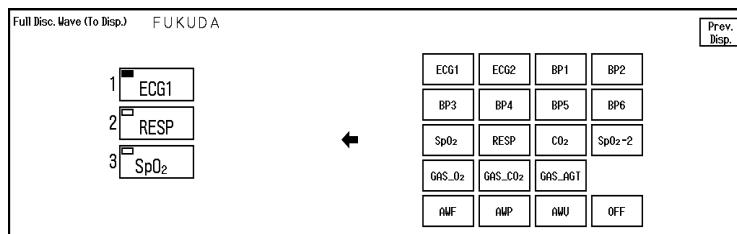
1 Press the [Waveform Size/Scale] key.

► The "Waveform and Size/Scale Selection" screen will be displayed.



2 Press the [Wave Sel.] key.

► The full disclosure waveform selection screen will be displayed.



3 Select the display position from the left.

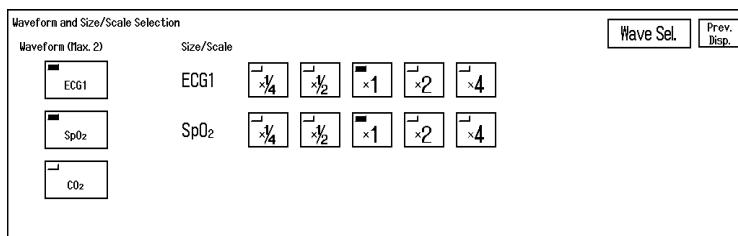
4 Select the parameter from the right to be assigned to the selected position.

REFERENCE

- On the compressed full disclosure waveform display, 2 from these 3 waveforms can be displayed.

5 Press the [Prev. Disp.] key.

4 Adjust the waveform size.



1 Select the parameter to change the waveform size.

► The key LED will light for the selected parameter.

2 Select the size/scale for each waveform.

3 Press the [Prev. Disp.] key.

5 Select the waveform display duration.

For 1 Waveform Display:

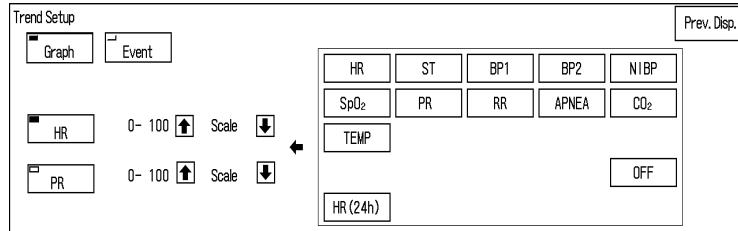
- Press the [2Min] / [8Min] / [30Min] / [60Min] key.
[2Min] / [8Min] can be selected only on the DS-7700W series.

For 2 Waveforms Display:

- Press the [1Min] / [4Min] / [30Min] / [15Min] key.
► The waveform will be displayed with the selected duration.
► [1Min] / [4Min] can be selected only on the DS-7700W series.

6 Press the [Trend Setup] key.

- The "Trend Setup" screen will be displayed.

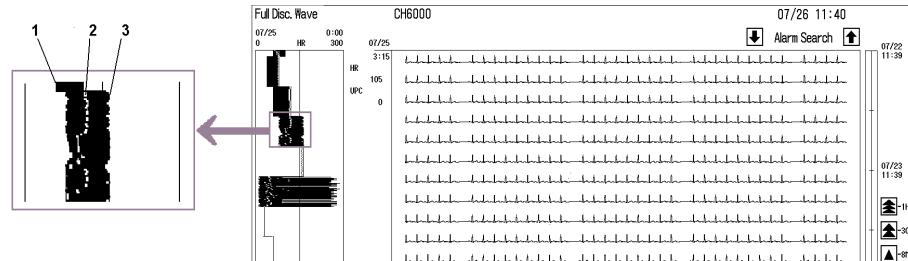


Trend Display Duration	Parameter
Same Display Duration as Compressed Waveform	HR, ST, BP1, BP2, NIBP, SpO ₂ , PR, RR, APNEA, CO ₂ , TEMP
	When FCF-16GA is used
24 hours	HR (24H)*

*: The selection is possible only for the DS-7700W series. And if HR (24H) is selected, the second trend cannot be displayed.

REFERENCE

- For HR (24H), min./max. instant HR, average HR per minute will be displayed in trend.



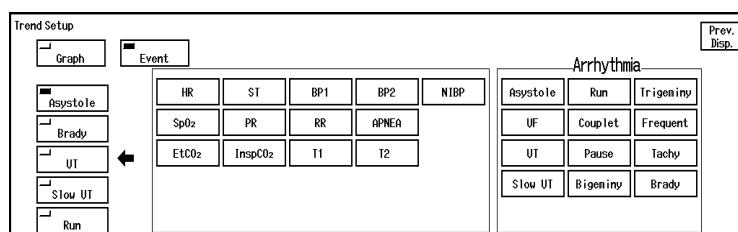
- 1 Minimum Instant HR
- 2 Average HR (White space on the graph)
- 3 Maximum Instant HR

To Set the Graphic Trend Display:

- 1 Press the [Graph] key.
- 2 Select 2 parameters to be displayed from the right.
- 3 Use the **↑**/**↓** keys to set the scale.

To Set the Alarm Event Trend Display:

- 1 Press the [Event] key.
- The "Trend Setup" screen for the alarm event will be displayed.



- 2 Select the event to display.
- 3 Press the [Prev. Disp.] key.

7

Scroll the display.

- ▶ : Scrolls the waveform display 2 hours backward.
- ▶ : Scrolls the waveform display 1 hour backward.
- ▶ : Scrolls the waveform half screen (30 min. for 1 waveform display of 60 min.) backward.
- ▶ : Scrolls the waveform half screen (30 min. for 1 waveform display of 60 min.) forward.
- ▶ : Scrolls the waveform display 1 hour forward.
- ▶ : Scrolls the waveform display 2 hours forward.
- ▶ [Latest]: The characters inside the key will turn to green and the latest waveform will be displayed.

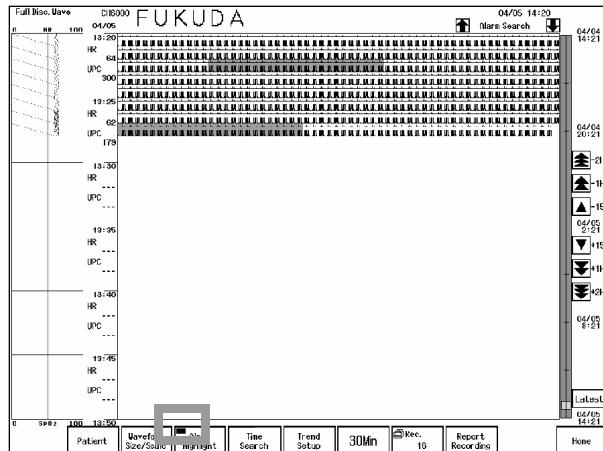
REFERENCE

- ◆ Pressing the time bar will jump to the desired position on the compressed full disclosure waveform display.
- ◆ When the [Latest] key is green, the display will automatically scroll so that the latest waveform will be always displayed. The automatic scrolling can be cancelled by pressing one of the scroll keys.

8

Press the [Alarm Highlight] key to highlight the alarm-generated point on the waveform.

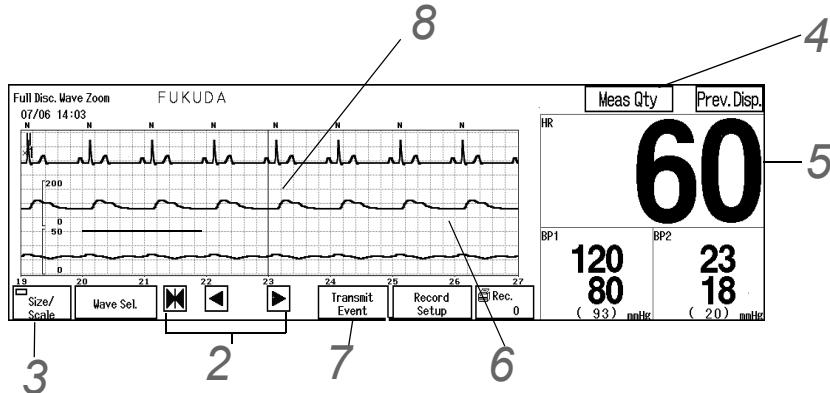
- ▶ The waveform background at alarm occurrence will be displayed in red.



To View the Enlarged Full Disclosure Waveform

1 Press the compressed full disclosure waveform area.

- ▶ The enlarged full disclosure waveform will be displayed.



REFERENCE

- The key arrangement differs between the main unit and the slave monitor/multimonitor, but the function is the same.
([Maintenance Manual "Using the Slave Monitor" P2-8](#))

2 Scroll the display to view the left and right of the waveform.

- ▶ **◀**: Scrolls the waveform display backward to older data.
- ▶ **▶**: Scrolls the waveform display forward to newer data.
- ▶ **■**: The waveform display will return to the original display when the enlarged full disclosure waveform was first displayed.

NOTE

- The interval to scroll the waveform can be selected from [1sec.] / [4sec.] / [6sec] for "Scroll Interval". (Menu>System Config.>Pre-Set>Soft Switch 2/3)
([Maintenance Manual "Soft Switch" P6-8](#))

3 Adjust the waveform size.

1 Press the [Size/Scale] key.

- ▶ The key to adjust the size/scale will be displayed on the waveform area.



2 Press the [Size] or [Scale] key displayed on the waveform.

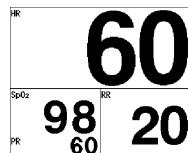
- ▶ The waveform size and scale will change.

4 To change the quantity of numeric data to be displayed, press the [Meas Qty] key.

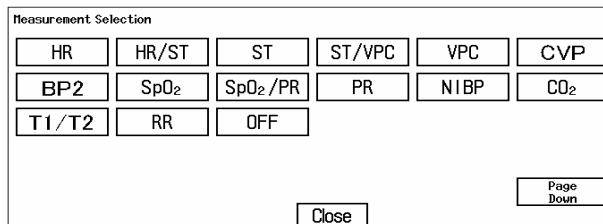
- ▶ Pressing the [Meas. Qty] will sequentially change the quantity of displayed parameters to 3, 5, 7, 10, 3,

5 Select the parameters to be displayed.

- 1 Press the numeric data area.



- ▶ The "Measurement Selection" screen will be displayed.

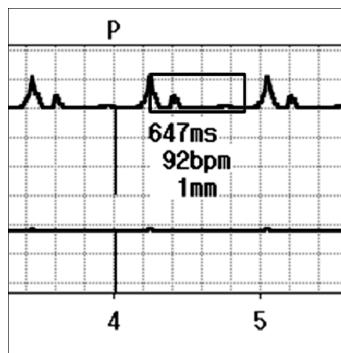


6 For the ECG waveform, PR, RR, PP interval, R-wave height can be measured.

NOTE

- ◆ The caliper function can be used only when a mouse is connected.

- 1 On the recall enlarged waveform, left-click on the starting point of measurement.
- ▶ The caliper mode will become active.
- ▶ During the caliper mode, a cross shape cursor and a red box will be displayed.



NOTE

- ◆ When the cursor is outside the waveform area, the red box and measurement value will not be displayed.
- When the size/scale key is displayed, caliper function cannot be used.

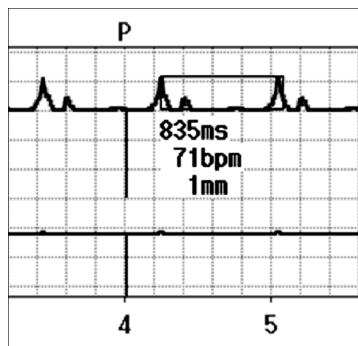
REFERENCE

- ◆ The box will be created by dragging the cursor. The following values will be displayed inside the waveform area.
x-axis value (waveform interval) in "ms"
conversion value in "bpm"

y-axis value (wave height) in "mm"

2 Click the measuring interval point to finalize the caliper display.

- ▶ The color of the caliper box will change to blue.



3 After finalizing the caliper display, click again.

- ▶ The previous caliper display will disappear and a new caliper display will appear.

4 Click outside the waveform area.

- ▶ The caliper mode will cease, and caliper display will disappear.

7

Pressing the [Transmit Event] key will transmit the event information to the data server.

- ▶ The bed ID and time of event will be transmitted to the data server.
- ▶ When the communication with the data server is not established, the key is grayed out and will not function.

REFERENCE

- The [Transmit Event] key will be displayed when a data server is present, and "Transmit Event" is set to [ON]. The data server setting can be performed on the "Network Configuration (Data Server)" under "Pre-Set" menu.
(Maintenance Manual "Data Server Setup" P3-26)

8

Press the waveform display area.

- ▶ The display will return to compressed full disclosure waveform screen.

REFERENCE

- By using a mouse, the caliper mode will become active.

To Print the Full Disclosure Waveform

The full disclosure waveform can be output to the built-in recorder or laser printer.

To Set the Printing Range on the Touch Panel (DS-7700W series only)

When compressed full disclosure waveform is displayed on the extended display unit, printing range can be set by specifying the starting and ending point.

The output recorder will be according to the output recorder selection for "Full Disc. Compressed Wave" (Menu>System Config.>Record>Output Rec. Sel.).

NOTE

- To specify the printing range, select [Specify] for "Full Disc. Wave Print Range" (Menu>System Config.>Pre-Set>Soft Switch) in advance.

(Maintenance Manual "Soft Switch" P6-8)

1

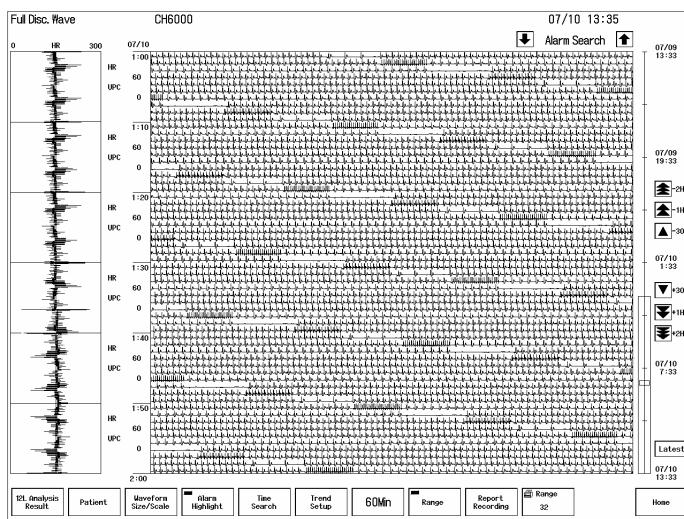
Press the [Range] key on the compressed full disclosure waveform screen.

- The key display will change from [Range] to [Rec.], and key LED will light in green.



2

Set the print range.



- 1 Set the starting and ending point for the print range by pressing the points on the displayed compressed waveform.

The set print range will be indicated by light blue background.

- 2 To cancel the set print range, press the compressed waveform display area.

3

After setting the print range, press the [Rec.] or [Range] key.

- The enlarged waveform of the set print range will be printed.

NOTE

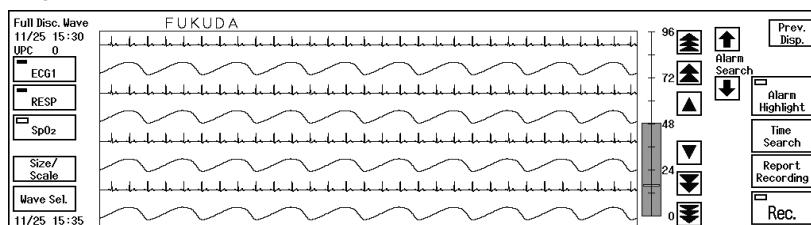
- If [Rec.] key is pressed before setting the range, whole range of displayed waveform will be printed. In this case, the background color for the whole range of displayed waveform will turn to light blue.

□ To Set the Printing Range Using a Mouse

When compressed full disclosure waveform is displayed on the main display unit, the printing range can be set by using a mouse.

1

Set the print range.



- 1 Set the print range by dragging the mouse. The set print range will be indicated by light blue background.
- 2 To cancel the set print range, press the compressed waveform display area.

2 After setting the print range, press the [Rec.] key.

- ▶ The enlarged waveform of the set print range will be printed.
- ▶ The output recorder will be according to the output recorder selection for "Full Disc. Compressed Wave" (Menu>System Config.>Record>Output Rec. Sel.).

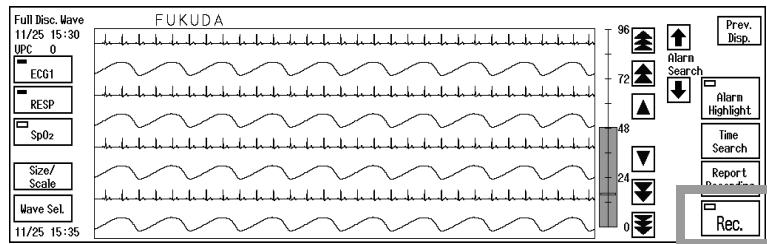
□ To Print on the Built-in Recorder

If [Built-in] is selected for "Full Disc. Compressed Wave" or "Full Disc. Zoom Wave" on the "Output Recorder Sel." screen, the waveform can be printed on the built-in recorder.

1 Press the [Rec.] key.

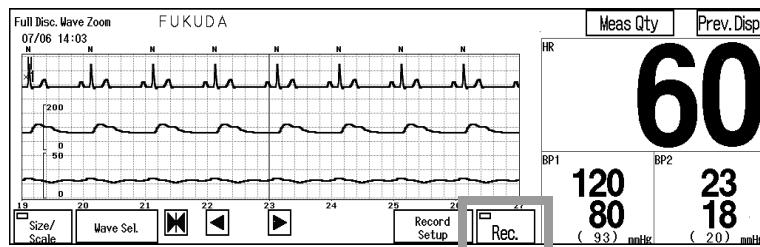
Compressed Full Disclosure Waveform on Main Unit:

- ▶ The currently displayed compressed full disclosure waveform will be output on the built-in recorder.



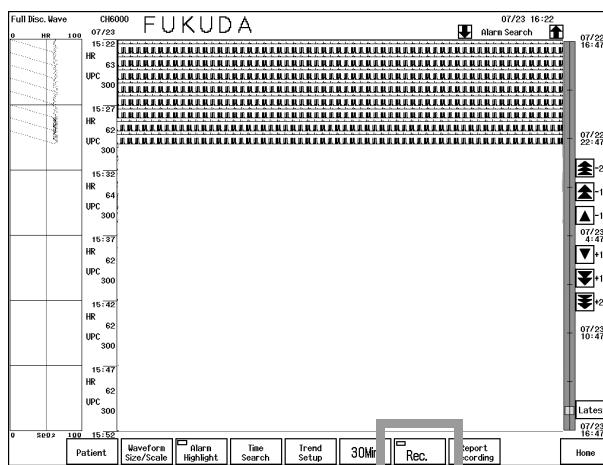
Enlarged Full Disclosure Waveform on Main Unit:

- ▶ 12 seconds of enlarged waveform and numeric data will be output on the built-in recorder.



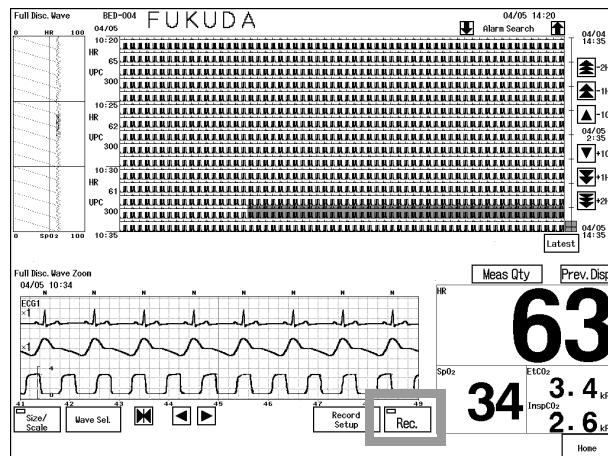
Compressed Full Disclosure Waveform on Slave Monitor/Multimonitor:

- ▶ The currently displayed compressed full disclosure waveform will be output on the built-in recorder.



Enlarged Full Disclosure Waveform on Slave Monitor/Multimonitor:

- 12 seconds of enlarged waveform and numeric data will be output on the built-in recorder.



□ To Print on the Laser Printer

REFERENCE

- ♦ The quantity of stacked data for the bed is displayed inside the key.

NOTE

- ♦ If the stacked data reaches maximum, the key will turn to gray which indicates the printing cannot be performed.

1 Press the [Rec. x] key.

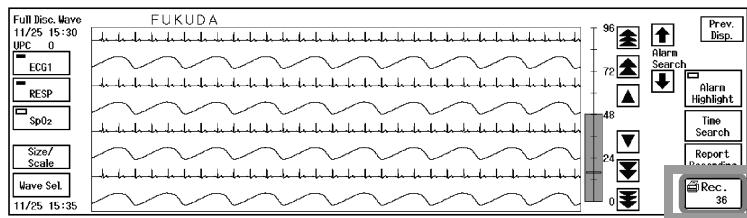
Compressed Full Disclosure Waveform on Main Unit:

- For 1 waveform display, 30 minutes of waveform will be printed.
The waveform of 15 minutes before and 15 minutes after the currently displayed time will be printed.

- For 2 waveforms display, 15 minutes of waveform will be printed.
The waveform of 5 minutes before and 10 minutes after the currently displayed time will be printed.

REFERENCE

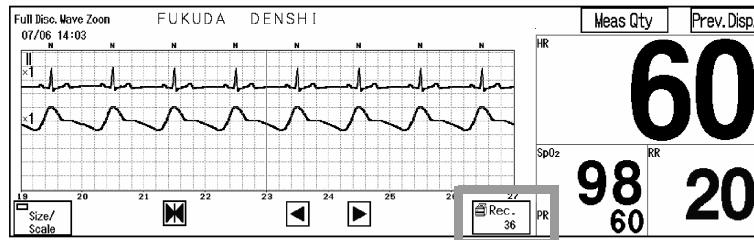
- ♦ The trend for waveform 1 will be printed. For example, if waveform 1 is ECG1, HR trend will be printed, and if waveform 1 is SpO₂, PR and SpO₂ trend will be printed.



Enlarged Full Disclosure Waveform on Main Unit:

- 30 seconds (15 seconds before and after the currently displayed time) of waveform and numeric data will

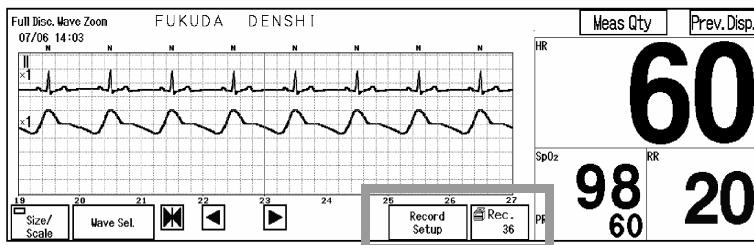
be printed on the laser printer.



Enlarged Full Disclosure Waveform on Main Unit (when FCF-16GA is used):

REFERENCE

- The quantity of recording waveforms can be selected from 3 waveforms (30 seconds) or 6 waveforms (10 seconds).

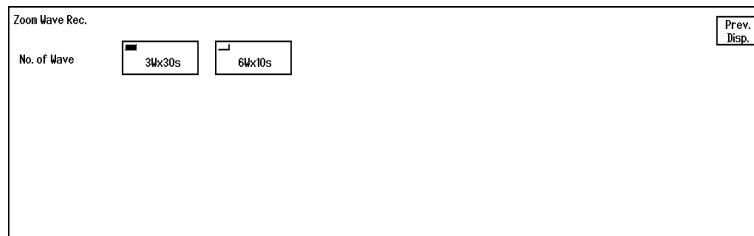


1 Press the [Record Setup] key.

► The "Zoom Wave Rec." screen will be displayed.

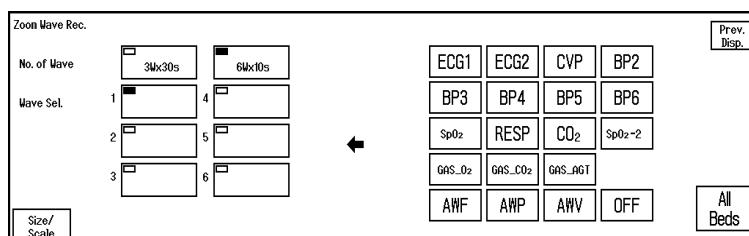
2 Select from [3Wx30s] or [6Wx10s].

When [3Wx30s] is selected:



1 Press the [Prev. Disp] key to end the setting.

When [6Wx10s] is selected:

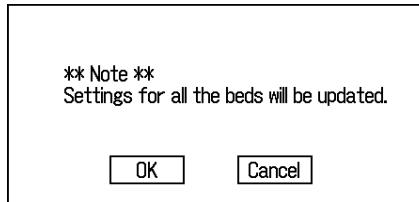


1 Press the key displayed at the left.

2 Select the parameter from the right to assign to the selected key on the left.

3 To set the same setting for all beds, press the [All Beds] key.

- ▶ A confirmation message will be displayed.



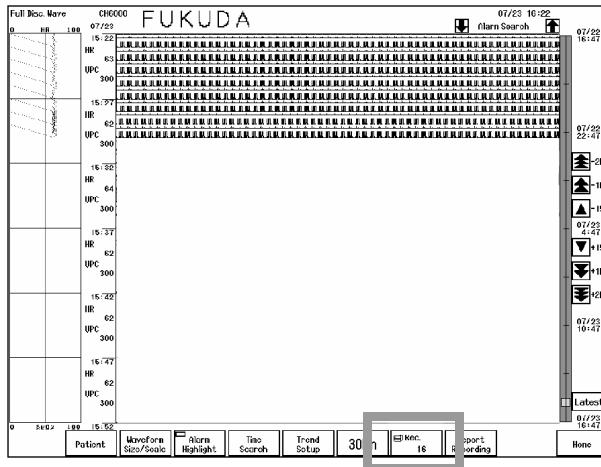
- 4 Press the [OK] key.

Compressed Full Disclosure Waveform on Slave Monitor/Multimonitor:

- ▶ For 1 waveform display, 60 minutes of waveform will be printed.
The waveform of 30 minutes before and 30 minutes after the currently displayed time will be printed.
- ▶ For 2 waveforms display, 30 minutes of waveform will be printed.
The waveform of 15 minutes before and 15 minutes after the currently displayed time will be printed.

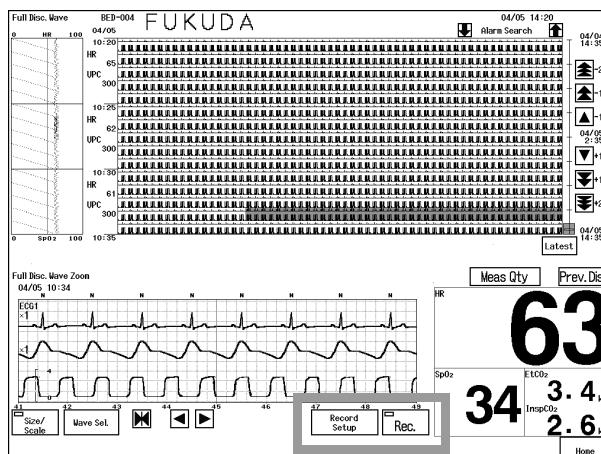
REFERENCE

- ♦ Currently displayed graphic trend will be printed.



Enlarged Full Disclosure Waveform on Slave Monitor/Multimonitor:

- ▶ 30 seconds (15 seconds before and after the currently displayed time) of waveform and numeric data will be printed on the laser printer.

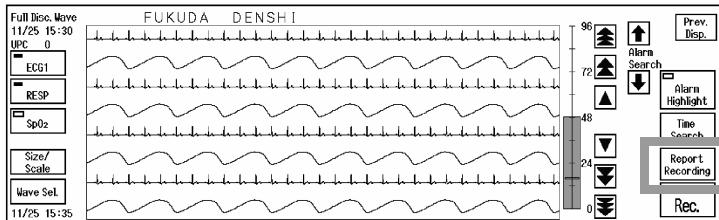


REFERENCE

- When using the FCF-16GA, the quantity of recording waveforms can be selected from 3 waveforms (30 sec.) or 6 waveforms (10 sec.).

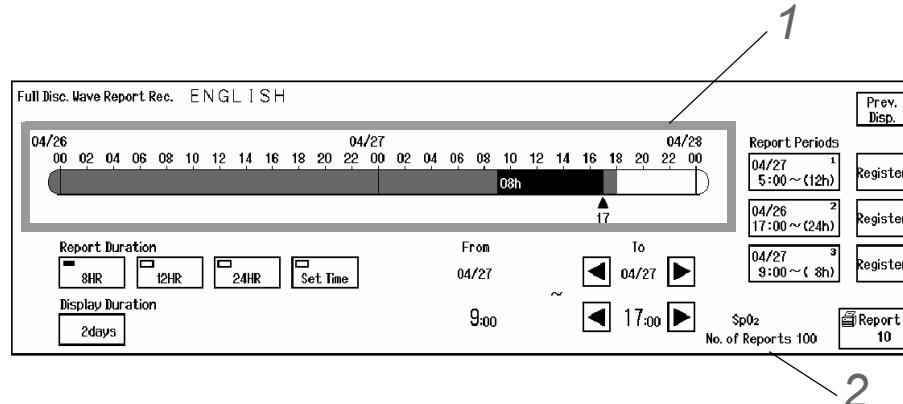
□ Report Recording

The report recording can be performed only on the laser printer.



- Press the [Report Recording] key on the "Full Disc. Wave" screen.

► The "Full Disc. Wave Report Rec." screen will be displayed.



- The set "Display Duration" will be shown in time bar.

Gray: full disclosure waveform recording range

Light Green: report recording range

- Quantity of reports to be output

- Press the key for "Display Duration".

NOTE

- The selection will differ depending on the CF card format type. (24Hours32Waves/48Hours16Waves/96Hours 8Waves/96Hours 32Waves).

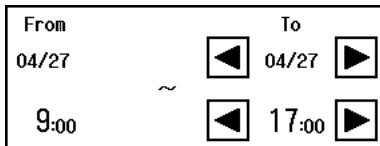
- Select the report duration by pressing the [8HR]/[12HR]/[24HR]/[Set Time] key.



► For example, if [8HR] is selected, the report recording will start from 8 hours before the current time.

When [Set Time] is selected:

- 1 Use the / keys to set the starting time and completing date/time.



- 2 To register the setting, press the [Register] key.

NOTE

- ♦ Pressing the [Register] key will overwrite the previously registered setting.

REFERENCE

- ♦ Maximum of 3 report periods can be registered.

- 4 Press the [Report] key.

- The report recording will start with the registered setting.

REFERENCE

- ♦ The following information will be printed on the report recording.
 - ♦ 1st page:
Graphic Trend of HR, ST, VPC
 - ♦ 2nd page:
HR Trend, Arrhythmia Event Trend
 - ♦ 3rd page and onward:
60 minutes of compressed waveform per page if 1 waveform display, and 30 minutes of compressed waveform per page if 2 waveforms display will be printed for the set report duration.
For example, if the set report duration is 1 hour, 1 page will be output for the 1 waveform display.
If the set report duration is 1 hour, 2 pages will be output for the 2 waveforms display.
If the set report duration is 8 hours, 8 pages will be output for the 1 waveform display and 16 pages will be output for the 2 waveforms display.
- ♦ For the main unit, graphic trend for waveform 1 will be printed.

- For the slave monitor/multimonitor, the currently displayed graphic trend will be printed.

To Search by Alarm Event

The full disclosure waveform at alarm occurrence can be searched.

The data will be searched from the stored alarm event.

1

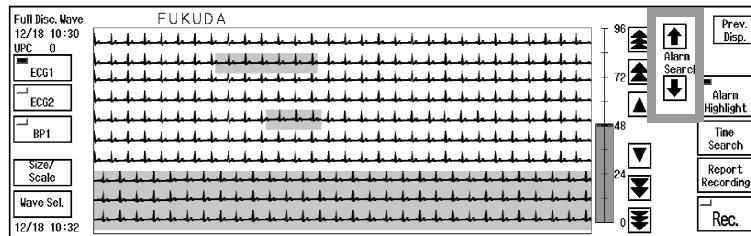
Press the **↑/↓** keys for "Alarm Search" on the "Full Disc. Wave" screen.

(☞ "To Display the Compressed Full Disclosure Waveform" P8-35)

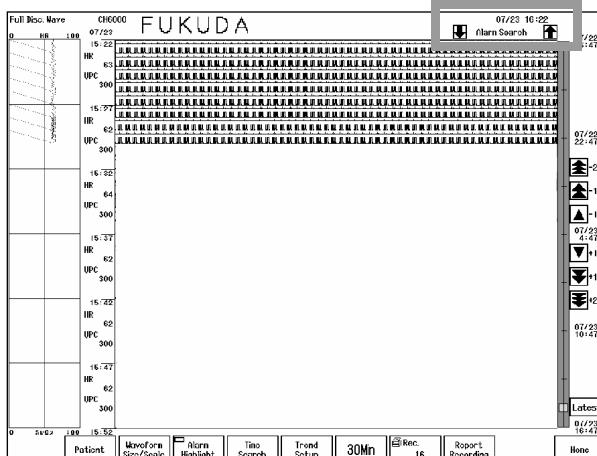
- The full disclosure at alarm occurrence will be displayed each time the key is pressed.
- Performing the alarm search will automatically turn ON the alarm highlight.

NOTE

- Alarm search will be performed for the displayed page. Other alarms displayed on the same page will be neglected.



Display on the Main Unit



Display on the Slave Monitor/Multimonitor

NOTE

- The alarm search cannot be performed for GAS O₂, GAS CO₂, GAS AGT.

To Search by Time

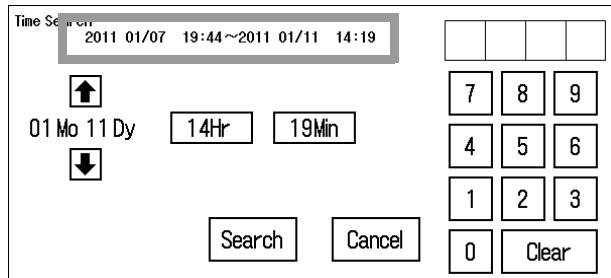
The full disclosure waveform of the specified time can be displayed.

Operation on the Main Unit

- 1** Press the [Time Search] key on the "Full Disc. Wave" screen to specify the search date/time.

(☞ "To Display the Compressed Full Disclosure Waveform" P8-35)

- ▶ The "Time Search" window will be displayed.



1 Use the **↑**/**↓** keys to specify the date.

2 Use the numeric keys to enter the time.

3 Press the [Hr] key.

4 Use the numeric keys to enter the minute.

5 Press the [Min] key.

Example:

Ex.) [1] [3] [Hr] [2] [5] [Min]

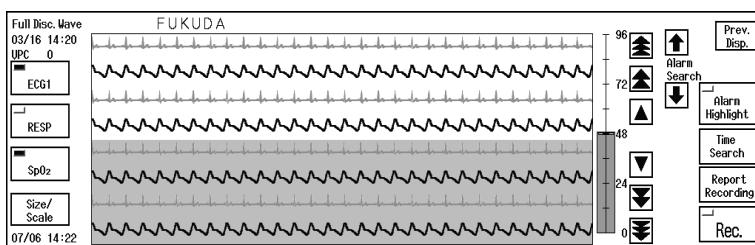
- 2**

Press the [Search] key.

- ▶ The time search will start.

- ▶ The full disclosure waveform for the specified time will be displayed.

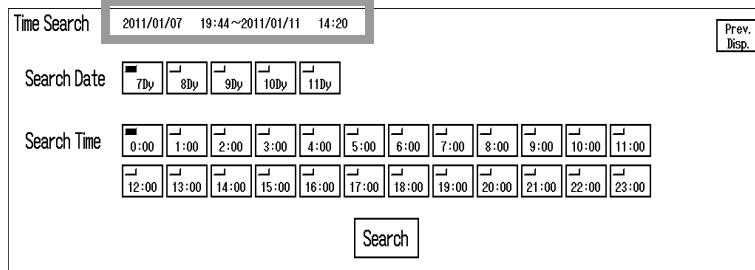
- ▶ The searched waveform will be displayed in light green background.



□ Operation on the Slave Monitor/Multimonitor

- 1** Press the [Time Search] key on the "Full Disc. Wave" screen to specify the search date/time.
 (☞ "To Display the Compressed Full Disclosure Waveform" P8-35)

► The "Time Search" window will be displayed.

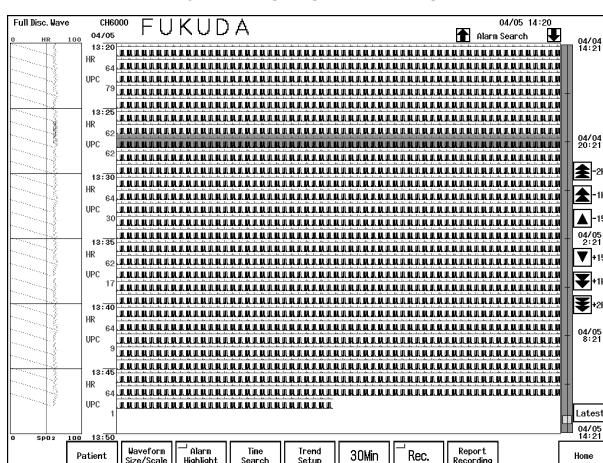


2 Specify the "Search Date".

3 Specify the "Search Time".

4 Press the [Search] key. The time search will start.

- The full disclosure waveform for the specified time will be displayed.
 ► The searched waveform will be displayed in light green background.



12-Lead Analysis (Optional Function)

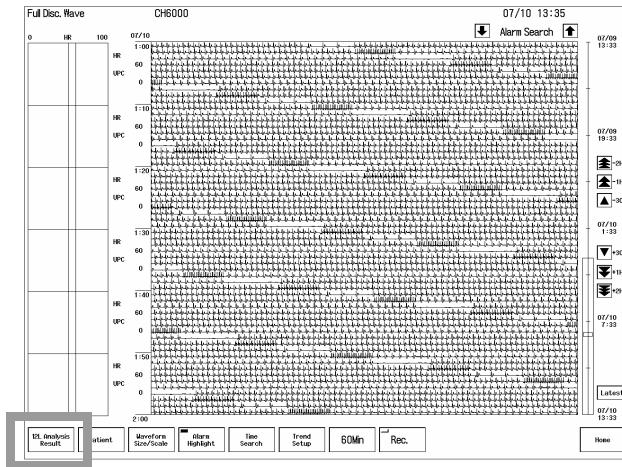
The 12-lead analysis result analyzed on the bedside monitor will be displayed. Maximum of 40 analyzed results can be stored.

NOTE

- The 12-lead analysis result display function is available only when full disclosure waveform is displayed on the slave monitor for the DS-7700 or on the extended display unit for the DS-7700W. Select [Full Disc.] for "Output Selection". (Menu>Pre-Set>Slave Monitor Setup / Extended Display Unit Setup) in advance.
([Maintenance Manual "Setup" P2-11](#))

1

On the full disclosure waveform screen on the extended display unit, press the [12L Analysis Result] key.



12-Lead Analysis Result Display

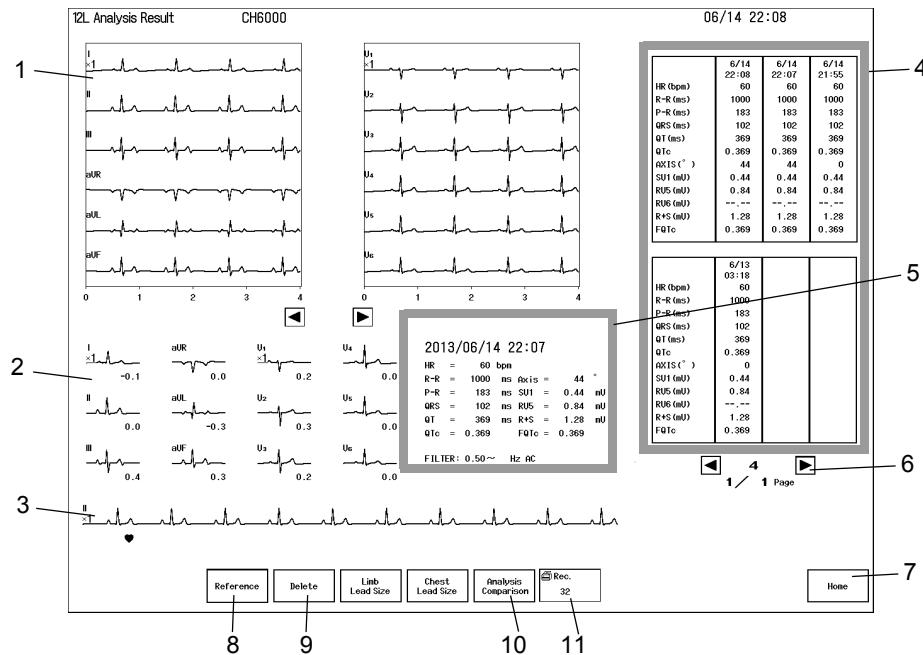
For the analysis result, analyzed waveform, dominant waveform, rhythm waveform, analyzed result, and analyzed result list will be displayed.

⚠ CAUTION

- If the time/date is changed during monitoring (manually or by time synchronization), the time/date of past measurement data will not be corrected. In such case, the time/date of NIBP list, 12-lead analysis result, etc. will differ between the central monitor and the bedside monitor.

NOTE

- If the stored data for all the beds exceeds 40, the data will be deleted starting from the oldest one. However, as 2 data per bed will remain, data will be deleted from beds with more than 2 data.



1 Analyzed Waveform

The analyzed waveforms of limb lead and chest lead will be displayed.

2 Dominant Waveform

The reference waveform used for the analysis will be displayed. The dominant waveform is the waveform at the point of mark on the rhythm waveform. On the analyzed result, the abnormal lead with the highest grade finding will be highlighted in red.

3 Rhythm Waveform

Among the ECG leads used for analysis, the lead for ECG1 displayed on the bedside monitor will be displayed.

4 Analyzed Result List

The analyzed result to be displayed can be selected. The currently displayed result will be indicated in yellow box and the result set as the reference will be indicated in blue box.

5 Analyzed Result

The main measurement data used for analysis will be displayed. The abnormal numeric data with the highest grade finding will be highlighted in red.

6 Page Selection of Analyzed List

The page of analyzed results can be changed.

7 Home Display

The 12-lead analysis result screen will close and the display will return to the full disclosure waveform screen.

8 Reference

The currently displayed analyzed result will be set as the reference for result comparison. The analyzed result set as the reference will be indicated by a blue box on the analyzed result list.

9 Delete

[Delete] will display the [Delete OK] and [Cancel] key.

[Delete OK] will delete the displayed analyzed result.

[Cancel] will cancel the delete process.

10 Analysis Comparison

The comparison of analyzed results will be displayed.

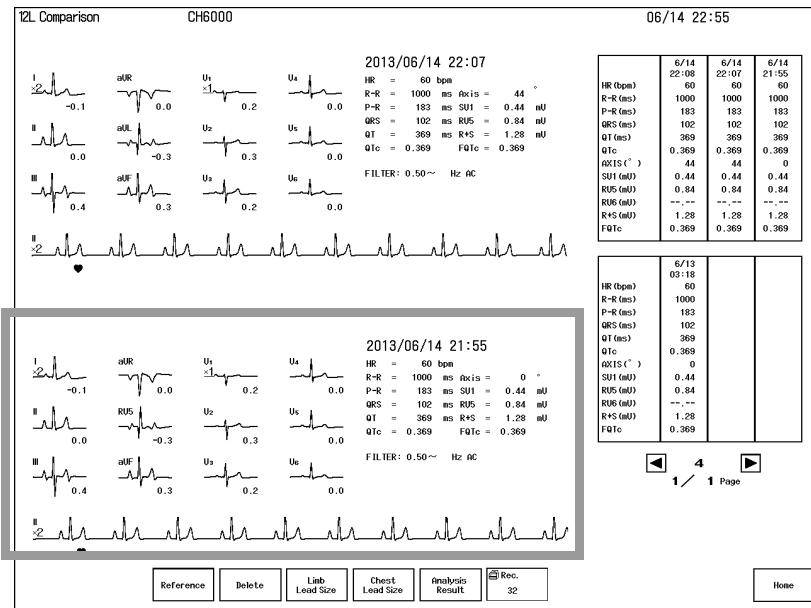
11 Print

The currently displayed analyzed result will be output on the laser printer.

Comparison of Analyzed Results

By pressing the [Analysis Comparison] key on the 12-lead analysis result screen, the comparison of analyzed results will be displayed.

On the "12L Comparison" screen, dominant waveform, rhythm waveform, analyzed result will be displayed in two rows for comparison.



Night Mode

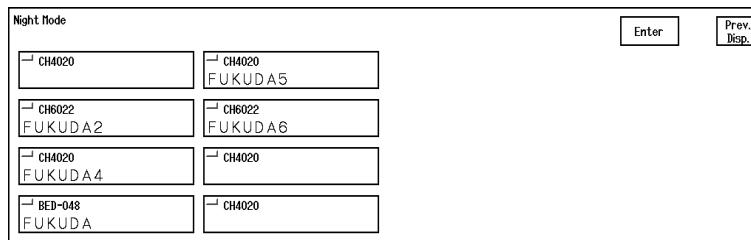
The night mode for the DS-LANIII network bed and the TCON bed can be turned ON or OFF on this equipment. The night mode is a function to decrease the screen brightness and alarm volume when turning OFF the light of the ward or when the patient is asleep, etc. The brightness and alarm volume settings during Night Mode needs to be preprogrammed on the bedside monitor.

NOTE

- The night mode can be set only for the DS-LANIII network bed and the TCON bed.

1 Press the [Menu], [Night Mode] keys.

► The "Night Mode" screen will be displayed.



REFERENCE

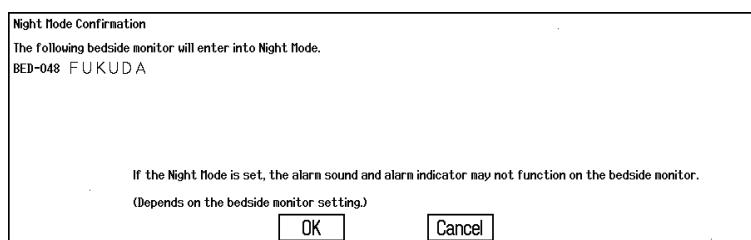
- The key LED is turned ON for the bed in night mode.
- The key LED is turned OFF for the bed not in night mode.

2 Press the keys for the beds to turn ON or OFF the night mode.

► LED ON: Night mode will turn ON.
► LED OFF: Night mode will turn OFF.

3 Press the [Enter] key.

► The "Night Mode Confirmation" screen will be displayed.



4 Press the [OK] key.

NOTE

- When the night mode is turned OFF, the "Night Mode Confirmation" screen will not be displayed.

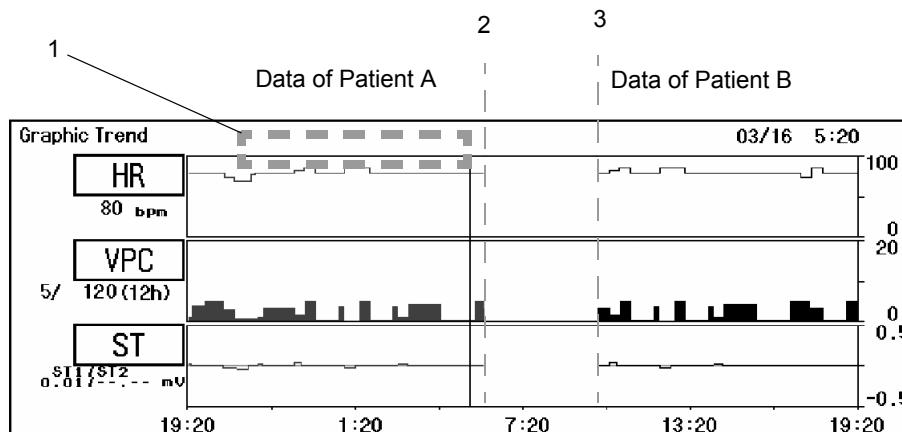
Review Data after EMR Discharge

Setting ON for "Display Data Before Discharging" on the "Network Configuration (Patient Data Server)" menu will allow to display the patient's review data even after the patient is discharged from the EMR. The review data can be displayed until the discharge process is performed on the central monitor.

(☞ "EMR Link Function" P5-19)

The review data that can be displayed are as follows.

- ♦ Graphic Trend
- ♦ Tabular Trend
- ♦ Recall (List Display, Enlarged Display)
- ♦ NIBP List
- ♦ ST Waveform
- ♦ 12-Lead ST
- ♦ Full Disclosure Waveform (Compressed Display, Enlarged Display)
- ♦ Full Disclosure Waveform (Slave/Compressed, Slave/Enlarged)



Example on "Graphic Trend" screen

1 Patient Name Display Area (The name of the previous patient will not be displayed.)

2 Discharged Date/Time for Previous Patient (A)

3 Admit Date/Time for Current Patient (B)

REFERENCE

- ♦ The graphic trend for currently admitted patient B will be normally displayed.
- ♦ The data for the previous patient A will be displayed with lower brightness.
- ♦ When the data of previous patient is displayed, the patient name display area will be left blank.
By moving the cursor to data on patient B, the name for patient B will be displayed in the patient name display area.
- ♦ The data for previous patient cannot be printed.
Only the data for the current patient can be printed.

Chapter 9 Recording

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Chapter 9 Recording

Types of Recording and Output Recorder

In this section, the procedure to record the monitoring data to the built-in recorder or to the laser printer connected to the TCP/IP network will be explained.

NOTE

- On a wired network system, if a remote recording operation is performed on the bedside monitor, it will be output on the central monitor with the smallest central ID. For example, if the bedside monitor is monitored by several central monitors (central ID: CNT-002, CNT-004, CNT-006), the remote recording from this bedside monitor will be output on the CNT-002 central monitor.
- When connected to the DS-LAN III network, the data of the DS-8500 system bedside monitor (from version 06-01) can be output to the laser printer connected to this central monitor. For details of the corresponding bedside monitors and their software versions, refer to our service representative.

There are following types of recording.

Recording Types	Output Recorder	
	Built-in Recorder	Laser Printer (A4/Letter)
Waveform Recording		
Manual Record	Yes	No
Alarm Record	Yes	No
Periodic Record	Yes	No
Telemetry Remote Recording	Yes	No
Review Data Recording		
Graphic Trend	Yes	Yes
Enlarged Graphic Trend	Yes	Yes
Tabular Trend	Yes	Yes
Recall List (All)	No	Yes
Recall List	No	Yes
Recall Zoom Wave	Yes	Yes
NIBP List (All)	Yes	Yes
NIBP List	Yes	No
ST	Yes	Yes
12-lead Waveform	Yes	Yes
12-lead ST Waveform	Yes	Yes
Full Disc. Wave, Compressed	Yes	Yes
Full Disc. Wave, Enlarged	Yes	Yes
Full Disc. Wave, Report	No	Yes

Yes:can be recorded

No: cannot be recorded.

NOTE

- The laser printer setup should be performed by our service representative or system

administrator of your institution.
 (Maintenance Manual "Laser Printer Operation" P3-22)

Recording Condition/Ouput Recorder Setup

The recording procedure can be set for each bed.

♦ Manual Recording

Pressing the  (Record Key) for the monitoring patient will start recording the waveform and numeric data, and pressing the key again will stop the recording. There are direct/delay recording, 12 sec./24 sec./continuous recording, and maximum of 3 waveforms can be selected for recording.

♦ Alarm Recording

When an alarm occurs for the monitoring parameter, waveform and numeric data will be automatically recorded with the pre-programmed recording condition.

♦ Periodic Recording

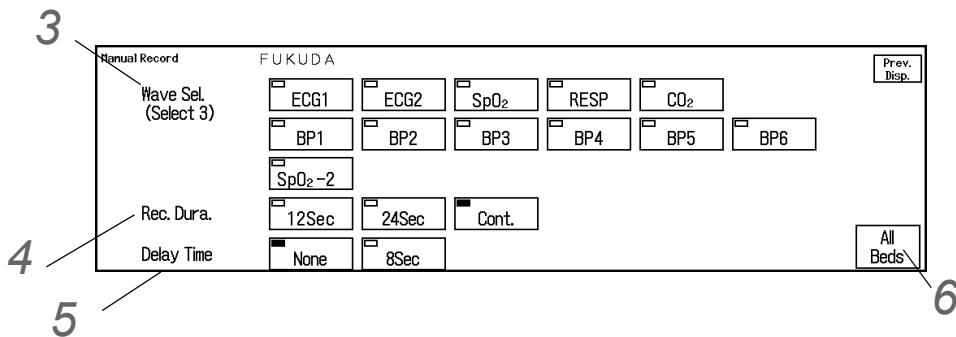
The waveform and numeric data will be automatically recorded at pre-programmed time or at fixed interval.

Manual Recording Setup

1 Select a bed to perform the manual recording setup by pressing the bed selection area.

2 Press the [Menu], [System Config.], [Record], [Manual Record] keys.

► The "Manual Record" screen will be displayed.



3 Select the parameters for "Wave Sel. (Select 3)".

► The key LED will light for the selected parameter.

REFERENCE

- ♦ When pressed again, the key LED will turn OFF.
- ♦ The waveform position will be automatically adjusted when recording.
- ♦ Up to 3 waveforms can be selected.

4 Set the "Rec. Dura." (recording duration).

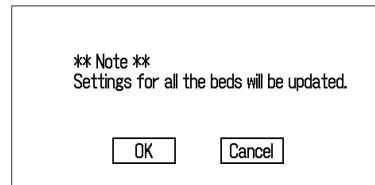
- [12Sec], [24Sec]: Recording will automatically stop after 12 seconds or 24 seconds.
- [Cont.]: Recording will continue until the  (Record) key is pressed.

5 Set the "Delay Time".

- ▶ [None]: Recording will start from the point the (Record) key is pressed.
- ▶ [8Sec]: Recording will start 8 seconds prior from the point the (Record) key is pressed.

6 To set the same setting for all beds, press the [All Beds] key on the lower right.

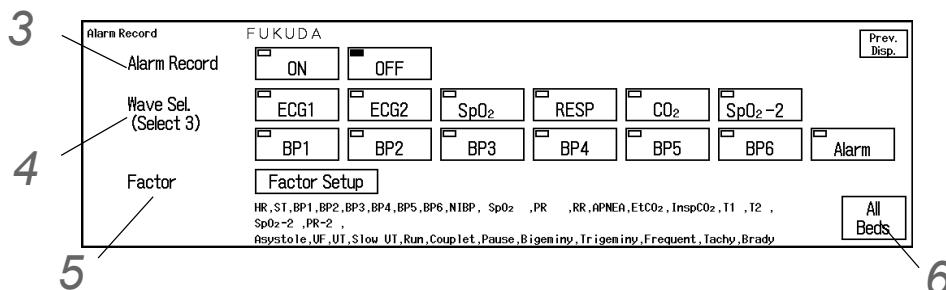
- ▶ A confirmation message will be displayed.

**NOTE**

- ♦ When performing manual recording on the wired network (DS-LANII/III) bedside monitor, the recording will be performed according to the condition set on the bedside monitor.

7 Press the [OK] key.**Alarm Recording Setup****1** Select a bed to perform the alarm recording setup by pressing the bed selection area.**2** Press the [Menu], [System Config.], [Record], [Alarm Record] keys.

- ▶ The "Alarm Record" screen will be displayed.

**3** Set ON/OFF of "Alarm Record".

- ▶ [ON]: Recording will automatically start at alarm occurrence.
- ▶ [OFF]: Recording will not start at alarm occurrence.

4 Select the parameters for "Wave Sel. (Select 3)".

- ▶ [Alarm]: Records the waveform which generated the alarm.
- ▶ The key LED will light for the selected parameter.

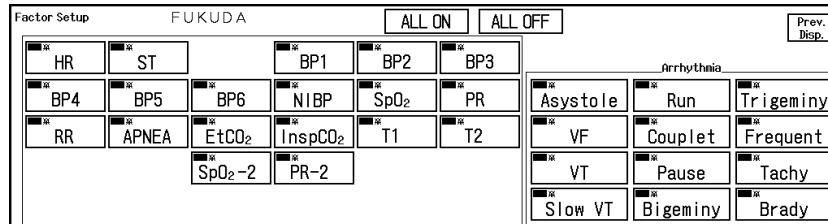
REFERENCE

- ♦ When pressed again, the key LED will turn OFF.
- ♦ The waveform position will be automatically adjusted when recording.

- Up to 3 waveforms can be selected.

5 Press the [Factor Setup] key to set the alarm recording factor.

- [Factor Setup] screen will be displayed.

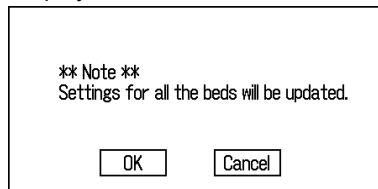


- Select the parameter to perform the setup. (More than one selection is possible.)

- [ALL ON]: All parameters will be selected.
- [ALL OFF]: All selections will be cancelled.

6 To set the same setting for all beds, press the [All Beds] key on the lower right.

- A confirmation message will be displayed.



7 Press the [OK] key.

NOTE

- If the same alarm generates during the alarm generation for the following parameter, alarm recording for the later generated alarm will not be performed.

Parameter	Priority of Recording
BP	SYS>DIA>MEAN
ST Level	ST1>ST2
12-lead ST Level	ST(I)>ST(II)>ST(III)>ST(aVR)> ST(aVL)>ST(aVF)>ST(V ₁)>ST(V ₂)> ST(V ₃)>ST(V ₄)>ST(V ₅)>ST(V ₆)

- If [OFF] is selected for "During Lead OFF: Alarm Record" under "Alarm Related Setup", alarm recording for the following alarm factor will not be performed at lead-off condition.
 - HR alarm, arrhythmia alarm, ST alarm
 - RR alarm and apnea alarm of impedance respiration
 - The alarm recording will not be performed for the ventilator alarm.

REFERENCE

- For the alarm recording, measurement status such as vital signal condition will be also printed with the recording type (ALARM). (☞ "Measurement Status" P9-22)
- The alarm recording duration is fixed as 12 seconds.
- The alarm recording prints the data at alarm occurrence.
- Alarm recording will be cancelled at condition such as recorder busy or paper out. The data

will be stored as recall data instead.

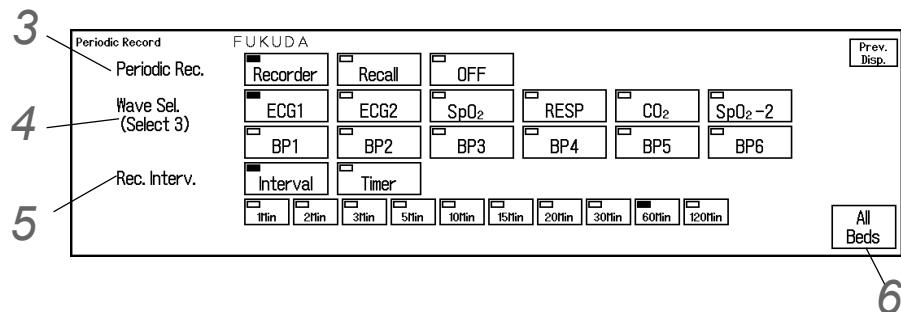
- If alarm generates simultaneously at more than one bed, the data that could not be recorded will be stored as recall data.

Periodic Recording Setup

1 Select a bed to perform the periodic recording setup by pressing the bed selection area.

2 Press the [Menu], [System Config.], [Record], [Periodic Record] keys.

- ▶ The "Periodic Record" screen will be displayed.



3 Select the destination to output the periodic recording.

- ▶ [Recorder]: Outputs to the built-in recorder.
- ▶ [Recall]: Stores the data as recall waveform.
- ▶ [OFF]: Turns OFF the periodic recording function.

NOTE

- When other data is in process of recording or the recorder is in paper out condition, one data per bed will be stacked (recording wait condition).

4 Select the parameters for "Wave Sel. (Select 3)".

- ▶ The key LED will light for the selected parameter.

REFERENCE

- Maximum of 3 waveforms can be selected.
- When pressed again, the key LED will turn OFF.
- If storing as recall waveform, 2 waveforms from the selected 3 waveforms will be stored according to the following priority.

ECG1>ECG2>BP1>BP2>...>BP6>SpO₂-1>RESP>CO₂>AWP>AWF>AWV>SpO₂-2

For example, if [ECG1], [RESP], [BP1] are selected, [ECG1] and [BP1] will be stored as recall waveform according to the priority.
(☞ "Recall" P8-11)

5 Press the [Interval]/[Timer] key for "Rec. Interv." (Recording Interval) to set the recording interval or time.

When [Interval] is selected:

Rec. Interv.	<input checked="" type="checkbox"/> Interval	<input type="checkbox"/> Timer
	<input type="checkbox"/> 1Min	<input type="checkbox"/> 2Min
	<input type="checkbox"/> 3Min	<input type="checkbox"/> 5Min
	<input type="checkbox"/> 10Min	<input type="checkbox"/> 15Min
	<input type="checkbox"/> 20Min	<input type="checkbox"/> 30Min
	<input type="checkbox"/> 60Min	<input type="checkbox"/> 120Min

1 Select the recording interval from [1Min] to [120Min].

► Recording will automatically start at selected interval.

REFERENCE

- The recording time will be integral multiple of the selected interval time starting from 0 minute.
For example, if the current time is 10:05, the recording time will be as follows for the following intervals.
2 min.: 10:06, 10:08, 10:10, ...
3 min.: 10:06, 10:09, 10:12, ...
10 min.: 10:10, 10:20, 10:30, ...
15 min.: 10:15, 10:30, 10:45, ...

When [Timer] is selected:

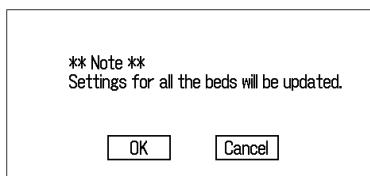
Rec. Interv.	<input type="checkbox"/> Interval	<input checked="" type="checkbox"/> Timer
	<input type="checkbox"/> 0:00	<input checked="" type="checkbox"/> 1:00
	<input type="checkbox"/> 2:00	<input type="checkbox"/> 3:00
	<input type="checkbox"/> 4:00	<input type="checkbox"/> 5:00
	<input type="checkbox"/> 6:00	<input type="checkbox"/> 7:00
	<input type="checkbox"/> 8:00	<input type="checkbox"/> 9:00
	<input type="checkbox"/> 10:00	<input type="checkbox"/> 11:00
	<input type="checkbox"/> 12:00	<input type="checkbox"/> 13:00
	<input type="checkbox"/> 14:00	<input type="checkbox"/> 15:00
	<input type="checkbox"/> 16:00	<input type="checkbox"/> 17:00
	<input type="checkbox"/> 18:00	<input type="checkbox"/> 19:00
	<input type="checkbox"/> 20:00	<input type="checkbox"/> 21:00
	<input type="checkbox"/> 22:00	<input type="checkbox"/> 23:00

1 Select the time to start the recording from [0:00] to [23:00]. (More than one selection is possible.)

► The recording will automatically start at selected time.

6 To set the same setting for all beds, press the [All Beds] key on the lower right.

► A confirmation message will be displayed.



7 Press the [OK] key.

Output Recorder Setup for Review Data Recording

If a laser printer is connected to TCP/IP network, output recorder of review data can be selected from built-in recorder or laser printer.

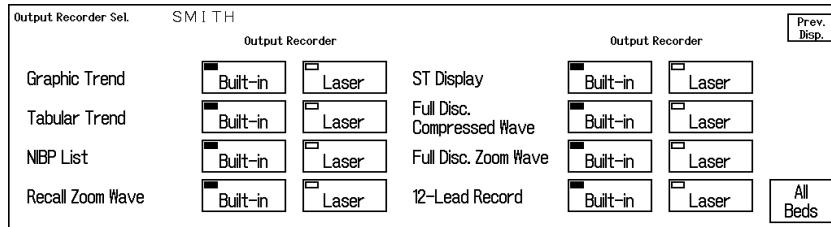
REFERENCE

- The laser printer setup should be performed by our service representative or system administrator of your institution.
(Maintenance Manual "Laser Printer Operation" P3-22)
- To monitor/record the 12-lead waveform, select ON for "12-Lead" under "Soft Switch".
(Maintenance Manual "Soft Switch" P6-8)

1 Select a bed to perform the output recorder setup by pressing the bed selection area.

2 Press the [Menu], [System Config.], [Record], [Output Rec. Sel.] keys.

► The "Output Recorder Sel." screen will be displayed.



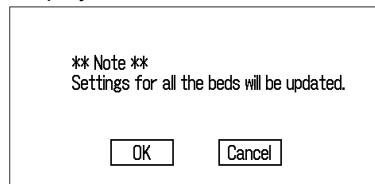
3 Select the output recorder for each review data.

► [Built-in]: Review data will be output on the built-in recorder.

► [Laser]: Review data will be output on the laser printer.

4 To set the same setting for all beds, press the [All Beds] key on the lower right.

► A confirmation message will be displayed.



5 Press the [OK] key.

12-Lead Recording Setup

The 12-lead waveform recording setup for the built-in recorder and laser printer can be performed.

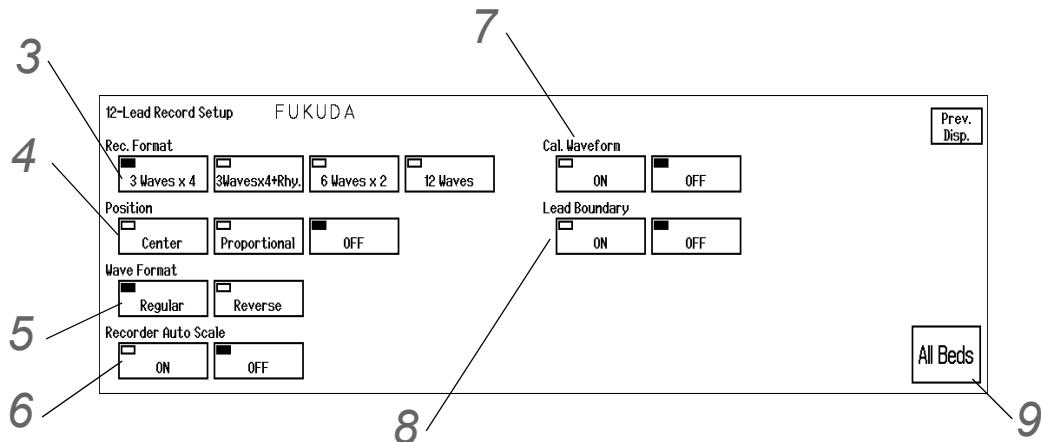
NOTE

- To monitor/record the 12-lead waveform, select ON for "12-Lead" under "Soft Switch".
([Maintenance Manual "Soft Switch" P6-8](#))

1 Select a bed to perform the setup by pressing the bed selection area.

2 Press the [Menu], [System Config.], [Record], [12-Lead Record] keys.

► The "12-Lead Record Setup" screen will be displayed.



3 Set the "Rec. Format".

- ▶ [3 Waves x4] : Records 3 waveforms in 4 columns.
- ▶ [3 Wavesx4+Rhy.]: Records 3 waveforms in 4 columns along with 10 seconds of rhythm waveform (ECG1 lead on the home display).
- ▶ [6 Waves x2] : Records 6 waveforms in 2 columns.
- ▶ [12 Waves]: Records 12 waveforms in 1 column.

4 Set the "Position".

- ▶ [Center]: Equalizes the printing width of each lead so that the waveform baseline will be at the center. The printing scale of the waveform will be also automatically adjusted.
- ▶ [Proportional]: Equalizes the blank space between each lead to avoid overlapping of the waveforms. The printing scale of the waveform will be also automatically adjusted.
- ▶ [OFF]: Waveform position will not be adjusted when recording.

5 Set the "Wave Format".

- ▶ [Regular]: Recording will start from the limb leads.
(In the order of I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6)
- ▶ [Reverse]: Recording will start from the chest leads.
(In the order of V1, V2, V3, V4, V5, V6, I, II, III, aVR, aVL, aVF)

6 If [OFF] is set for "Position", set the "Recorder Auto Scale".

- ▶ [ON]: Recording scale will be automatically adjusted.
- ▶ [OFF]: Recording will be performed with the displayed scale.

NOTE

- ◆ The scale will be adjusted in the range of 1, 1/2, 1/4.
It will not be adjusted to 2, 4 even if the amplitude is small.

7 Set the "Cal. Waveform".

- ▶ [ON]: Calibration waveform will be recorded.
- ▶ [OFF]: Calibration waveform will not be recorded.

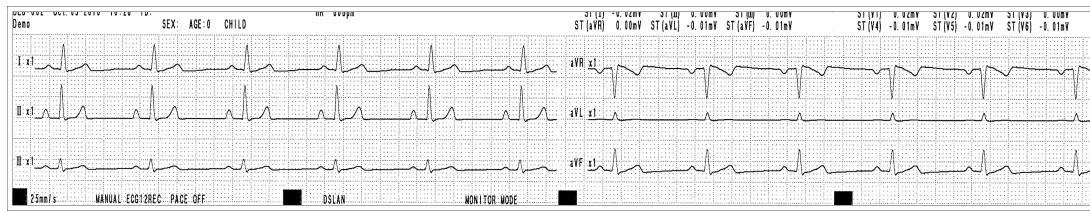
8 Set the "Lead Boundary".

- ▶ [ON]: Lead boundary between the leads will be recorded.
- ▶ [OFF]: Lead boundary will not be recorded.

9 To set the same setting for all beds, press the [All Beds] key on the lower right.

- ▶ A confirmation message will be displayed.

10 Press the [OK] key.



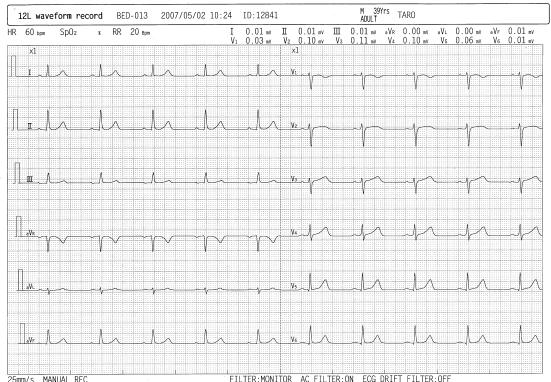
Output Example of Built-in Recorder

The printed numeric value is the value at the begininng of the waveform.

12-Lead Waveform Recording Format

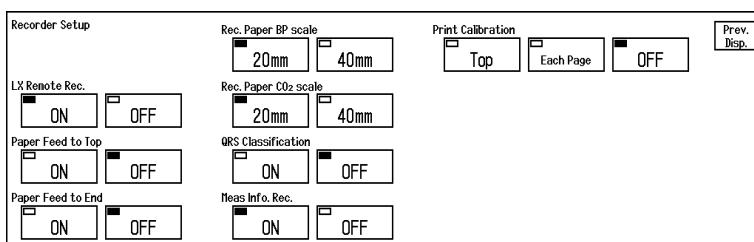
The printed numeric value is the value at the begininng of the waveform.

Output Example	Waveform Layout	Length of Each Waveform
3Wavesx4	<p>1st column: I,II,III 2nd column: aVR, aVL, aVF 3rd column: V1, V2, V3 4th column: V4, V5, V6</p>	2.5 sec.
3Wavesx4+Rhythm	<p>1st column: I,II,III 2nd column: aVR, aVL, aVF 3rd column: V1, V2, V3 4th column: V4, V5, V6 Bottom column: 10 seconds of rhythm waveform (ECG1 lead on the home display)</p>	2.5 sec.

Output Example	Waveform Layout	Length of Each Waveform
6Wavesx2 	1st column: I, II, III , aVR, aVL, aVF 2nd column: V1, V2, V3, V4, V5, V6	5 sec.
12 Waves 	The waveforms from the top are as follows. I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6	10 sec.

Recorder Setup

The following setup can be performed on the "Recorder Setup" under "Pre-Set Menu".



NOTE

- This setup should be performed by our service representative or system administrator of each institution.
(参见维修手册“Recorder Setup” P6-6)

Recording Paper Size Selection

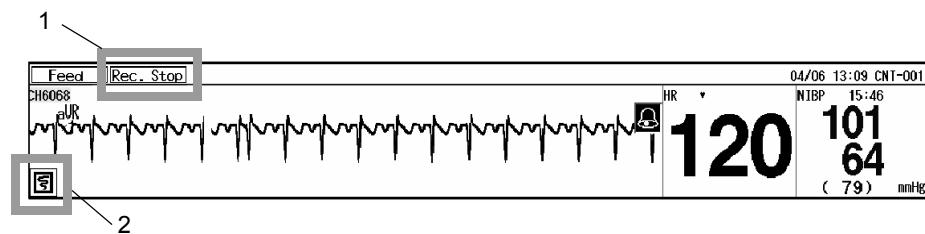
Under the Soft Switch menu, the recording paper size for the laser printer can be selected from A4 or letter size.

(参见维修手册“Soft Switch” P6-8)

To Start/Stop the Recording

Manual Recording

Operation from the Home Display:



- 1 [Rec. Stop] Key
- 2 [Record] (Manual Record) Key

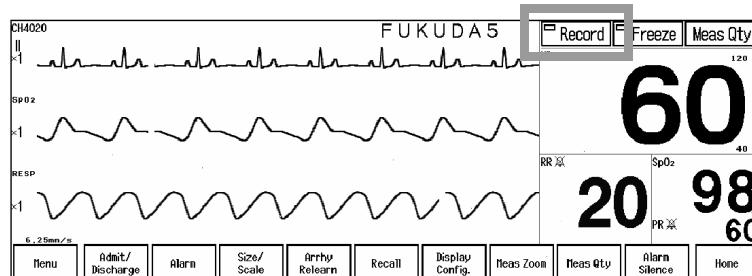
1 Press the [Record] (Record) key.

- ▶ The recording will start.
- 1** To stop the recording, press the [Record] (Record) key for the same bed, or press the [Rec. Stop] key on the home display.
- ▶ The recording will stop.

REFERENCE

- ♦ Pressing the [Record] (Record) keys for more than one bed will sequentially start the recording for the pressed beds. However, [12Sec] or [24Sec] should be selected for recording duration on the "Manual Record" screen.

Operation from the Individual Bed Display:



1 Press the [Record] key on the individual bed display.

- ▶ The recording will start.
- ▶ The key LED will light during recording.
- 1** To stop the recording, press the [Record] key again.

Operation from the User Key:

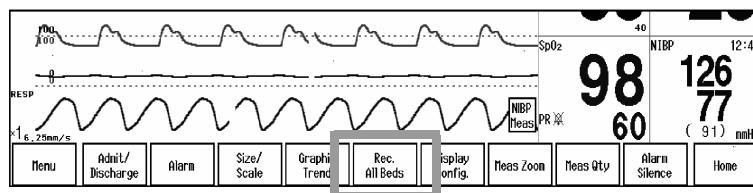
NOTE

- Using this procedure will start the recording for all beds displayed on the home display.
- The recording duration and delay time is fixed as 12 seconds and 8 seconds respectively.

1

Assign [Rec. All Beds] to the user key.

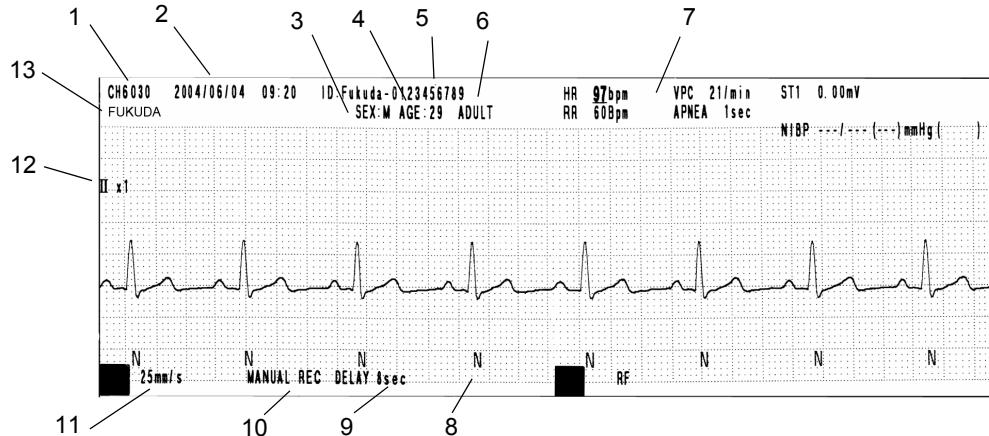
(Maintenance Manual "User Key" P6-14)



2

Press the [Rec. All Beds] key.

- The recording will start.



1 Bed ID/Channel ID

2 Recorded Time

3 Sex

4 Age

5 Patient ID

6 Patient Type

7 Parameter

The printed numeric value is the value at the beginning of the waveform (at the bed ID, channel ID display area).

8 QRS Classification

About the QRS Classification:

Selecting [ON] for "QRS Classification" on the "Recorder Setup" under "Pre-Set Menu" will print the following symbols.

(Maintenance Manual "Recorder Setup" P6-6)

9 Delay Time

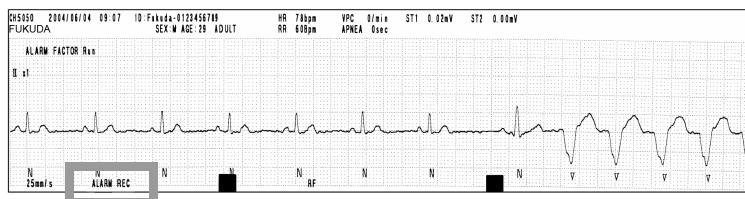
About the Delay Time:

If [None] is selected for "Delay Time" on "Manual Record" screen, <MANUAL REC. DIRECT> will be printed.

- 10 Record Mode
- 11 Recording Speed
- 12 Waveform Type, Lead, Size
- 13 Patient Name

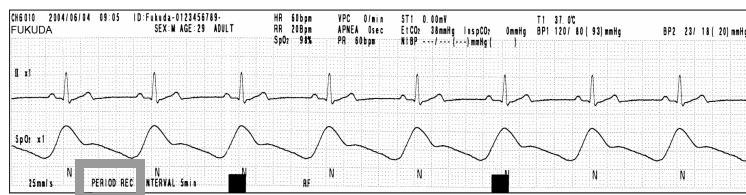
Alarm Recording, Periodic Recording

When the set condition is met, alarm/periodic recording will automatically start/stop.



Example of Alarm Recording

The printed numeric value is the value at alarm occurrence (at about 7 sec. point).



Example of Periodic Recording

The printed numeric value is the value at the beginningng of the waveform (at the bed ID, channel ID display area).

Remote Recording

When the record key on the bedside monitor or "EVENT" key on the telemetry transmitter is pressed, remote recording can be performed on the built-in recorder of this unit.

Waveform Remote Recording from the Wired Bedside Monitor

- 1 Press the record key on the bedside monitor.

► Recording will be performed on the built-in recorder of this unit.

NOTE

- Central monitor should be selected as output recorder for waveform recording on the bedside monitor.

REFERENCE

- If more than one central monitors are connected to the network, recording will be

performed on the central monitor with the smallest central ID.

- ♦ The recording will be performed according to the recording condition set on the bedside monitor. Recording setting on the central monitor will not be effective.
- ♦ For the patient ID, maximum of 10 digits will be printed.

□ Graphic Remote Recording from the Wired Bedside Monitor

1

Press the [Print] key on the extended function screen (ex. graphic trend).

- ▶ Graphic recording will be performed on the built-in recorder of this unit.

NOTE

- ♦ Central monitor should be selected as output recorder for graphic recording on the bedside monitor.

REFERENCE

- ♦ The recording will be performed according to the recording condition set on the bedside monitor.

□ Remote Recording from the Telemetry Bedside Monitor (with HLX-561)

From the bedside monitor (DS-5400, DS-5100, etc.) without the recorder (HR-500, etc.), remote recording can be performed through the telemetry transmitter (ex. HLX-561) to the built-in recorder of this unit.

NOTE

- ♦ The telemetry remote recording is effective only for manual recording. If a recorder is connected to the bedside monitor, telemetry remote recording will not function.
- ♦ Central monitor should be selected as output recorder for waveform recording on the bedside monitor.

REFERENCE

- ♦ The recording duration and delay time is fixed as 24 seconds and 12 seconds respectively.
- ♦ The waveform selection will be according to the manual record setting on the central monitor (this unit). Manual recording setting on the bedside monitor will not be effective.

□ Remote Recording from the Telemetry Transmitter (LX-5160, LX-5630, LX-7120, LX-7230)

1

Press the event key for more than 3 seconds on the LX-5160, LX-5630, and for more than 2 seconds for the LX-7120, LX-7230.

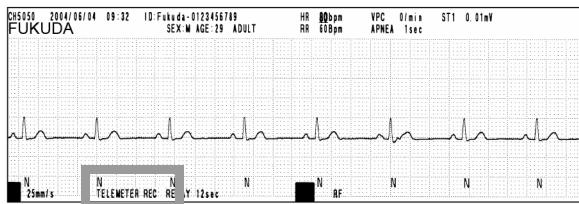
- ▶ Recording will be performed on the built-in recorder of this unit.

NOTE

- ♦ Select [ON] for "LX Remote Rec." on the "Recorder Setup" under "Pre-Set Menu".
( Maintenance Manual "Recorder Setup" P6-6)

REFERENCE

- The recording duration and delay time is fixed as 24 seconds and 12 seconds respectively.
- The waveform selection will be according to the manual record setting on the central monitor (this unit). Manual recording setting on the bedside monitor will not be effective.

*Example of Telemetry Remote Recording*

The printed numeric value is the value at the beginning of the waveform (at the bed ID, channel ID display area).

Review Data Recording (Graphic/Tabular Trend, etc.)

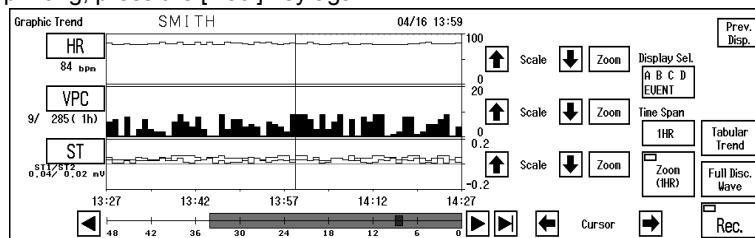
The review data such as graphic trend, tabular trend, NIBP list, recall waveform, ST waveform can be recorded. The review data recording can be started by pressing the [Rec.]/[Rec. x] key displayed on each review data screen. The example of graphic trend is explained below.

- 1** Select the patient to display the graphic trend by pressing the bed selection area.
- 2** Press the [Menu], [Graphic Trend] keys.
 - The "Graphic Trend" screen will be displayed.
- 3** Press the [Rec.]/[Rec. x] key to start the graphic trend recording.

When the output recorder is the built-in recorder:

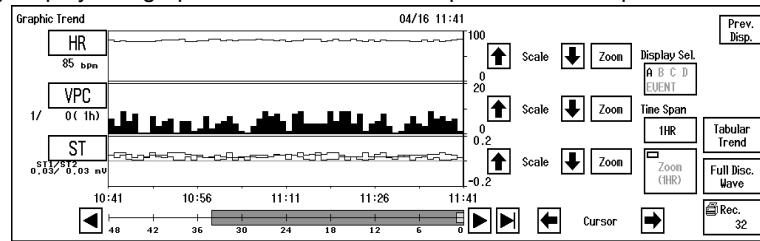
- The currently displayed 3 graphic trend data will be output on the built-in recorder.

- 1** To stop the printing, press the [Rec.] key again.



When the output recorder is the laser printer:

- The currently displayed 3 graphic trend data will be output on the laser printer.



NOTE

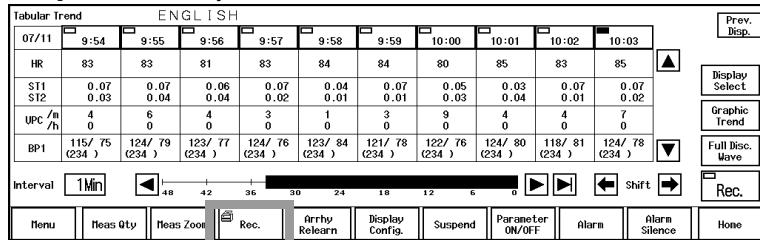
- ♦ If the stacked data becomes full, the key will turn to gray which indicates that the printing cannot be performed.
- ♦ When the output destination is the laser printer, pressing again the [Rec.] key during printing will not stop the printing. A new data will be added as stacked data instead.

REFERENCE

- ♦ The quantity of stacked data for the bed is displayed inside the key.

When operating from the user key:

- 1 Assign [] Rec. to the user key.

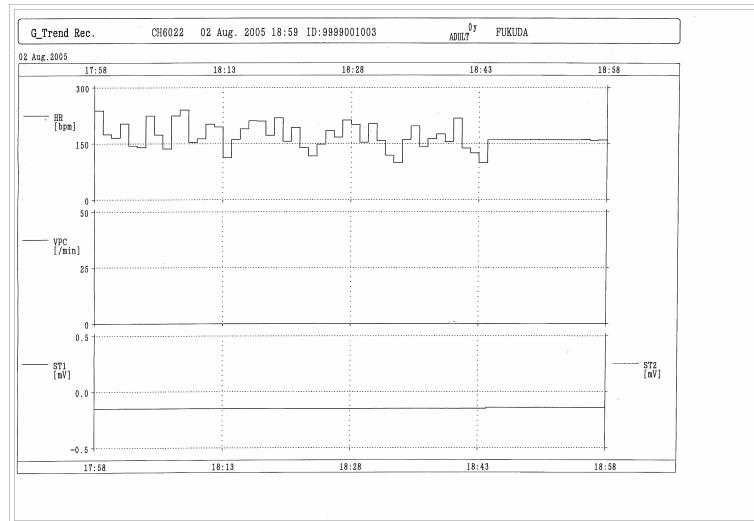


- 2 Press the [] Rec. key.

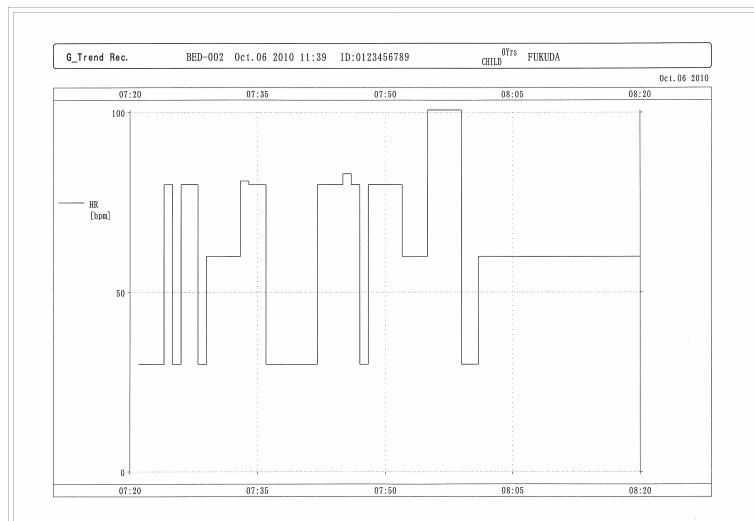
NOTE

- ♦ This user key is effective only when review data (graphic trend, tabular trend, NIBP list, recall zoom, ST, compressed/zoom full disclosure, 12-lead) is displayed.

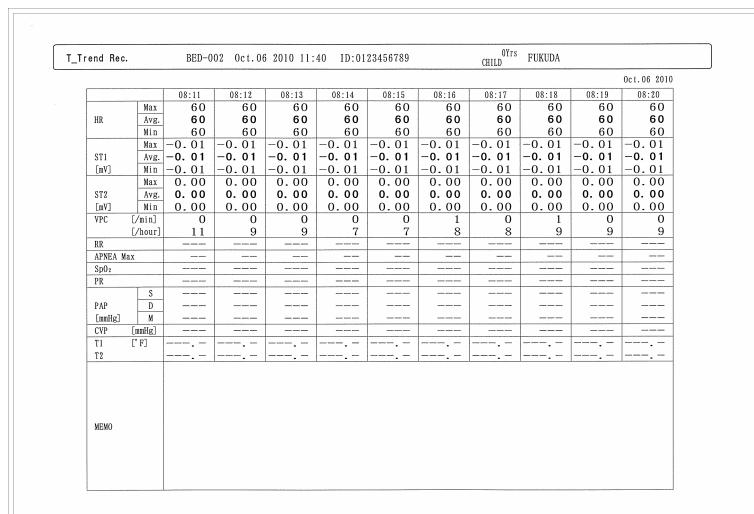
□ Output Example of Laser Printer



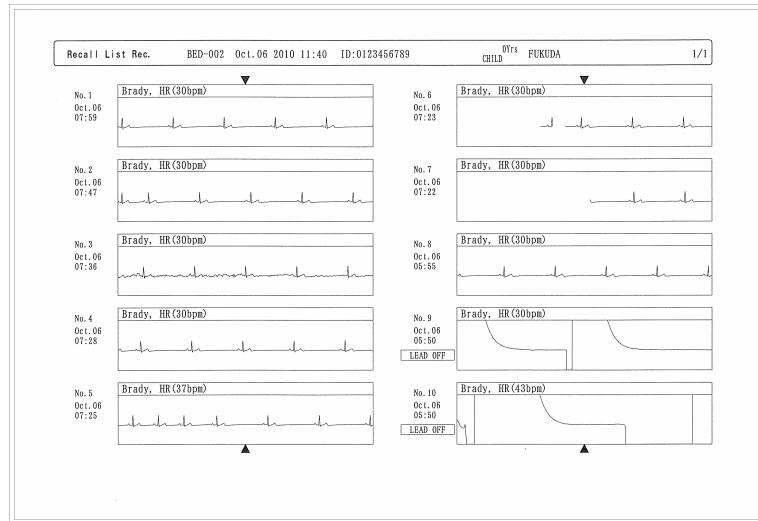
Graphic Trend



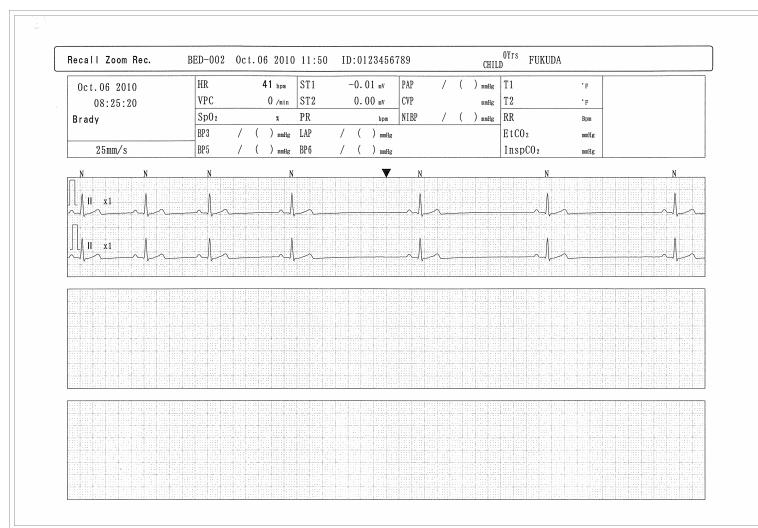
Enlarged Graphic Trend



Tabular Trend



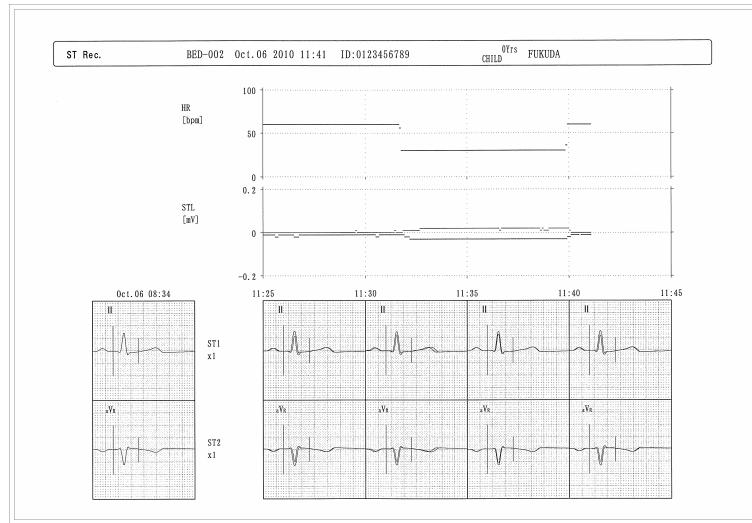
Recall List/Recall List (All)



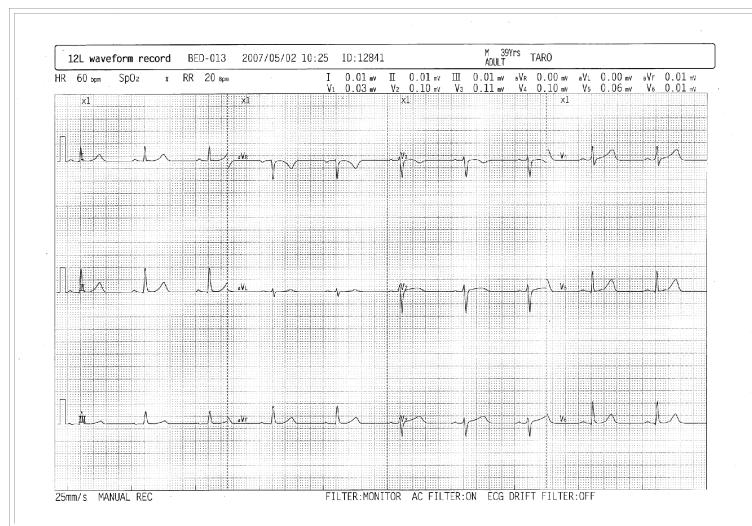
Recall, Zoom (The printed value is the value at ▼ point.)

No.	Date	NIBP [mmHg]	HR	Spo ₂	PR	No.	Date	NIBP [mmHg]	HR	Spo ₂	PR	No.	Date	NIBP [mmHg]	HR	Spo ₂	PR
1	Oct. 06 11:00	94/73(70)	30	—	—	41							81				
2	Oct. 06 10:59	106/61(77)	30	—	—	42							82				
3	Oct. 06 10:57	102/65(77)	80	—	—	43							83				
4	Oct. 06 10:56	108/73(87)	80	—	—	44							84				
5	Oct. 06 10:52	108/73(87)	80	—	—	45							85				
6	Oct. 06 09:57	106/62(82)	80	—	—	46							86				
7	Oct. 06 09:41	108/61(81)	120	—	—	47							87				
8	Oct. 06 09:39	102/63(74)	120	—	—	48							88				
9	Oct. 06 09:38	109/45(64)	120	—	—	49							89				
10	Oct. 06 09:37	132/73(71)	120	—	—	50							90				
11	Oct. 06 09:36	—	—	—	—	51							91				
12	Oct. 06 09:33	114/64(81)	30	—	—	52							92				
13	Oct. 06 09:33	—	—	—	—	53							93				
14	Oct. 06 09:32	117/52(74)	80	—	—	54							94				
15	Oct. 06 09:30	117/52(74)	80	—	—	55							95				
16	Oct. 06 09:29	—	—	—	—	56							96				
17	Oct. 06 09:25	99/62(80)	80	—	—	57							97				
18	Oct. 06 09:24	102/62(80)	80	—	—	58							98				
19	Oct. 06 09:21	129/49(67)	80	—	—	59							99				
20	Oct. 06 09:21	107/58(78)	80	—	—	60							100				
21	Oct. 06 09:20	108/52(71)	80	—	—	61							101				
22	Oct. 06 09:19	—	—	—	—	62							102				
23	Oct. 06 09:18	—	—	—	—	63							103				
24	Oct. 06 09:17	—	—	—	—	64							104				
25	Oct. 06 09:16	—	—	—	—	65							105				
26	Oct. 06 09:15	—	—	—	—	66							106				
27	Oct. 06 09:14	—	—	—	—	67							107				
28	Oct. 06 09:13	—	—	—	—	68							108				
29	Oct. 06 09:12	—	—	—	—	69							109				
30	Oct. 06 09:11	—	—	—	—	70							110				
31	Oct. 06 09:10	—	—	—	—	71							111				
32	Oct. 06 09:09	—	—	—	—	72							112				
33	Oct. 06 09:08	—	—	—	—	73							113				
34	Oct. 06 09:07	—	—	—	—	74							114				
35	Oct. 06 09:06	—	—	—	—	75							115				
36	Oct. 06 09:05	—	—	—	—	76							116				
37	Oct. 06 09:04	—	—	—	—	77							117				
38	Oct. 06 09:03	—	—	—	—	78							118				
39	Oct. 06 09:02	—	—	—	—	79							119				
40	Oct. 06 09:01	—	—	—	—	80							120				

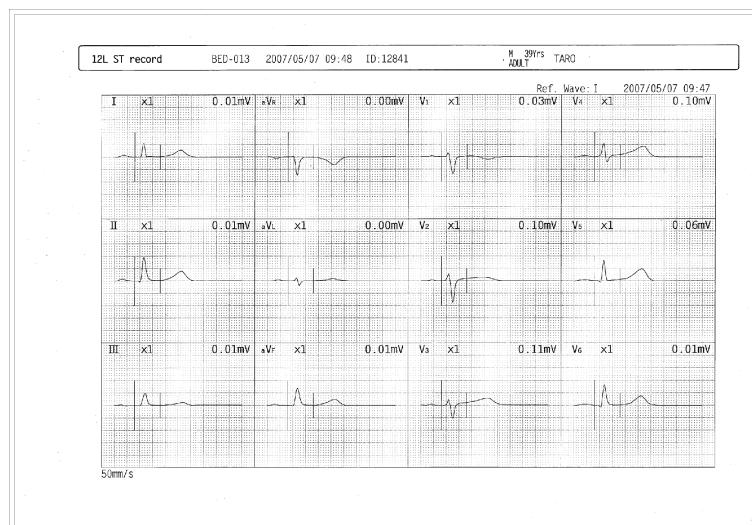
NIBP List (All)



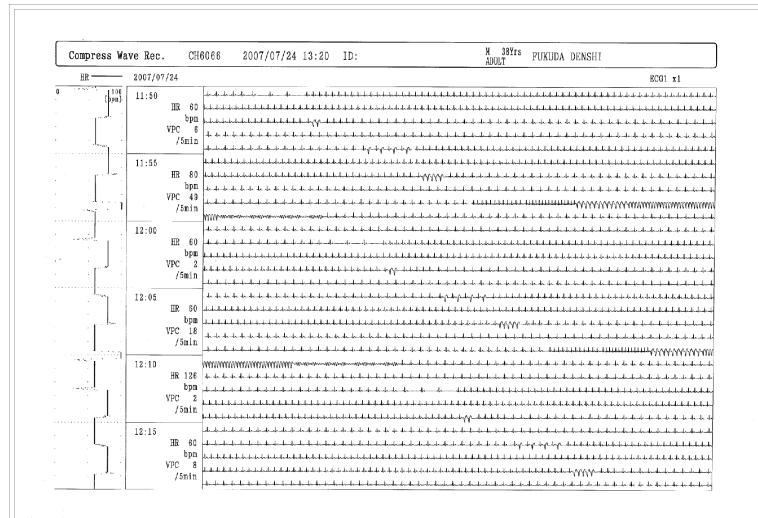
ST Record



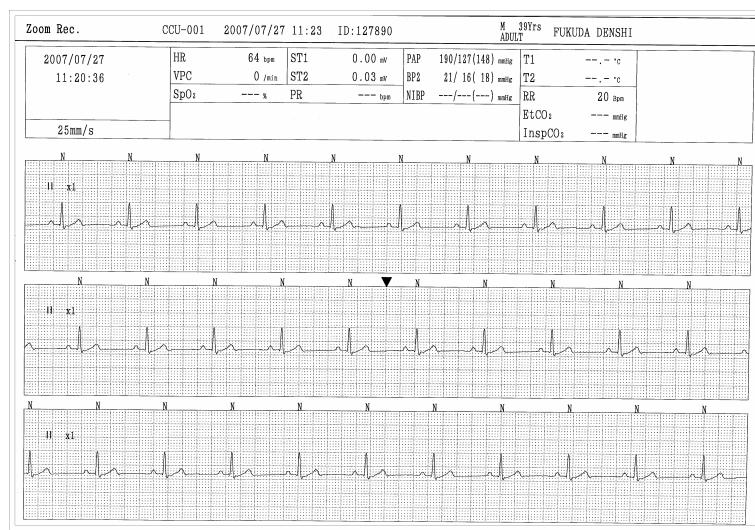
12-Lead Waveform <3 Waves x 4> (The printed numeric value is the value at the beginning of the waveform.)



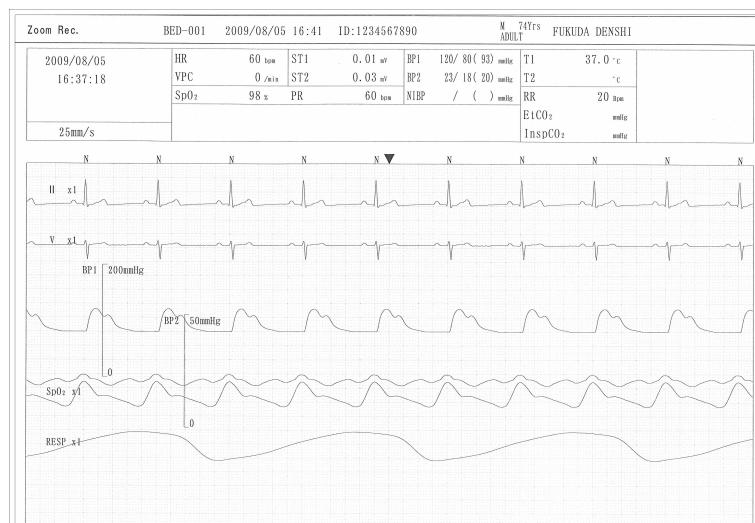
12-Lead ST (The printed numeric value is the value at the beginning of the waveform.)



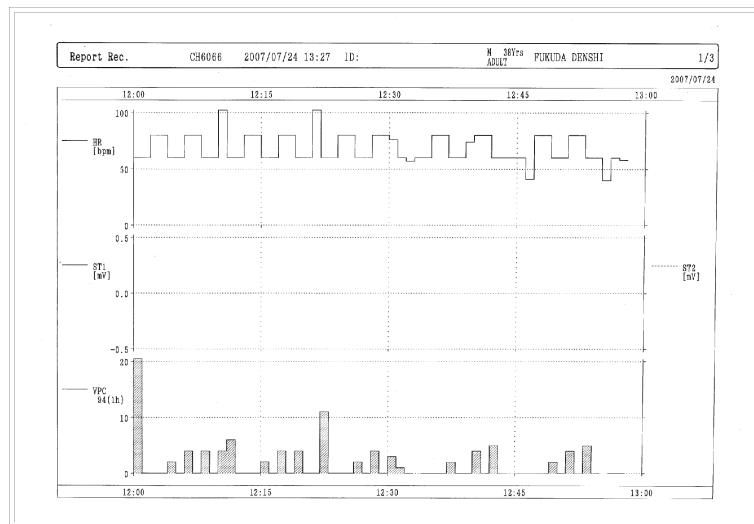
Full Disc. Wave, Compressed



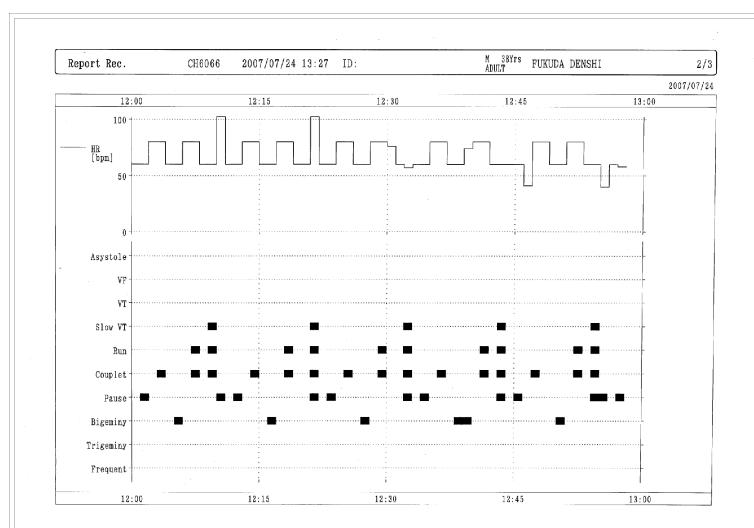
Full Disclosure, Zoom <3 Waves x 30 sec.> (The printed value is the value at ▼ point.)



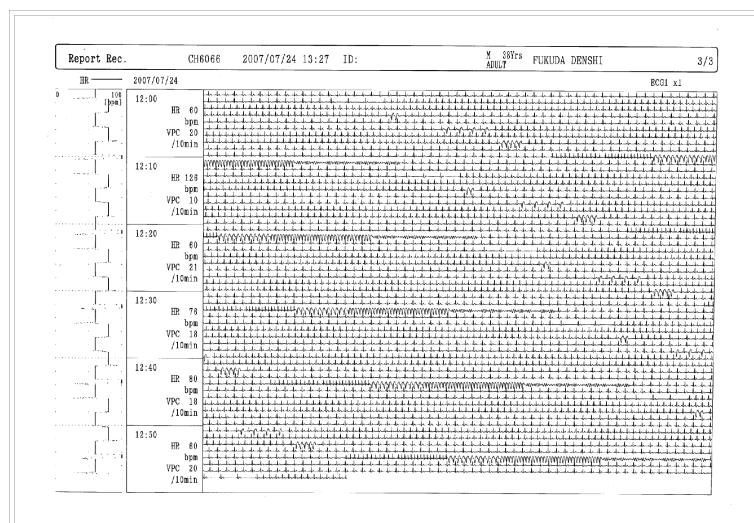
Full Disclosure, Zoom <6 Waves x 10 sec.> (The printed value is the value at ▼ point.)



*Full Disc. Wave, Report
(1st page: HR, ST1, VPC trend)*



Full Disc. Wave, Report
(2nd page: HR and Arrhythmia Event Trend)



Full Disc. Wave, Report

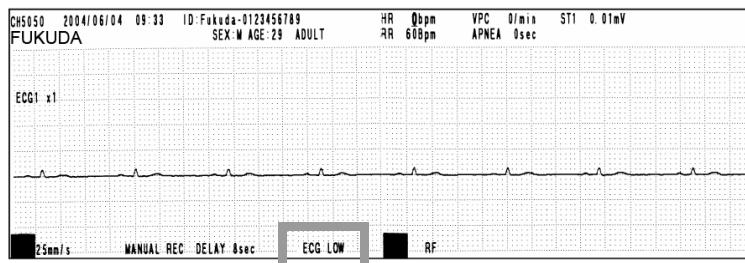
(3rd page and onward: compressed waveform and trend)

REFERENCE

- The compressed waveform and trend will be recorded for preprogrammed duration.

Measurement Status

On the recording output, measurement status such as vital signal condition and equipment status will be printed after the recording type.



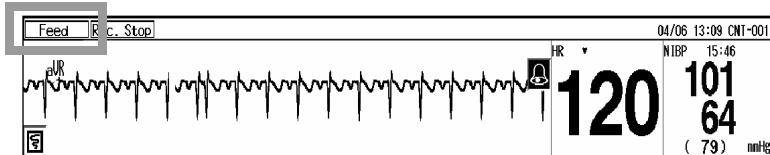
The following measurement status will be output on the recording paper.

Measurement Status	Description
LEAD OFF	The electrode is detached. Check electrodes.
CVA	CVA is detected.
P SEARCH	SpO ₂ pulse wave is small. SpO ₂ probe sensor attachment is not appropriate, etc.
ECG LOW	The amplitude of ECG waveform is low.
ECG CAN'T	Cannot analyze
ECG1 LOW	The amplitude of ECG1 waveform is low.
ECG2 LOW	The amplitude of ECG2 waveform is low.
ECG1 CAN'T	Cannot perform arrhythmia analysis of ECG1.
ECG2 CAN'T	Cannot perform arrhythmia analysis of ECG2.
CO ₂ CHECK	CO ₂ sensor error.
TLM OFF	Too far, noise interference.
TLM LOWBAT	Telemetry battery or bedside monitor battery is depleted.
LAN OFF	Communication error with DS-LANII/III. DS-LANII/III connection is cut off. Cannot receive data via DS-LANII/III.
TCON OFF	TCON signal cannot be received. Data cannot be received by TCON.
TCON ERROR	Communication error with TCON.

Built-in Recorder Operation

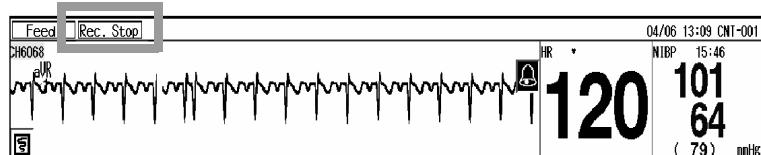
To Feed the Paper

- 1** Press the [Feed] key on the home display.



To Stop the Recording

- 1** Press the [Rec. Stop] key on the home display.



Status Message

The built-in recorder status will be indicated with the following message.

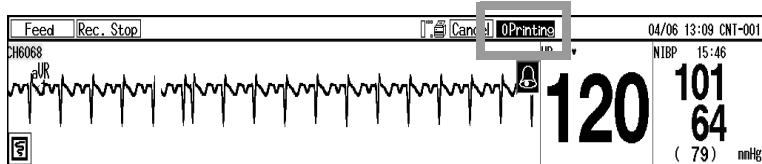


Displayed Message	Description
Check Recorder	Thermal head error
Check Magazine	Recorder paper cassette is open. Set the cassette properly.
Paper Out	No recording paper The recording will automatically stop when the recording paper is out. Set a new pad of recording paper. (☞ "Built-in Recorder Operation" P9-23) The message will continue to be displayed until the recording paper is set.
Paper Jam	Recording paper is jammed. Remove the jammed paper, and set the recording paper properly.
Recorder Busy	Recording is in operation.

Laser Printer Operation

Status Message

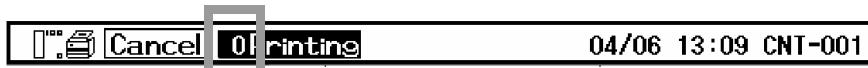
The laser printer status will be indicated with the following messages and icons.
(☞ "Upper Display Area" P3-5)



Stacked Data

Maximum of 64 data can be stacked for recording.

On the laser printer status message display area, total number of stacked data for all beds will be displayed.



Inside the [Rec. x] key on the review data display (graphic trend, tabular trend, etc.), the quantity of stacked data for the currently selected bed will be displayed.

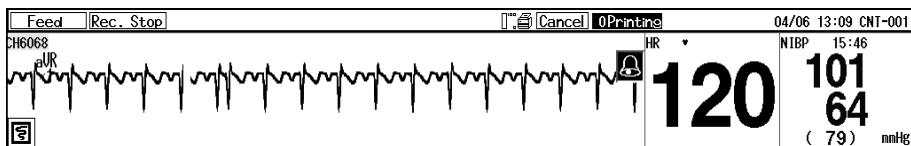


When the total stacked data for all beds reaches 64, the key will become ineffective by turning gray.

To Delete the Stacked Data

- 1 Press the [Cancel] key on the upper part of the home display.

▶ All stacked data will be deleted.



NOTE

- Pressing again the [Print] key on each review data screen will not stop the recording. A new data will be added as stacked data instead.

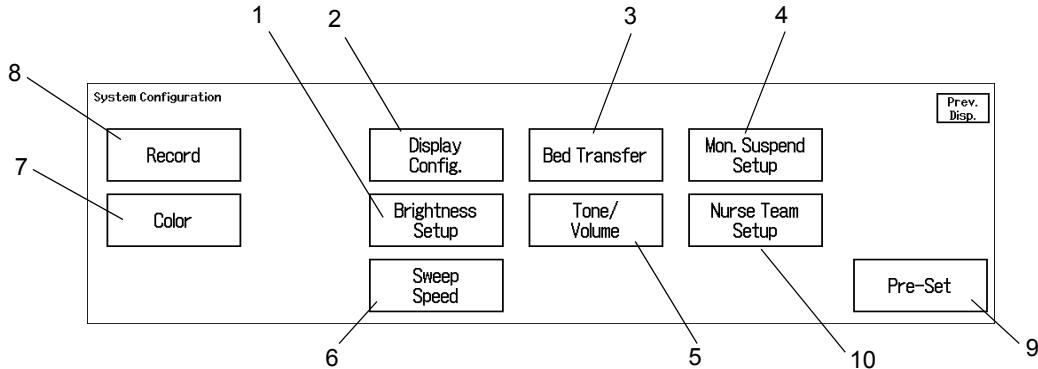
Chapter 10 Setup

System Configuration Menu	10-1
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Waveforms/Numeric Data Selection (Individual Bed Display).....	10-8
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Tone / Volume	10-13
Sweep Speed	10-16
Monitor Suspend Setup	10-17
Nurse Team Setup	10-18

Chapter 10 Setup

System Configuration Menu

This section describes the setup procedure of each item on the system configuration menu.



1 Brightness Setup

The brightness of the display can be set.

2 Display Config.

Display layout of the home display and individual bed display can be set.

3 Bed Transfer

By using the bed transfer/exchange function, patient information and monitoring data can be transferred/exchanged between the beds.

(☞ "Admit / Discharge" P5-1)

4 Mon. Suspend Setup

During monitoring suspend condition, different messages in different colors according to the patient's destination can be displayed. This can be set only when "Monitor Suspend's Message Selection" on the "Soft Switch" is set to [ON].

5 Tone/Volume

The volume and tone of the alarm sound, heartbeat sound, key sound can be set.

6 Sweep Speed

The sweep speed of the displaying waveform can be set. A different sweep speed can be set for circulatory system (BP, ECG) and respiratory system.

7 Color

The colors of displaying waveform, numeric data and patient name can be set.

8 Record

The recording condition for manual, periodic, and alarm recording can be set. Output recorder for each review data can be selected from built-in recorder or laser printer.

(☞ "Recording" P9-1)

9 Pre-Set

Pressing this key displays the "Pre-Set Menu".

10 Nurse Team Setup

To easily recognize the patients for each nurse team, the displayed colors on the home display and individual bed display can be changed according to the nurse team.

(☞ "Nurse Team Setup" P10-18)

NOTE

- The Pre-Set menu should be set by our service representative or system administrator

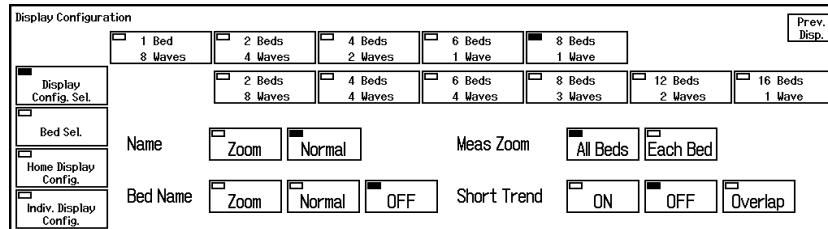
before starting monitoring.
 (参照 Maintenance Manual "Procedure to Start Monitoring" P1-2)

Display Configuration

The display configuration of the home display and individual bed display can be set on this menu.

- 1** Press the [Menu], [System Config.], [Display Config.] keys.

- The "Display Configuration" screen will be displayed.



REFERENCE

- ♦ On the "Display Configuration" screen, the following setup can be performed.
 - ♦ Home display layout
 - ♦ Patient Name (Zoom/Normal)
 - ♦ Bed Name (Zoom/Normal/OFF)
 - ♦ Meas Zoom (All Beds/Each Bed)
 - ♦ Short Trend (ON/OFF/Overlap)
 - ♦ Bed Selection (Home Display)
 - ♦ Waveform/Measurement Selection (Home Display)
 - ♦ Waveform/Measurement Selection (Individual Bed Display)
 - ♦ Measurement Area Selection (Individual Bed Display)

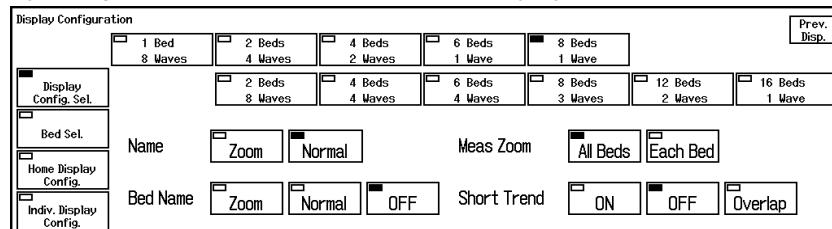
The waveforms and numeric data that can be displayed on the home display and individual bed display are as follows.

Waveform Selection	ECG1, ECG2, BP1 to 6, SpO ₂ , RESP, CO ₂ , GAS_CO ₂ , GAS_O ₂ , GAS_AGT, OFF, Name, SpO ₂ -2, AWP, AWF, AWV
Measurement Selection	HR, HR/Alarm, HR/ST, ST, VPC, ST/VPC, RR, RR/Alarm, BP1 to 6, SpO ₂ , SpO ₂ /PR, PR-1, NIBP, NIBP List, NIBP Meas., CO ₂ , T1/T2, SvO ₂ /CCO, 12ST-A, 12ST-B, 12ST-C, 12ST-D, OFF, GAS_CO ₂ , GAS_O ₂ , GAS_N ₂ O, GAS_AGT, GAS(CO ₂ +AGT+O ₂ +N ₂ O), GAS(AGT+O ₂ +N ₂ O), SPIRO, SpO ₂ -2, SpO ₂ /PR-2, PR-2, SpO ₂ /PI, SpO ₂ /PI-2, SpCO, SpMet, BIS, INVOS

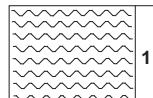
Home Display Layout

1

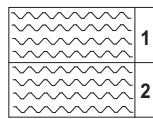
On the "Display Configuration" screen, select the home display layout from [1Bed 8Waves] to [16Beds 1Wave].



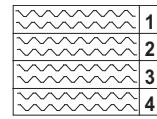
1bed 8waves



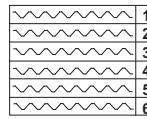
2beds 4waves



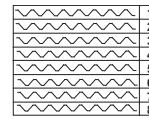
4beds 2waves



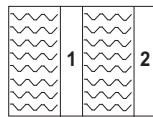
6beds 1wave



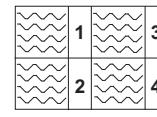
8beds 1wave



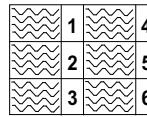
2beds 8waves



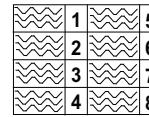
4beds 4waves



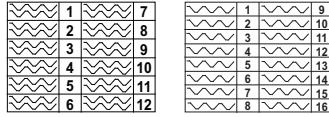
6beds 4waves



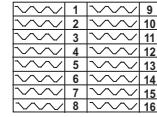
8beds 3waves



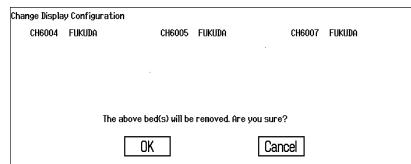
12beds 2waves



16beds 1wave



- 1** When the selected number of beds is less than the currently displayed number of beds, a confirmation message will be displayed.



- 2** If it is OK to remove some of the displaying number of beds, press the [OK] key. The bed selection will be displayed.

(☞ "Bed Selection" P10-5)

- 2** Select the display size for "Name" (patient name).

▶ [Zoom]: Enlarges the patient name display overlapping it with the waveform.

▶ [Normal]: Patient name will be displayed in normal size.

- 3** Select the display size for "Bed Name".

- ▶ [Zoom]: Enlarges the bed name display overlapping it with the waveform.
- ▶ [Normal]: Bed name will be displayed in normal size.
- ▶ [OFF]: Bed name will not be displayed.

NOTE

- ◆ The patient name and bed name cannot be enlarged at the same time.

4 Set the "Meas Zoom".

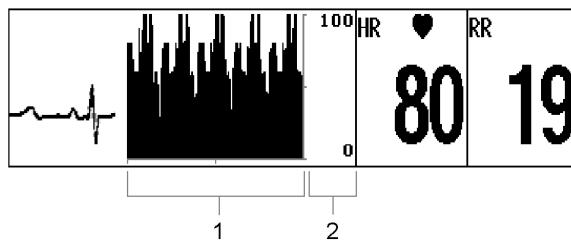
REFERENCE

- ◆ Enlarging/reducing the size of numeric data can be applied to all beds or only to the selected bed.

- ▶ [All Beds]: When the [Meas Zoom] key (user key) is pressed, numeric data for all beds will be enlarged/reduced.
- ▶ [Each Bed]: When the [Meas Zoom] key (user key) is pressed, numeric data for only the selected bed will be enlarged/reduced.

5 Set the "Short Trend".

- ▶ [ON]: Short trend will be displayed on the home display.
- ▶ [OFF]: Short trend will not be displayed on the home display.
- ▶ [Overlap]: Short trend will be displayed overlapped with the waveform.



1 Short Trend Display

Short trend will be displayed beside the numeric data.

The displaying order of the parameter will be according to the setting made on the "Measurement Selection" of the "Home Display Config.".

Pressing the trend display area will sequentially change the display duration in the order of 10 min, 20 min, 30 min, 10 min.

2 Trend Scale Display

Trend scale will be displayed between the short trend and numeric data. The scale will be according to the value set on the "Graphic Trend" screen.

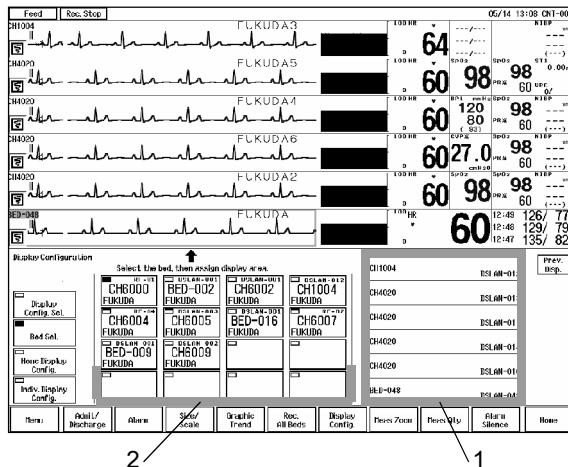
NOTE

- ◆ The short trend can be displayed only when the display layout is 1Bed 8Waves, 2Beds 4Waves, 4Beds 2Waves, 6Beds1Wave, 8Beds 1Wave.
- ◆ The display duration of the short trend will differ depending on the display width of the numeric data.
- ◆ The short trend cannot be displayed when maximum area is used for the numeric data display.

Bed Selection

1 Press the [Bed Sel.] key on the "Display Configuration" screen.

- ▶ The selectable beds will be listed at the center.
- ▶ The current setup will be displayed at the right.



1 Current Setup

2 Bed Selection List

REFERENCE

- ◆ The color of the upper right display on the key will change to green or white with the key selection.
- Green: Indicates that the bed is selected for display.
- White: Indicates that the bed is not selected.

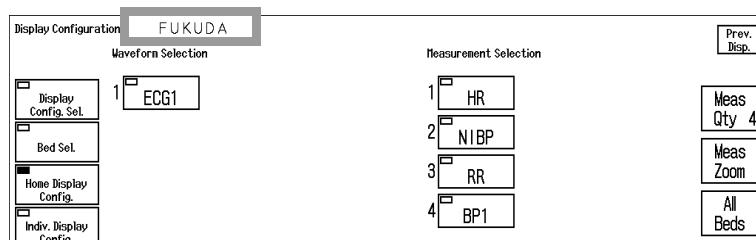
2 From the bed selection list, select the bed to display for the previously selected bed selection area.

3 On the home display, press the bed selection area where you desire to display the selected bed.

Waveforms/Numeric Data Selection (Home Display)

1 Press the [Home Display Config.] key on the "Display Configuration" screen.

- ▶ The "Display Configuration" screen for the home display will be displayed.
- ▶ At the upper part of the display, the patient name to perform the setup will be displayed.



"Display Configuration" Screen for the Home Display

REFERENCE

- To perform the setup for another patient, select the patient by pressing the bed selection area on the home display.

2

To change the quantity of numeric data to be displayed, press the [Meas Qty] key.

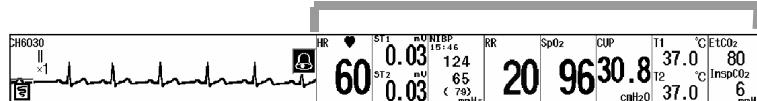
- ▶ Pressing the [Meas Qty] key will sequentially change the quantity of displaying numeric data.
- ▶ On the [Meas Qty] key, the quantity of currently displayed numeric data will be displayed.

NOTE

- The quantity of displaying numeric data can be changed only for the display layout of 1Bed 8Waves, 2Beds 4Waves, 4Beds 2Waves, 6Beds 1Wave, 8Beds 1Wave.

REFERENCE

- The maximum display size for the numeric data is shown below.

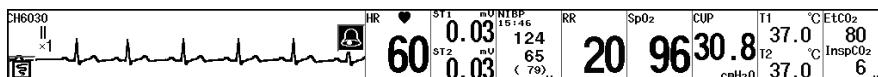
**3**

Press the [Meas Zoom] key to enlarge/reduce the size of each numeric data area.

- ▶ The size of each numeric data area will enlarge/reduce without changing the size of the whole numeric data display area.



- ▶ Each time the [Meas Zoom] key is pressed, it will sequentially enlarge/reduce the size of each numeric data area.

**REFERENCE**

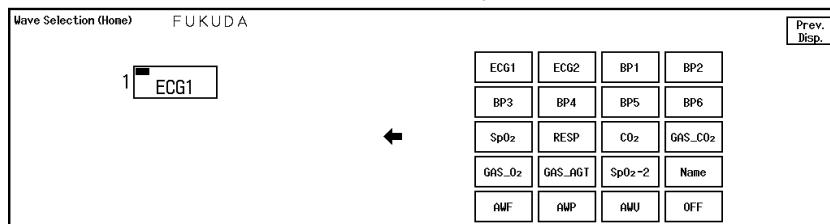
- If [All Beds] is selected for "Meas Zoom", the [Meas Zoom] key function will be applied to all beds.
- If [Each Bed] is selected, the [Meas Zoom] key function will be applied only to the selected bed.

4

Select the waveforms to be displayed on the home display.

- 1 Press one of the keys under "Waveform Selection".

- ▶ The "Wave Selection (Home)" screen will be displayed.



- 2 Select the displaying position from the key on the left.
- 3 Select the parameter from the list on the right.
 - ▶ The selected parameter will be assigned to the selected position on the left.

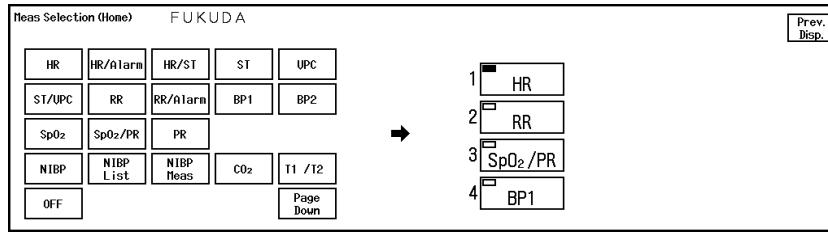
REFERENCE

- ♦ Selecting [Name] will display the patient name instead of waveform.

- 4 Press the [Prev. Disp.] key.

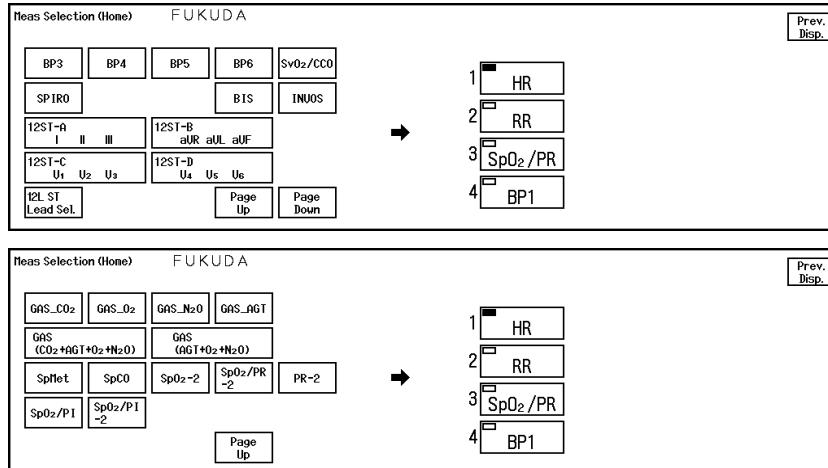
- 5 Select the numeric data to be displayed on the home display.

- 1 Press one of the keys under "Measurement Selection".
- ▶ The "Meas Selection (Home)" screen will be displayed.



"Meas Selection (Home)" Screen/1st Page

- 2 Select the displaying position from the key on the right.



- 3 Switch the pages using the [Page Down]/[Page Up] keys.

- 4 Select the parameter from the list on the left.

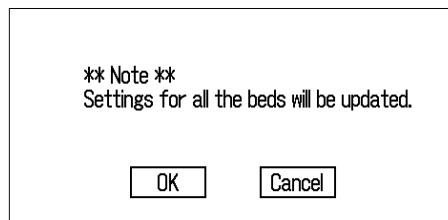
NOTE

- ♦ The [NIBP Meas] key function is available only for the DS-LANIII bed and the TCON bed.

- 5 Press the [Prev. Disp.] key.

- 6 To set the same display layout for all beds, press the [All Beds] key on the lower right.

- ▶ A confirmation message will be displayed.

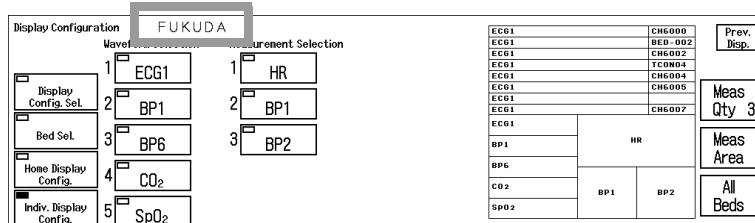


7 Press the [OK] key.

Waveforms/Numeric Data Selection (Individual Bed Display)

1 Press the [Indiv. Display Config.] key on the "Display Configuration" screen.

- ▶ The "Display Configuration" screen for the individual bed display will be displayed.
- ▶ At the upper part of the display, the patient name to perform the setup will be displayed.



"Display Configuration" Screen for the Individual Bed Display

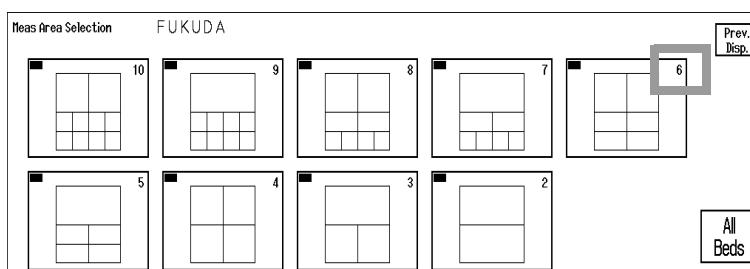
REFERENCE

- ♦ To perform the setup for another patient, select the patient by pressing the bed selection area on the home display.

2 Select the numeric data display layout.

1 Press the [Meas Area] key.

- ▶ The "Meas Area Selection" screen will be displayed.



REFERENCE

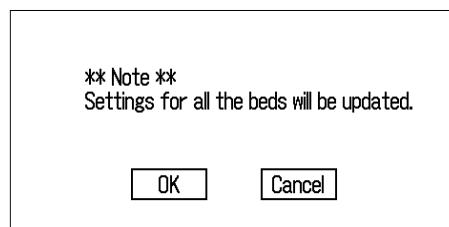
- ♦ The number displayed at upper right of each layout is the quantity of displayable numeric data.

2 Select the numeric data display layout by pressing the corresponded key.

- ▶ The key LED will light to indicate that the layout is selected.

3 To set the same display layout for all beds, press the [All Beds] key on the lower right.

- ▶ A confirmation message will be displayed.



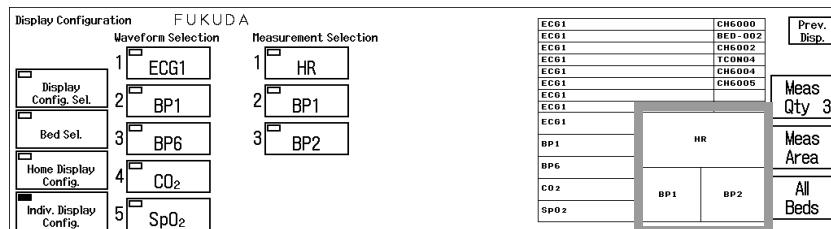
4 Press the [OK] key.

5 Press the [Prev. Disp.] key.

3 To change the quantity of numeric data to be displayed on the individual bed display, press the [Meas Qty] key.

- ▶ Pressing the [Meas Qty] key will sequentially change the quantity of numeric data which can be checked on the layout image.

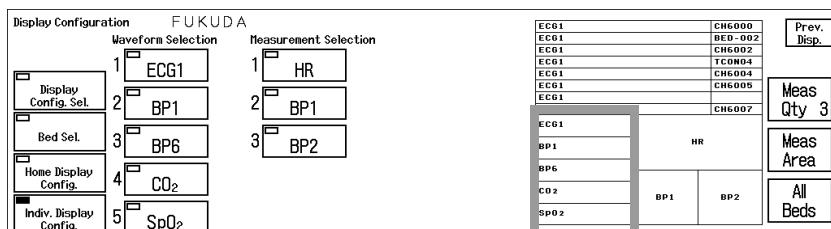
The display layout selected at procedure 2 will be applied.



4 Select the waveforms to be displayed on the individual bed display.

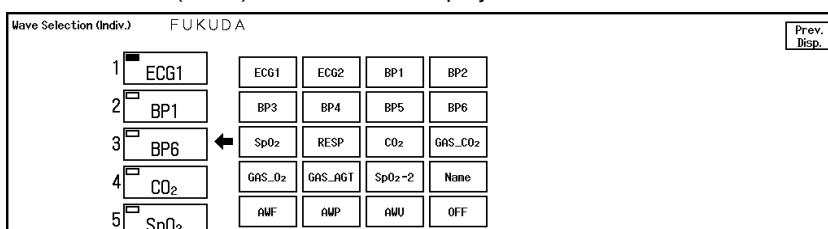
REFERENCE

- Maximum of 5 waveforms can be displayed on the individual bed display.



1 Press one of the keys under "Waveform Selection".

- ▶ The "Wave Selection (Indiv.)" screen will be displayed.



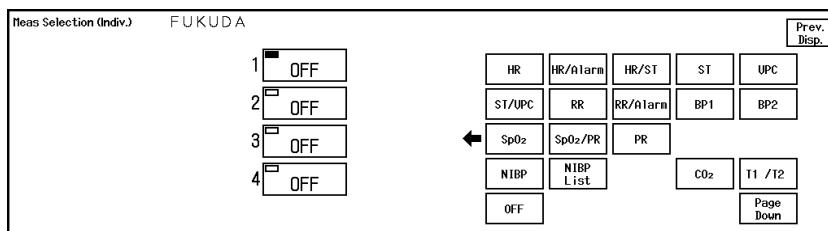
2 Select the displaying position from the key on the left.

3 Select the parameter from the list on the left.

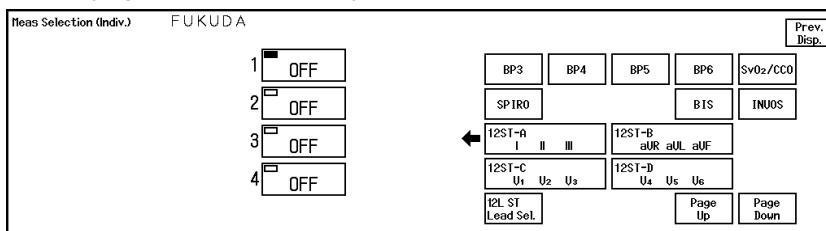
4 Press the [Prev. Disp.] key.

5 Select the numeric data to be displayed on the individual bed display.

- 1** Press one of the keys under "Measurement Selection".
 ▶ The "Meas Selection (Indiv.)" screen will be displayed.



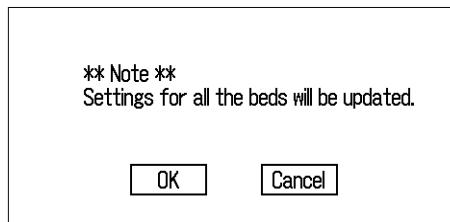
- 2** Select the displaying position from the key on the left.



- 3** Switch the pages using the [Page Down]/[Page Up] keys.
4 Select the parameter from the list on the left.
5 Press the [Prev. Disp.] key.

- 6** To set the same display layout for all beds, press the [All Beds] key on the lower right.

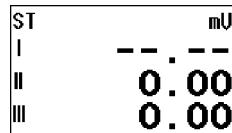
- ▶ A confirmation message will be displayed.
 ▶ The numeric data display layout setting will be also applied to all beds.



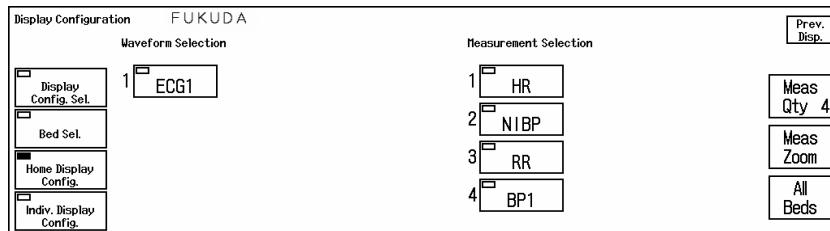
- 7** Press the [OK] key.

12-Lead ST Lead Selection

When monitoring 12-lead waveform, ST value of 3 leads can be displayed inside the ST numeric data box.
 4 types of lead combination (A, B, C, D) can be registered.
 The registered combination will be applied for both home display and individual bed display.



- 1** Press the [Home Display Config.]/[Indiv. Display Config.] key on the "Display Configuration" screen.
 ▶ The "Display Configuration" screen for the home display/individual bed display will be displayed.



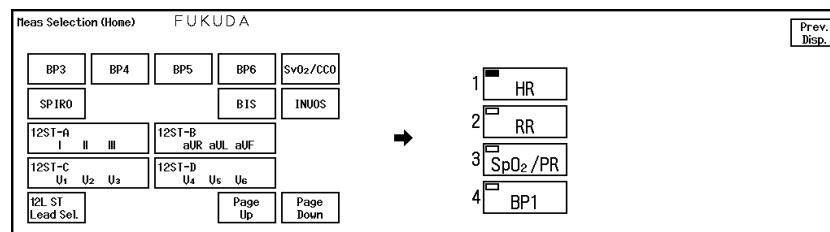
"Display Configuration" Screen for the Home Display

2 Press one of the keys under "Measurement Selection".

- ▶ The "Meas Selection (Home)" screen or "Meas Selection (Indiv)" screen will be displayed.

3 Press the [Page Down] key.

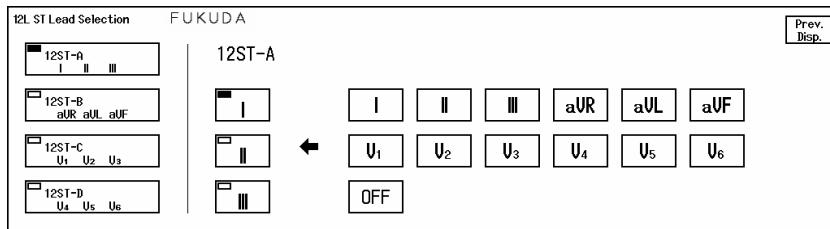
- ▶ The "Meas Selection (Home)" screen or "Meas Selection (Indiv.)" screen will be displayed.



"Meas Selection (Home)" Screen/2nd Page

4 Press the [12L ST Lead Sel.] key.

- ▶ The "12L ST Lead Selection" screen will be displayed.



5 Register the leads for 4 groups.

- 1 Select the group (A to D) to register from left side of the screen.
- 2 Select the lead display position (upper, middle, lower) from the keys on the middle of the screen.
- 3 Select the lead from the right side of the screen to display for each position.

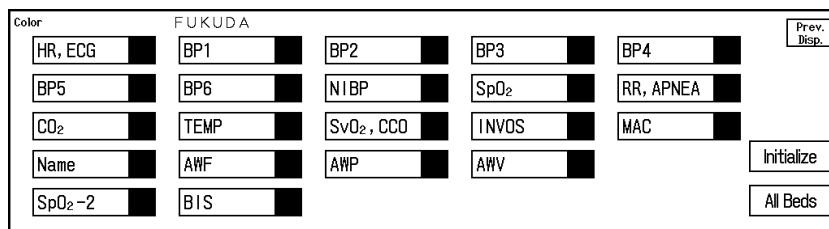
Color

The colors of the displaying waveform, numeric data and patient name can be set.

To Change the Setting:

- 1** Select the patient to perform the color setup by pressing the bed selection area.
- 2** Press the [Menu], [System Config.], [Color] keys.

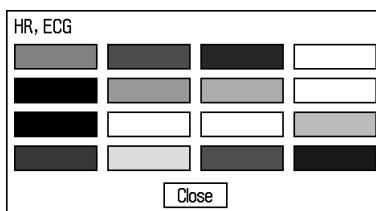
► The "Color" setup screen will be displayed.



- 3** Select a color.

1 Press the key for each parameter.

► The color selection window will be displayed.



- 2** Select the color.

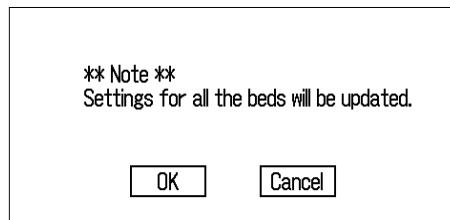
► The selected color will be applied to the parameter and returns to the "Color" screen.

REFERENCE

- ♦ The color assigned for [Name] will be applied to the patient name displayed on the home display and individual bed display.

- 4** To set the same color setting for all beds, press the [All Beds] key on the lower right.

► A confirmation message will be displayed.



- 5** Press the [OK] key.

To Initialize the Setting:

1 Press the [Initialize] key.

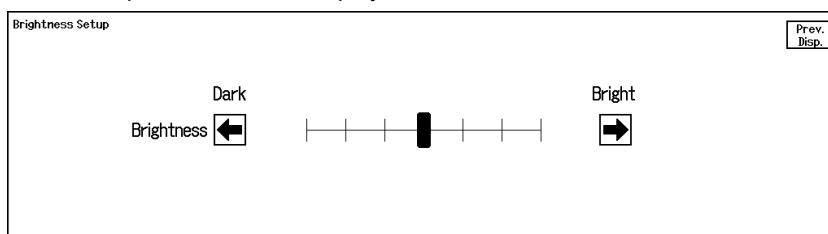
- ▶ The color setting will be initialized.

Brightness

The brightness of the display can be adjusted.

1 Press the [Menu], [System Config.], [Brightness Setup] keys.

- ▶ The "Brightness Setup" screen will be displayed.



2 Press \leftarrow/\rightarrow to adjust the brightness.

- ▶ The display brightness will be adjusted.

REFERENCE

- The brightness can be also adjusted by directly pressing on the bar.

Tone / Volume

The volume and tone of the alarm sound, heartbeat sound, key sound can be set.

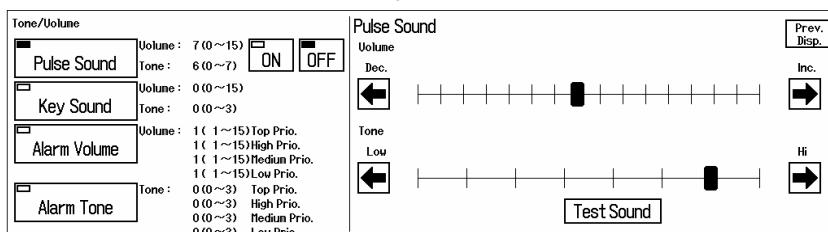
The same setting will be applied to all beds.

WARNING

- Do not set the alarm volume too low. If the alarm volume is too low, alarm occurrence may not be recognized.

1 Press the [Menu], [System Config.], [Tone/Volume] keys.

- ▶ The "Tone/Volume" setup screen will be displayed.



2 Set the volume and tone for pulse sound, key sound.

- 1 Press the [Pulse Sound]/[Key Sound] key.
- 2 For [Pulse Sound], select [ON] or [OFF].
- 3 Press **◀/▶** to adjust the volume.
- 4 Press **◀/▶** to adjust the tone.
- 5 Press the [Test Sound] key to check the adjusted sound.

REFERENCE

- The volume/tone can be also adjusted by directly pressing on the bar.

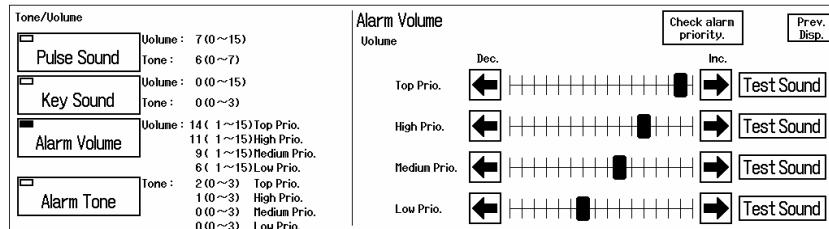
3 Set the alarm volume.

CAUTION

- The alarm volume level will be always in the order of alarm priority, top, high, medium, low. For example, the alarm volume for top priority alarm will be always larger than high priority alarm.

REFERENCE

- The alarm volume for top priority alarm can be set only when the alarm system is in FUKUDA DENSHI mode.
- The adjustable range of minimum alarm volume is pre-set on the alarm related setup. ( Maintenance Manual "Alarm Related Setup" P6-16)

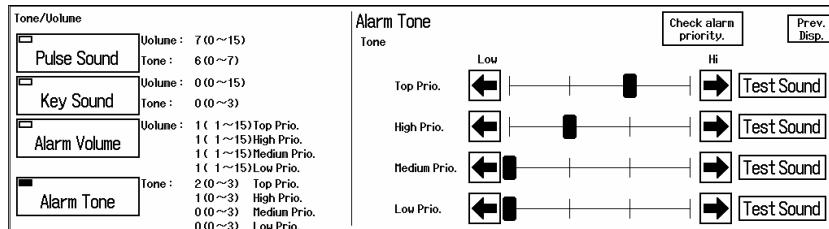


- 1 Press the [Alarm Volume] key.
- 2 Press **◀/▶** to adjust the volume for each alarm priority.
- 3 Press the [Test Sound] key to check the adjusted sound.

4 Set the alarm tone.

NOTE

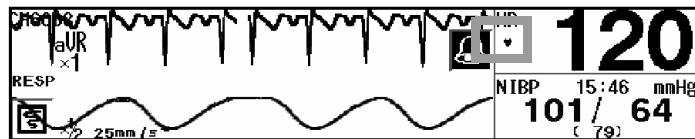
- When the alarm system is IEC, a password is required to display this screen.



- 1 Press the [Alarm Tone] key.
- 2 Press **◀/▶** to adjust the tone for each alarm priority.
- 3 Press the [Test Sound] key to check the adjusted sound.

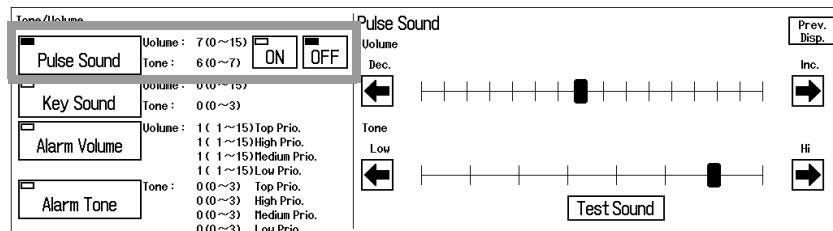
□ Synchronized Tone/Mark

On the home display or individual bed display, a mark synchronized to the heartbeat or pulse can be displayed and synchronized tone can be generated.



The following settings can be performed for synchronized tone generation and synchronized mark display.

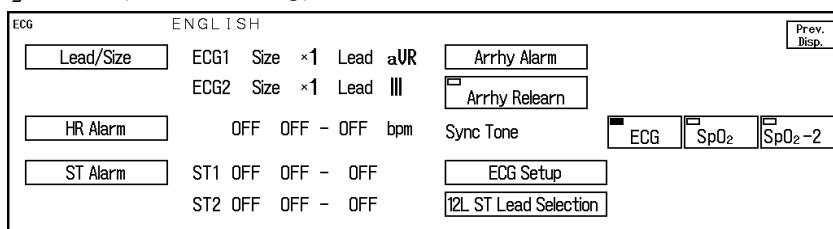
- ♦ "Tone/Volume" Screen (System Configuration)



Pulse Sound: ON/OFF

Whether to generate the pulse sound or not (ON/OFF) can be selected, and volume/tone can be adjusted.

- ♦ "ECG", "SpO₂" Screen (Parameter Setup)

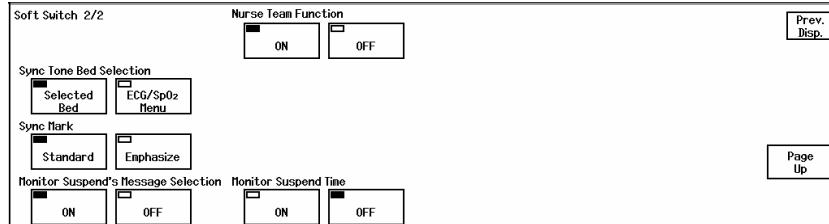


"Sync Tone": Synchronized tone can be selected from ECG, SpO₂-1, SpO₂-2, or OFF.

REFERENCE

- ♦ [OFF] for "Sync Tone" will be displayed when [ECG/SpO₂ Menu] is set for "Sync Tone Bed Selection" on the "Soft Switch" screen.

- ♦ "Soft Switch" Screen (Pre-Set Menu)



Sync Tone Bed Selection: [Selected Bed] / [ECG/SpO₂ Menu]

Sync Mark: [Standard] / [Emphasize]

(Maintenance Manual "Soft Switch" P6-8)

If [Selected Bed] is set for "Sync Tone Bed Selection":

- ♦ Sync Tone

The synchronized tone for the currently selected bed will be generated.

(The bed for individual bed display, or the bed with the waveform area outlined in light blue on the home display.)

- ♦ Synchronized Mark

[Standard] will display the synchronized marks for all beds in red.

[Emphasize] will emphasize the mark for the bed generating the synchronized tone in red. The marks for other beds will be displayed in a color set for that parameter.

If [Selected Bed] is set for "Sync Tone Bed Selection":

- ♦ Sync Tone

The synchronized tone for the bed which ECG or SpO₂ is selected for "Sync Tone" on the ECG or SpO₂ menu will be generated. The bed to generate the synchronized tone will be fixed to one bed.

- ♦ Synchronized Mark

[Emphasize] will be automatically set.

NOTE

- ♦ The preset menu should be set by our service representative or system administrator before starting monitoring.

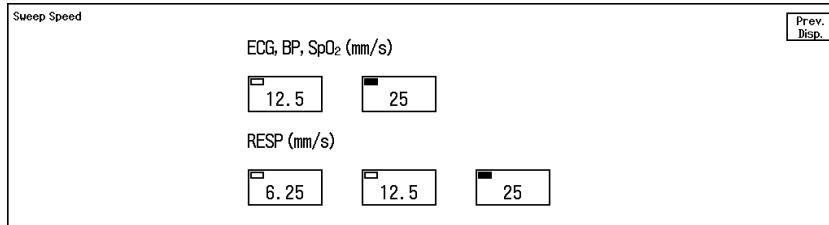
Sweep Speed

The sweep speed of the displayed waveform can be set. The sweep speed can be set separately for ECG/BP waveform and respiration waveform.

The same setting will be applied to all beds.

1 Press the [Menu], [System Config.], [Sweep Speed] keys.

- The "Sweep Speed" screen will be displayed.



2 Select the ECG/BP/SpO₂ sweep speed (mm/s) from [12.5]/[25].

3 Select the RESP sweep speed (mm/s) from [6.25]/[12.5]/[25].

REFERENCE

- ♦ The respiration waveform includes CO₂, O₂, AGT, AWF(SPIRO), AWP(SPIRO), AWV(SPIRO).

Monitor Suspend Setup

During monitoring suspend condition, different messages in different colors according to the patient's destination can be displayed.

This can be set only when "Monitor Suspend's Message Selection" on the "Soft Switch" is set to [ON].

NOTE

- The preset menu should be set by our service representative or system administrator before starting monitoring.
([Maintenance Manual "Soft Switch" P6-8](#))

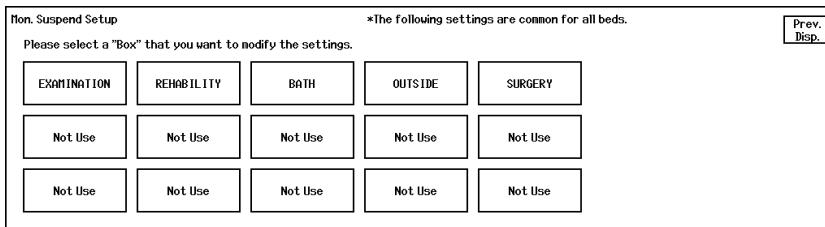
REFERENCE

- ON/OFF of monitor suspend timer function can be selected on the "Soft Switch" screen.

1

Press the [Menu], [System Config.], [Mon. Suspend Setup] keys.

► The "Mon. Suspend Setup" screen will be displayed.



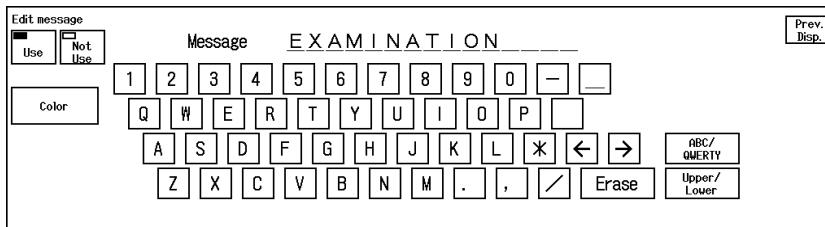
REFERENCE

- Maximum of 15 monitor suspend messages can be set.

2

Select the key to edit the monitor suspend message.

► The "Edit message" screen will be displayed.



- 1 Press [Use] or [Not Use] key, to select whether to use this message or not.
- 2 Use the touch panel keys or keyboard to enter the patient name up to 15 characters.
- 3 Press the [Color] key to set the background color of the message.

- ▶ The "Color" selection window will be displayed.



3 Select the color.

- ▶ The "Color" selection window will close.
- ▶ The background of the monitor suspend message will be displayed in the selected color.

Nurse Team Setup

To easily recognize the patients for each nurse team, the displayed colors on the home display and individual bed display can be changed according to the nurse team.

(☞ "To Select the Nurse Team" P5-10)

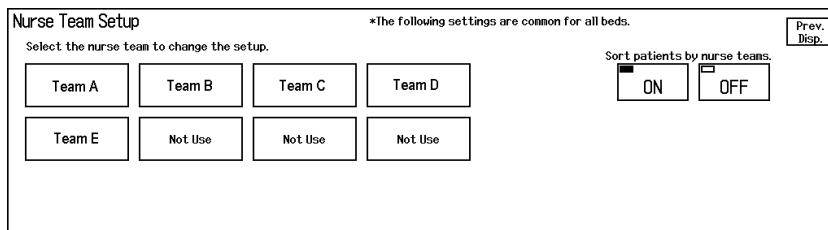
When the nurse team is changed, the displayed order of patients can be rearranged according to the nurse team. This can be set only when "Nurse Team Function" on the "Soft Switch" is set to [ON].

NOTE

- The preset menu should be set by our service representative or system administrator before starting monitoring.
- (☞ "Soft Switch" P6-8)

1 Press the [Menu], [System Config.], [Nurse Team Setup] keys.

- ▶ The "Nurse Team Setup" screen will be displayed.



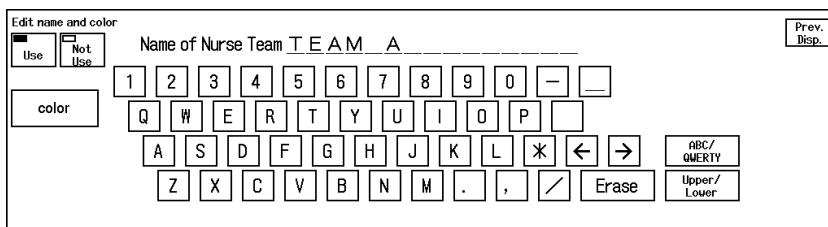
2 Set the name and displaying color of the nurse team.

REFERENCE

- Maximum of 8 nurse teams can be set.

1 Select the key to edit the nurse team name.

- ▶ The "Edit name and color" screen will be displayed.



- 2** Select from [Use] or [Not Use].
- 3** Use the touch panel keys or keyboard to enter the nurse team name up to 15 characters.
- 4** Press the [Color] key to set the color for each nurse team.
 - ▶ The "Color" selection window will be displayed.



- 5** Select the color.
 - ▶ The "Color" selection window will close.

REFERENCE

- ♦ The waveform area for the patient of each nurse team will be displayed in set color.
-

- 6** Press the [Prev. Disp.] key.
 - ▶ The "Nurse Team Setup" screen will be displayed.
- 3** Select ON/OFF for "Sort patients by nurse teams.".
 - ▶ [ON]: When the nurse team is changed on the "Admit/Discharge" screen, a confirmation message to sort the patients will be displayed.
 - ▶ [OFF]: When the nurse team is changed on the "Admit/Discharge" screen, a confirmation message to sort the patients will not be displayed.

Chapter 11 Troubleshooting

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Chapter 11 Troubleshooting

This section explains the troubleshooting for each case.

Other than the troubles stated below, troubles of the bedside monitor, telemetry transmitter, or other device can be considered.

Refer also to the operation manual of those devices.

Wired Network, TCP/IP Network

- The waveforms and numeric data for the wired network beds are not displayed.

Cause 1

The central ID is duplicated.

Solution

Make sure to set a unique central ID for each central monitor. Set the ID in the range from 1 to 8 for DS-LANII, and 1 to 16 for DS-LANIII network.

(☞ Maintenance Manual "Central ID or Room ID Setup (DS-LANII/III)" P3-13)

Cause 2

The DS-LAN setup is not correct.

Solution

Make sure that the DS-LAN Setup (DS-LANII/DS-LANIII) for all bedside monitors and central monitors in the same network are the same. If the DS-LAN setting is changed, make sure to restart the system.

(☞ Maintenance Manual "DS-LAN Setup (DS-LANII/III)" P3-12)

Cause 3

A HUB not compatible to wired network is used.

Solution

Use a 10Base repeater HUB for DS-LANII network and a recommended switching HUB for DS-LANIII network.
Do not confuse the HUB for DS-LAN and TCP/IP network.

Cause 4

A central monitor which is not compatible with the DS-LANIII network is used.

Solution

The following central monitors can not be used with the DS-LANIII network.

- ♦ DS-5700
- ♦ DS-5800N/NX/NX^{MB}
- ♦ DS-7600/7600W with software version V05 and prior

When using these central monitors, all monitors in the same network should be set to DS-LANII.

Cause 5

On the DS-LANII network, DS-5800 is set as the network-administrating monitor.

Solution

In case of DS-LANII network, it is necessary to set DS-7700, DS-7600 system or DS-5700 as the network-administrating monitor.

Cause 6

DS-LAN Cable (Ethernet branch cable or connection cable) is not correctly connected.Or, the wire is broken.

Solution

Check if DS-LAN cable is properly connected.Or, replace the DS-LAN cable.

Cause 7

The network connecting device is malfunctioning.

Solution

Replace the device.

Telemetry, TCON

The waveform transmission is often interrupted.

Cause 1

A low battery mark "█" is displayed in the waveform display area for the telemetry receiving bed.

Solution

Replace the transmitter battery with a new one.

Cause 2

The patient is located too far from the receiver antenna.

Solution

Make sure that the patient is located within the receiving area.

Cause 3

There is a metallic obstruction (elevator, door, etc.) between the transmitter and receiver.

Solution

Try to prevent metallic obstruction between the transmitter and receiver.

A noise is interfering on the waveform, and the waveform suddenly changes.

Cause 1

[OFF] is selected for the AC filter.

Solution

Select [ON] for the "AC Filter" on the "ECG Setup" screen.

Cause 2

The AC filter frequency is not selected correctly.

Solution

Set the correct frequency ([50Hz] or [60Hz]) for "AC Filter" on the "Soft Switch" screen.

Cause 3

[OFF] is selected for the ECG drift filter.

Solution

Select [ON] for "Drift Filter" on the "ECG Setup" screen.

Cause 4

A transmitter with the same channel ID is used nearby. Or, a transmitter with a channel ID of close frequency is

used nearby.

Solution

Stop using the other transmitter.

The waveform is not transmitted or displayed.

Cause 1

The bed is TCON bed.

Solution

The waveform cannot be displayed for the TCON bed.

Cause 2

The antenna cable is disconnected.

Solution

Connect the antenna cable securely.

Cause 3

The battery is installed with opposite polarity.

Solution

Verify the (+) (-) direction of the battery and install correctly.

Cause 4

The battery of the transmitter is depleted.

Solution

Replace the transmitter battery with a new one.

Cause 5

The channel setup is not correct.

Solution

The antenna connection and receiver setup should correspond.

Interference waveform() is displayed.

Cause 1

The group ID of the transmitter and this unit does not match.

Solution

Set the correct group ID.

Cause 2

A transmitter with an interfering channel ID is used nearby.

Solution

Use the transmitter with a channel ID that does not interfere.

TCON data cannot be received. Nothing is displayed in the "TCON" area of the "Bed Register" screen under the "Pre-Set Menu".

Cause 1

The Bidirectional Wireless Communications Module is not connected to the bedside monitor.

Solution

Check the connection. If not properly connected, securely connect it.

Cause 2

The TCON port (COM1/2/3) set on the serial communication setup menu and the port for TCON connection differ.

Solution

Check if the port for TCON connection and the port on the serial communication setup menu are the same. If not, set it correctly.

Cause 3

The TCON group between the DS-7700 and the bedside monitor is different.

Solution

If the group is different between the units, TCON communication cannot be performed. Set it so that TCON group is the same.

Cause 4

The distance between this unit and the bedside monitor is too far. Or, some obstruction is in between and transmission is cut off.

Solution

Install this unit and the bedside monitor so that the distance in between is within 50m. Try to prevent metallic obstruction between the transmitter and receiver.

Cause 5

The base station is not set.

Solution

To construct the TCON System, a base station must be set. Set this unit or another central monitor (DS-7600, DS-7700) for the base station. If another central monitor is set as the base station, set this unit as the remote station.

Cause 6

TCON ID is set as [TCON OFF].

Solution

Select [C1] for the base station and [C2] for the remote station.

A certain parameter cannot be displayed.

Cause 1

When the TCON Mark  is displayed, a communication error between this unit and the bedside monitor can be considered, or if this unit is the remote station, a communication error with the base station can be considered.

Solution

Improve the communication status.

The NIBP measurement of the TCON bed cannot be performed from this unit. Or, Night Mode cannot be set.

Cause 1

When the TCON Mark  is displayed, a communication error between this unit and the bedside monitor can be considered, or if this unit is the remote station, a communication error with the base station can be considered.

Solution

Improve the communication status.

Cause 2

If the bed uses wireless telemetry and TCON (RF+T, LW+T), poor reception can be considered.

Solution

Improve the communication status of the telemeter.

 Registration of channel ID fails.**Cause 1**

Only a medical telemetry channel ID can be registered.

Solution

Make sure to register a medical telemetry channel ID.

Cause 2

There are two frequency bands (MHz and GHz) for the medical telemetry channel ID, and the range of channel ID is different for each frequency band.

Solution

Make sure to register the channel ID corresponding to the selected frequency band.

Bed Register

 A bed cannot be selected on the "Bed Register" screen.**Cause**

The remaining displayable bed is 0.

Solution

The maximum numbers of beds that can be registered are 16 beds.

 The bed is wired network bed, and the bed ID or channel ID is not displayed.**Cause 1**

The wired network setup is incorrect.

Solution

Check the wired network connection.

Cause 2

The DS-LAN setup is not correct.

Solution

Make sure that the "DS-LAN Setup" (DS-LANII/DS-LANIII) under "Pre-Set Menu" is correctly set.

Cause 3

The central ID, room/bed ID is incorrect.

Solution

Check if the central ID, room/bed ID of this unit and the monitors connected to the DS-LANII/DS-LANIII are not duplicated. If duplicated, set the correct ID.

□ The room ID and bed ID of the TCON bed are not displayed.

Cause 1

The TCON setting is incorrect.

Solution

Check the settings of this unit and TCON within the TCON System.

Cause 2

A communication error between this unit and the bedside monitor can be considered, or if this unit is the remote station, a communication error with the base station can be considered.

Solution

Improve the communication status. The communication status with the base station can be verified via the TCON Mark such as  or .

□ The bedside channel ID of the TCON bed is displayed in gray.

Cause

A bed with the channel ID displayed in gray is registered as TCON telemetry bed (RF+T, LW+T).

Solution

When setting it as TCON bed, cancel the registration, or change the channel on the Telemeter Setup under the Pre-Set menu.

Alarm

□ Alarm does not generate. Alarm is not displayed.

Cause 1

Alarm is suspended.

Solution

Cancel the [Alarm Suspend] selection on the "Menu" screen.

Cause 2

Alarm is silenced.

Solution

Press the [Resume All Alm. Sound] on the "Menu" screen.

Cause 3

Alarm setup for the parameter is set to [OFF].

Solution

On the alarm setup menu for the corresponding parameter, set the alarm [ON].

Cause 4

The alarm threshold level is not set for the parameter.

Solution

Set the upper/lower alarm threshold level on the alarm setup menu for the corresponding parameter.

Alarm does not generate.

Cause

Alarm sound is suspended.

Solution

When the alarm sound is suspended on the DS-8500 system, the alarm sound will be also suspended on this central monitor.

The alarm sound on this central monitor will resume when the alarm sound on the DS-8500 system resumes.

Check ON/OFF setting of "Link 'Alarm Sound Suspend' Setting" on the "Alarm Related Setup" under the "Pre-Set" menu.

(☞ Maintenance Manual "Alarm Related Setup" P6-16)

Alarm sound is difficult to recognize.

Cause 1

The volume of the alarm sound is too low.

Solution

If the alarm sound is set too low, the sound may be hard to recognize. On the [Tone/Volume] screen, increase the alarm volume.

Cause 2

Alarm is silenced.

Solution

Press the [Resume All Alm. Sound] on the "Menu" screen.

Arrhythmia alarm does not generate. Arrhythmia alarm is not displayed.

Cause 1

Alarm is suspended.

Solution

Cancel the [Alarm Suspend] selection on the "Menu" screen.

Cause 2

The arrhythmia alarm is set to OFF .

Solution

On the "Arrhythmia Alarm" screen, select [ON] for the alarm of the corresponding arrhythmia.

Cause 3

The arrhythmia alarm is not supported for that bedside monitor.

Solution

Use the bedside monitor which supports the arrhythmia alarm.

The alarm for Slow VT, Couplet, Pause, Trigeminy, Tachy, Brady cannot be set.

Cause

The DS-LANII network is used.

Solution

Use the DS-LANIII network.

NOTE

- These arrhythmia alarm will not be monitored on this unit for the DS-LANII network bed

(BED, LW). Alarm setup and display for these arrhythmia are not possible.

□ The "Cannot analyze" message is displayed.

Cause

A noise is interfering on the ECG and arrhythmia analysis is suspended for more than 30 seconds. The "Cannot analyze" alarm generates when "Suspend Arrhy. Analysis during Noise Interference" under "Alarm Related Setup" ("Pre-Set Menu") is set to [ON], and the arrhythmia analysis is suspended for more than 30 seconds.

Solution

Check the electrode attachment, and remove the noise source.

- ♦ Check if electrodes and lead cables are properly attached.
- ♦ Replace the electrode, lead cable if defective.
- ♦ If any noise source is near the patient, locate it away from the patient as much as possible.
- ♦ If EMG is interfering, change the electrode site to a location where EMG will less likely to interfere.

□ The "ECG Artifact" message is displayed.

Cause

- ♦ The electrode contact is poor.
- ♦ Electrical blanket or other noise source is near the patient.
- ♦ EMG is interfering.

Solution

Check the electrode attachment, and remove the noise source.

- ♦ Check if electrodes and lead cables are properly attached.
- ♦ Replace the electrode, lead cable if defective.
- ♦ If any noise source is near the patient, locate it away from the patient as much as possible.
- ♦ If EMG is interfering, change the electrode site to a location where EMG will less likely to interfere.

□ The "ECG Low" message is displayed.

Cause

The electrode contact is poor, or the noise is interfering and the ECG amplitude is 0.25mV or below for the waveform size of x1, x1/2, x1/4, and 0.15mV or below for the waveform size of x2, x4. The amplitude is too low and out of range of QRS detection.

Solution

Check the electrode attachment, and remove the noise source.

- ♦ Set the appropriate waveform size.
- ♦ Check if electrodes and lead cables are properly attached.
- ♦ Replace the electrode, lead cable if defective.
- ♦ If any noise source is near the patient, locate it away from the patient as much as possible.
- ♦ If EMG is interfering, change the electrode site to a location where EMG will less likely to interfere.

□ Alarm generated on the bedside monitor can not be silenced or suspended from this unit.

Cause

[OFF] is selected for "Alarm Silence, Alarm Suspend from Central" on the "Alarm Related Setup" ("Pre-Set Menu").

Solution

Select [ON].

- HR alarm, PR alarm does not generate. [ON] can not be selected for the alarm setting.

Cause

The alarm for the parameter not selected for the "HR/PR Alarm Source" (ECG/SpO₂/BP) on the bedside monitor will be automatically set to OFF on this unit.

Display

- A certain parameter cannot be displayed.

Cause 1

The parameter is not set to be displayed on the bedside monitor.

Solution

Set the parameter to be displayed on the bedside monitor.

Cause 2

The parameter is set to [OFF] on the "Parameter ON/OFF" screen.

Solution

On the "Parameter ON/OFF" screen, select [ON] for the parameter to be displayed.

- Waveform and numeric data for certain bed cannot be displayed.

Cause 1

If using the wired network system, there is no central monitor with the central ID 001.

Or, the central ID is duplicated

Solution

The central monitor with the central ID: 001 will function as a network-administrating monitor and controls the whole network segment. One of the central monitors must have the central ID: 001 in a network system. Also, the central ID must not be duplicated among the central monitors.

Cause 2

The channel ID is not correct.

Solution

Set the correct channel ID on the "Channel Setup" screen under the "Pre-Set Menu".

Cause 3

Monitoring is suspended for that bed.

Solution

Press the [Resume] key and resume monitoring for that patient.

Cause 4

A low battery mark "" is displayed in the waveform area for that bed.

Solution

Replace the transmitter battery with a new one.

Cause 5

The bed is not selected on the "Display Configuration".

Solution

Select the bed on the "Display Configuration".

Cause 6

The waveform is not selected for the home display or the individual bed display on the "Display Configuration".

Solution

Select the waveform to be displayed on the home display or individual bed display on the "Display Configuration".

Cause 7

The bedside monitor is not properly connected to the DS-LANII/DS-LANIII network.

Solution

Connect using the Ethernet branch cable (CJ-522) or LAN interface cable (CJ-530).

Cause 8

The software version of the telemetry receiver does not correspond.

Solution

Refer to our service representative.

- The waveform/numeric data for particular bed are not displayed on the DS-5800N/NX/NX^{MB} connected to the DS-LANII network.

Cause

3 or more DS-5800N/NX/NX^{MB} are used.

Solution

For the DS-5800N/NX/NX^{MB} Central Monitor, the same patient data (both home display and individual bed display) cannot be displayed simultaneously on 3 monitors. Adjust the bed selection so that the same patient is selected on maximum of two DS-5800N/NX/NX^{MB} Central Monitors.

- The measurement data is displayed as "---".

Cause

The data is outside the measurement range.

Solution

Check the cable connection status for that parameter.

- ♦ For ECG, RESP: check the electrode attachment.
- ♦ For BP: perform BP zero balance.

- Artificial pacemaker is not displayed.

Cause 1

[Not Used] is selected for "Pacemaker" on the "Admit/Discharge" screen.

Solution

Select [Used] for "Pacemaker" on the "Admit/Discharge" screen.

Cause 2

"Pace Pulse" is set to [OFF] on the "ECG Setup" screen.

Solution

Select [ON] or [Distinct Color] for "Pace Pulse" on the "ECG Setup" screen.

- The heart rate is not counted, and the "Chk Electrode" message and  mark is displayed.

Cause

The electrode of the displayed lead type is detached, or is not making good electrical contact with the skin. If the lead type is not displayed, 2 or more electrodes are detached.

Solution

- ♦ Check the electrode application.
- ♦ Replace the electrode, or check the lead cable.

- The ECG waveform and HR are not displayed.

Cause

[BP] is selected for HR alarm source on the bedside monitor.

Solution

Select [HR]/[SpO₂] for HR alarm source.

- ST waveform and measurement data are not displayed.

Cause

ST measurement was cancelled as the arrhythmia learning has started.

Solution

After the arrhythmia learning, set the reference waveform again on the "ST Display" screen.

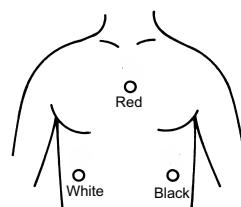
- The "CVA detected" message is displayed.

Cause

Heartbeat is interfering and superimposed on the respiration waveform.

Solution

Place the electrode as shown below where the heartbeat will be less likely to interfere.



- "0" is displayed for respiration rate, or apnea alarm is generated.

Cause

The amplitude of the respiration waveform is low. It is below the detection level of 0.2 ohm.

Solution

Change the electrode site.

❑ The pulse waveform is not displayed. The "Chk SpO₂ sensor" message is displayed.

Cause 1

The sensor is detached from the patient.

Solution

Check if the sensor is properly attached to the patient.

Cause 2

The amplitude of the pulse waveform is too low, or the sensor is not positioned correctly.

Solution

Check if the light emitting part and light receiving part of the sensor LED is aligned.

Cause 3

The sensor is defective.

Solution

Replace the sensor.

Cause 4

SpO₂ sensor is not firmly connected to the SpO₂ input connector.

Solution 1

Make sure the SpO₂ sensor is securely connected.

Solution 2

If the LX-5630 or LX-7230 transmitter is used and SpO₂ measurement is not necessary, press the [Alarm Silence] key to clear the "Chk SpO₂ sensor" message.

Cause 5

Sensor is exposed to light.

Solution

Place a black or dark cloth over the sensor to avoid direct sunlight. When not used, avoid placing the sensor in light or unplug the sensor from the connector.

❑ The BP numeric data, BP waveform, NIBP numeric data are not displayed.

Cause

The BP unit (mmHg/kPa) is different between the bedside monitor and the central monitor.

Solution

If the BP unit (mmHg/kPa) is different between the bedside monitor and central monitor, BP numeric data, NIBP numeric data, NIBP list will not be transmitted from the bedside monitor. It will be treated as not measured data, and will not be displayed on this unit. Alarm limit setup on this unit cannot be performed either. Set the same unit for bedside monitor and central monitor.

❑ The temperature numeric data is not displayed.

Cause 1

The temperature unit (°C/°F) is different between the bedside monitor and central monitor.

Solution

If the temperature unit is different between the bedside monitor and central monitor, the temperature data will not be transmitted from the bedside monitor. It will be treated as not measured data, and will not be displayed on this unit. Alarm limit setup on this unit cannot be performed either. Set the same unit for bedside monitor and central monitor.

Cause 2

The temperature unit °F is set on the bedside monitor connected to the DS-LANII .

Solution

When the temperature unit °F is set on the bedside monitor connected to the DS-LANII network, temperature data will not be transmitted from the bedside monitor. It will be treated as not measured data, and will not be displayed on this unit. Alarm limit setup on this unit cannot be performed either. When the DS-LANII network is used, set the temperature unit to °C on the bedside monitor.

- The BP measurement data is displayed as "---" .

Cause

The BP zero balance has not been performed since the power is turned ON.

Solution

Open the three-way valve of the transducer to air and perform zero balance.

- The NIBP numeric data is displayed as "---" .

Cause 1

The measurement accuracy is not reliable due to body motion artifact.

Solution

During the measurement, have the patient stay still as much as possible.

Cause 2

The pulse is too small to acquire reliable measurement accuracy.

Solution

Check if the cuff application is proper, and if the cuff size is corresponded to the selected patient type.

- The CO₂ is measured on the bedside monitor, but the waveform and numeric data are not displayed on this unit.

Cause 1

The software version of the HLX-561 Telemetry Transmitter on the bedside monitor is V01-07 or prior.

Solution

Update the HLX-561 software version.

Cause 2

CO₂ is measured on the DS-5400 Bedside Monitor with the software version V03-02 or prior.

Solution

Update the DS-5400 software version.

Cause 3

CO₂ is measured on the DS-5300 Bedside Monitor.

Solution

The DS-5300 is not capable to transmit the CO₂ data.

Use other bedside monitor which can transmit the CO₂ data.

Recorder

- The "Paper Out" message is displayed.

Cause

The paper cassette is empty.

Solution

Install a new pad of paper into the cassette.

- The "Check Magazine" message is displayed.

Cause 1

The paper cassette is open.

Solution

Close the cassette until it locks into place with a click sound.

Cause 2

The paper is jammed inside the cassette.

Solution

Open the cassette, and install the paper properly.

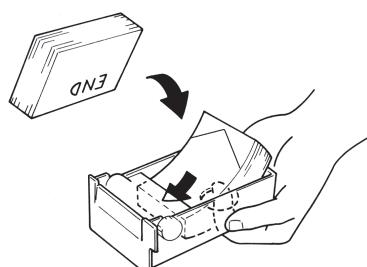
- The "Paper Out" and "Check Magazine" message is not displayed, but recording cannot be performed.

Cause

The recording paper is not correctly installed. The front and backside of the paper is set oppositely.

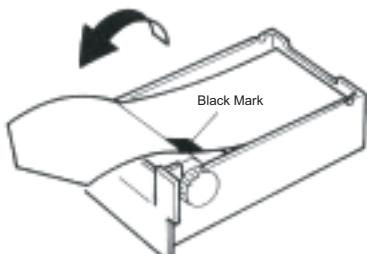
Solution

The side with "END" printed is the backside of the recording paper. Face the "END" mark down in the cassette.



Solution2

Place the paper so that the thermal printing side (side with black mark) is facing top.



The "Paper Jam" message is displayed.

Cause

The paper is jammed.

Solution

Open the cassette, and install the paper properly.

The recorder paper cassette does not open even though the cassette release button is pressed.

Cause

The recording paper has come off the paper feed roller inside the cassette.

Solution

- 1 Turn off the power of the monitor.
- 2 While pressing the cassette release button, use a Phillips-head screwdriver to lightly lift up the recorder and pull out the cassette.
- 3 Properly set the recording paper inside the cassette, and turn ON the power of the monitor.
- 4 Cut the recording paper along the perforated line.

The ECG waveform is recorded, but the second and third waveforms are not recorded.

Cause

The second and third waveform are not set on the recording setup.

Solution

Set the second and third waveform for manual, alarm, periodic recording on the corresponding recording setup screen.

Alarm recording does not function.

Cause 1

The alarm recording mode is set to OFF.

Solution

On the "Alarm Record" screen (under "Record", "System Configuration"), select [ON] for "Alarm Record". Also, set the second and third waveform for recording and the alarm factor to generate the alarm recording.

Cause 2

Alarm is set to OFF for the parameter.

Solution

On the alarm setup menu for the corresponding parameter, set the alarm [ON]. Also, set the upper and lower alarm limit.

Periodic recording does not function.

Cause

The periodic recording mode is set to OFF.

Solution

On the "Periodic Record" screen (under "Record", "System Configuration"), select [ON] for "Periodic Record". Also, set the second and third waveform for recording along with recording time/interval.

□ Telemetry remote recording does not function.**Cause 1**

The event button on the transmitter such as LX-5160 is not pressed long enough to transmit the signal to this unit.

Solution

Press the event button for more than 3 seconds.

Cause 2

The telemetry remote recording function is set to [OFF].

Solution

Select [ON] for "LX Remote Rec." on the "Recorder Setup" under "Pre-Set Menu".

□ Remote recording does not function.**Cause**

A recorder is equipped on the bedside monitor.

Solution

Perform the recording on the bedside monitor. If a recorder is equipped on the bedside monitor, telemetry remote recording will not function.

□ The "Check Recorder" message is displayed.**Cause**

The thermal head temperature has increased.

Solution

A damage to the thermal head can be considered. Refer to our service representative.

Laser Printer

□ The data is not output to the laser printer.**Cause 1**

The paper cassette is not firmly closed.

Solution

Close the paper cassette.

Cause 2

The paper cassette is empty.

Solution

Install the recording paper in to the paper cassette.

Cause 3

Printer cable is disconnected.

Solution

Connect the printer cable.

Cause 4

Printer is set to offline mode.

Solution

Set the printer mode to online mode.

Cause 5

Breakdown of the HUB has occurred.

Solution

Check the LED on the HUB if it is properly communicating. If the LED is not lighted, contact our service representative.

Cause 6

Other monitor is in process of recording.

Solution

Suspend the ongoing recording or wait until the recording is complete.

Cause 7

The network setup for the laser printer is not performed.

Solution

Refer to our service representative.

Cause 8

The MAC address, IP address setting of the printer is incorrect.

Solution

Set the correct MAC address, IP address and restart the printer.

Cause 9

The network board of the laser printer is malfunctioning.

Solution

Check if any error message or error code is displayed on the printer LCD. If an error message is displayed, contact our service representative.

Data transfer error to the printer has occurred.

Cause 1

Printer cable is disconnected.

Solution

Connect the printer cable.

Cause 2

Printer is set to offline mode.

Solution

Set the printer to online mode.

□ Printer output does not stop.

Cause

Printing operation was performed too frequently.

Solution

Wait until the recording is complete. Or, deleted the stacked data. Do not turn off the power of the printer during recording as it may cause a printing error.

□ The printed output is incomplete or frame only.

Cause 1

The recorder cover or paper cassette was opened during recording, or the printer was left out of paper for a certain time.

Solution

Do not open the recorder cover or paper cassette during recording. Also, supply new pad of paper immediately when the paper is out.

Cause 2

The system was restarted during recording.

Solution

Do not restart the system during recording.

□ Printer output is garbled.

Cause

The power of the printer was turned OFF and back ON during recording.

Solution

When resetting the printer power, it should be done after the recording is complete.

□ The [Rec.] key  turned to gray and cannot be pressed.

Cause

The stacked data has reached the maximum recordable quantity (64).

Solution

Wait until the quantity of stacked data decreases. Or, press the [Cancel] key displayed at the upper part of the home display to delete the stacked data.

PC/CF Card

□ The "There is no card in the slot." message is displayed on the "PC/CF Card" screen.

Cause

The PC/CF card is not inserted, or not correctly inserted to the card slot.

Solution

Set the card correctly to the card slot.

- The "Error reading from card." or "Error writing to card." message is displayed on "PC/CF Card Data Transfer" screen.

Cause

Error is detected during read/write process.

Solution

If the error has been detected during writing, try again. If the error has been detected during reading, data might not be correctly written on the CF card. Rewrite the data after formatting and try the procedure again.

- The "Check PC/CF Card" message is displayed in the system status message display area at the upper part of the home display.

Cause 1

The card is not properly inserted.

Solution

Remove the card and insert again properly.

Cause 2

Unspecified card is used.

Solution

For storing the full disclosure waveform, use the FCF-1000 or FCF-16GA CF card.

Cause 3

Failed to write full disclosure waveform due to card damage, etc.

Solution

Replace with a new card.

Cause 4

The number of times of write operation for the CF card has reached its maximum capacity.

Solution

When the number of times of write operation reaches maximum capacity, writing cannot be performed. Replace with a new card.

- The data cannot be transferred. The key on the "PC/CF Card Data Transfer" screen cannot be pressed.

Cause 1

The CF card is write-protected.

Solution

Cancel the write-protect function.

Cause 2

Unspecified card is used.

Solution

For data transfer, use the FCF-128 CF card.

Cause 3

The card is defective.

Solution

Replace with a new card.

EMR Link Function

- The "Check EMR comm." message is displayed.

Cause 1

The communication failure between the DS-7700 system and the patient data server.

Solution

Check the communication status of the DS-7700 system, patient data server, and EMR machine.

Cause 2

The network setup is incorrect.

Solution

On the "Network Configuration" under "Pre-Set Menu", set the correct IP address and port number.
( Maintenance Manual "Patient Data Server Setup" P3-23)

Cause 3

The patient data server system has gone down.

Solution

Check if the patient data server is properly operating. If not, refer to the operation manual of the patient data server.

Cause 4

The connection cable is disconnected.

Solution

Verify that the DS-7700 system, patient data server, EMR machine is connected properly. If not, connect them properly.

- The "Check Data Server Comm." message is displayed.

The communication failure between the DS-7700 system and the patient data server.

Solution

Check the communication status of the DS-7700 system, patient data server, and EMR machine.

Cause 2

The network setup is incorrect.

Solution

On the "Network Configuration" under "Pre-Set Menu", set the correct IP address and port number.
( Maintenance Manual "Patient Data Server Setup" P3-23)

Cause 3

The patient data server system has gone down.

Solution

Check if the patient data server is properly operating. If not, refer to the operation manual of the patient data server.

Cause 4

The connection cable is disconnected.

Solution

Verify that the DS-7700 system, patient data server, EMR machine is connected properly. If not, connect them properly.

Cause 5

The protocol of data server setting on this unit does not correspond with the setting on the data server.

Solution

Check if protocol of data server setting on this unit corresponds with the setting on the data server. If not corresponded, set it correctly.

General

- HR synchronizing sound does not generate.

Cause 1

"Pulse Sound" is set to [OFF] on the "Tone/Volume" screen. Or, the lowest volume is set.

Solution

Set the "Pulse Sound" to [ON]. Or, increase the volume.

Cause 2

The synchronizing tone setting is incorrect.

Solution

On the "ECG" screen (or "SpO₂" screen), select [ECG]/[SpO₂-1]/[SpO₂-2] for "Sync Tone".

Cause 3

The synchronizing tone is set to generate on the pre-assigned bed only.

Solution

If [ECG/SpO₂ Menu] is selected for "Sync Tone Bed Selection" on the "Soft Switch", the synchronizing tone will be generated only for the bed which the selection (ECG or SpO₂) is made.

(If synchronizing tone selection is made on one of the beds, the synchronizing tone for all other beds will turn [OFF].) To change the synchronizing tone generating bed, turn the tone OFF (on the "Tone/Volume" screen) for the currently assigned bed, and perform [ECG]/[SpO₂] selection for "Sync Tone"(on the "ECG" or "SpO₂" screen) for newly assigning bed.

(☞ "[ECG/SpO₂] Synchronized Tone" P7-17)

(☞ Maintenance Manual "Soft Switch" P6-8)

- The data was initialized when the power was turned ON.

Cause

The power has been turned OFF for more than 10 minutes.

Solution

When the power has been turned OFF for more than 10 minutes, the data of graphic trend, tabular trend, NIBP list, ST measurement, recall will be erased. To retain the data, turn ON the power within 10 minutes.

- The data is initialized each time the power is turned ON.

Cause 1

The internal switch is set to initialize.

Solution

The internal switch setting needs to be changed. Refer to our service representative.

Cause 2

The battery for the backup memory is depleted.

Solution

The battery needs to be replaced. Refer to our service representative.

- The display is too dark.

Cause 1

The display brightness is not adjusted.

Solution

Due to the LCD characteristic, the visible range is limited. Adjust to the appropriate brightness on the "Brightness Setup" screen.

- The system does not start although the power switch is turned ON.

Cause 1

The power cable is not connected.

Solution

Turn OFF the power and connect the power cable.

Cause 2

The display unit is not properly connected to the main unit.

Solution

Properly connect the main unit and the display unit.

- The "Check Backup Battery" message is displayed.

Cause

The battery for the backup memory is depleted.

Solution

The battery needs to be replaced. Refer to our service representative.

- The date/time is displayed in yellow.

Cause

The time synchronization with the SNTP server or patient data server has failed.

Solution

If the time is incorrect, set the correct time. Check the connection with the SNTP server or patient data server.

Mouse/Keyboard

- The mouse pointer does not move.

Cause

A mouse other than the recommended one is used.

Solution

If a mouse other than recommended is used, it may not function or may suddenly stop functioning. Use the recommended mouse.

The mouse stopped functioning.

Cause

The mouse is not recognizing the control signal from the DS-7700 system.

Solution

Press the [Home] key on the lower right of the screen. (The mouse control signal from this unit will reset.) If the mouse still does not function, the mouse connector may be disconnected. Ensure that the connection is secure.

The keyboard is not functioning.

Cause 1

The keyboard is directly connected to the display unit.

Solution

The keyboard will not function if directly connected to the display unit. Make sure to connect it using a PS/2 splitter cable.

Cause 2

A keyboard other than the recommended one is used.

Solution

If a keyboard other than recommended is used, it may not function or may suddenly stop functioning. Use the recommended keyboard.

Cause 3

The keyboard and mouse are not properly connected.

Solution

A keyboard mark and a mouse mark are indicated on the PS/2 splitter cable. Properly connect the keyboard and mouse to the corresponding connectors.

The keyboard stopped functioning.

Cause

The keyboard is disconnected.

Solution

Connect the keyboard. If it does not function within 30 seconds, securely plug in the connector again.

Slave Monitor

Nothing is displayed on the slave monitor, or the display flickers.

Cause 1

The display resolution does not satisfy the specification.

Solution

Use a slave monitor with resolution of XGA (1024dot x768dot) for DS-7700 series, and SXGA (1280dot x1024dot) for DS-7700W series. Do not use any slave monitors which does not satisfy the required display resolution even if it is capable of displaying higher resolution than the actual resolution. If such monitor is used, the display screen image will not be properly shown.

Cause 2

Synchronization has failed.

Solution

Use the monitor which satisfies the following horizontal/vertical frequency.

Horizontal Frequency	: 48.4kHz (For DS-7700 series)
	64.0kHz (For DS-7700W series)
Vertical Frequency	: 60Hz (For both DS-7700 series and DS-7700W series)

Cause 3

Improper cable is used.

Solution

For digital connection, use the CJZ-01SS display connection cable.

There are 3 different types of CJZ-01SS, which are:

Model Type	Length
CJZ-01SS3	3m Can be also used for extended display unit connection.
CJZ-01SS5	5m Cannot be used for extended display unit connection.
CJZ-01SS10	10m Cannot be used for extended display unit connection.

Bed Transfer/Bed Exchange

- The central monitor for the new bed is not displayed for "Other Unit".

Cause 1

The connection cable is disconnected.

Solution

Check if the DS-7700 system for current bed and new bed is properly connected. If not, connect them properly.

Cause 2

The network setup is incorrect.

Solution

On the "Network Configuration" under "Pre-Set Menu", set the correct IP address and port number.

- "TCP/IP network is disconnected. (Central Monitor Communication Error)" message is displayed.

Cause 1

The connection cable for the central monitor set for [Server] on the "Network Configuration (Central Monitor Comm.)" is disconnected.

Solution

Check if the DS-7700 system for current bed and new bed is properly connected. If not, connect them properly.

Cause 2

The network setup is incorrect.

Solution

On the "Network Configuration" under "Pre-Set Menu", set the correct IP address and port number for the server.

Cause 3

The server does not exist within the network for central monitor communication.

Solution

Assign one central monitor within the network to [Server] on the "Network Configuration (Central Monitor Comm.)".

- "TCP/IP network is disconnected. (Bed exchange data communication error.)" message is displayed.

Cause

The connection cable is disconnected.

Solution

Check if the DS-7700 system for current bed and new bed is properly connected. If not, connect them properly.

Extended Display Unit

- Nothing is displayed on the extended display unit. The same display with the main unit is displayed.

Cause 1

The video cable of the extended display unit is connected to the slave output connector of the main unit.

Solution

Connect the cable to the extended video output connector.

Cause 2

The "Extended Display Unit Setup" is not properly set.

Solution

Select the proper function for "Output Selection" under the "Extended Display Unit Setup".

- The touch panel does not function on the extended display unit.

Cause 1

The serial communication cable is not connected (COM4).

Solution

Connect the serial communication cable of the extended display unit to the extended serial connector of this unit.

Cause 2

The "Multimonitor Setup" is not properly set.

Solution

Set the Dip-SW6 to OFF for LC-7019FT and ON for L760T-C (EIZO[®]) and restart the system.

- The alarm indicator does not function on the extended display unit.

Cause 1

The serial communication cable is not connected (COM4).

Solution

Connect the serial communication cable of the extended display unit to the extended serial connector of this unit.

Cause 2

The "Multimonitor Setup" is not properly set.

Solution

Set the Dip-SW6 to OFF for LC-7019FT and restart the system.

- The <Check multimonitor conn.> message is displayed on the main unit.

Cause 1

[Multi Display] is selected for "Output Selection" on the "Extended Display Unit Setup" although multimonitor is not used.

Solution

Select [OFF] or [Full Disc.] for "Output Selection" on the "Extended Display Unit Setup" screen.

Cause 2

AC power is not supplied to the extended display unit.

Solution

Check the AC power supply of the extended display unit.

Cause 3

The serial communication cable is not connected to the extended display unit.

Solution

Check the serial communication cable connection between the main unit and the extended display unit.

Cause 4

The video cable is not connected to the extended display unit.

Solution

Check the video cable connection between the main unit and the extended display unit.

Chapter 12 Setup Item/Default Value

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Chapter 12 Setup Item/Default Value

Setup Item

This section lists selection, default setting, and backup status for each setup item.

The following indicates the selection, default setting and backup status for each setup item.

REFERENCE

- The <Setting at Discharge> column indicates the following status.
 - ♦ <No Change> : Settings will be retained even after the patient is discharged.
 - ♦ <Default>: Settings will be initialized to factory default settings when the patient is discharged.
 - ♦ <Admit Setup>: Settings will be changed to the settings made for "Admit Setup" under "Pre-Set Menu" when the patient is discharged.
 - ♦ <> or item without <Setting at Discharge>: These items are not the setting for each patient and will not be affected by the discharge process.

Patient Admit/Discharge

Item	Description	Default	Setting at Discharge
ID	Numeric, Alphabet, Symbol (20 characters)	Blank	Default
Patient Name	Numeric, Alphabet, Symbol (16 characters)	Blank	Default
Comment	Numeric, Alphabet, Symbol (30 characters)	Blank	Default
Pacemaker	Used, Not used	Not used	Default
Patient Type	Adult, Child, Neonate	Adult	No Change
Sex	Male, Female	Unspecified	Default
Age	0 to 150 years or 0 to 999 days	0 year	Default
Year, Month, Day	Year, Month, Day	0 year 0 month 0 date	Default
Admit Date	Blank	Blank	Default
Height	0 to 300	Blank	Default
Weight	0 to 350	Blank	Default
BSA	0 to 5.41	Blank	Default
Bed Name		No selection	Default
Nurse Team		No selection	Default

Alarm Setup

Item	Description	Default	Setting at Discharge
System Alarm	Suspend, ON	Suspend	-
Each Parameter	Refer to "Admit Setup" under "Pre-Set Items" on "Chapter 7 Setup Item/Default Value" of "DS-7700 Maintenance Manual".	Admit Setup	

Parameter Setup

Item	Details	Default	Setting at Discharge	
ECG1, ECG2	Lead	(Depends on the bedside monitor, telemetry transmitter)	ECG1: Lead II ECG2: Lead I	
	Waveform Size	x1/4, x1/2, x1, x2, x4	ECG1: x1 ECG2: x1	
	Baseline Position	-20mm to +20mm	ECG1: -5mm ECG2: ±0mm	
	Sync Tone	OFF, ECG, SpO ₂ -1, SpO ₂ -2	ECG	
	AC Filter	ON, OFF	ON	
	Drift Filter	ON, OFF	ON	
	QRS Pace Mask	ON, OFF	ON	
	Pace Pulse	ON, OFF, Distinct Color	Distinct Color	
RESP	Waveform Size	x1/4, x1/2, x1, x2, x4	x1	
	CVA	ON, OFF	OFF	
SpO ₂ -1, SpO ₂ -2	Waveform Size	x1/4, x1/2, x1, x2, x4	SpO ₂ -1 x1 SpO ₂ -2 x1	
	Sync Tone	OFF, ECG, SpO ₂ -1, SpO ₂ -2	ECG	
NIBP	Auto Mode	OFF, Interval, Timer	OFF	
	Interval	2min, 2.5min, 3min, 10min, 15min, 20min, 30min, 60min, 120min	120 min.	
	Timer	0:00, 1:00, 2:00 ... 23:00	(No setting)	
BP	Scale	20, 50, 75, 100, 150, 200, 250, 300mmHg 4, 8, 12, 16, 20, 24, 28, 32, 36, 40kPa	200mmHg 24kPa	Default
CO ₂	Unit	mmHg, kPa, %	mmHg	No Change
	Scale	50, 100mmHg 4, 8, 10kPa 4, 8, 10%	100mmHg 8kPa 8%	Default
GAS	O ₂ Scale	18 to 30, 18 to 60, 18 to 100, 0 to 30, 0 to 60, 0 to 100%	18 to 30%	No Change
	AGT Scale	4, 8, 16%	4%	No Change
	GAS Alarm	ON, OFF	ON	Admit Setup
SPIRO	AWP Scale	10, 20, 30, 50, 120	50	Admit Setup
	AWF Scale	±5, ±10, ±20, ±50, ±180	±50	
	AWV Scale	50, 250, 500, 1000, 3000	500	

Item	Details	Default	Setting at Discharge
Parameter ON/ OFF	ECG	ON, OFF	Admit Setup
	BP1 to 6	ON, OFF	
	NIBP	ON, OFF	
	SpO ₂ -1	ON, OFF	
	RESP	ON, OFF	
	CO ₂	ON, OFF	
	TEMP	ON, OFF	
	SvO ₂ /CCO	ON, OFF	
	GAS	ON, OFF	
	SpO ₂ -2	ON, OFF	
	INVOS	ON, OFF	
	BIS	ON, OFF	
	SPIRO	ON, OFF	

Review Function Setup

NOTE

- The trend data, NIBP list data, ST data, recall data will be stored for 10 minutes after the power is turned OFF.

Graphic Trend

Item	Details	Default	Setting at Discharge
Display Sel.	Group A, Group B, Group C, Group D, EVENT	Group A	No Change
Group A	HR, ST, VPC, BP1 to 6, NIBP, SpO ₂ -1, PR-1, RR, APNEA, CO ₂ , TEMP, SvO ₂ , CCO, CCI, BT, GASCO ₂ , GAS_O ₂ , ΔO ₂ , GAS_N ₂ O, GAS_AGT, MAC	HR, VPC, ST	No Change
Group B	BIS, ScvO ₂ , SpO ₂ -2, PR-2, PI, PI-2, PVI, SpCO, SpMet	HR, RR, APNEA	No Change
Group C		HR, SpO ₂ -1, PR	No Change
Group D		HR, BP1, BP2	No Change
EVENT	HR, ST1, ST2, BP1 to 6, NIBP, SpO ₂ -1, PR-1, RESP, APNEA, EtCO ₂ , InspCO ₂ , T1, T2, Asystole, VF, VT, Slow VT, Run, Couplet, Pause, Bigeminy, Trigeminy, Frequent, Tachy, Brady	Asystole, VF, VT, Run, Frequent	No Change
Time	1, 2, 4, 8, 12, 24 hours	1 hour	No Change
Scale	HR: 100, 200, 300bpm ST: ±0.2, ±0.5, ±1.0, ±2.0mV ±2, ±5, ±10, ±20mm VPC: 20, 50, 100 beats BP1 to 6: 20, 50, 100, 150, 200, 300mmHg 4, 8, 16, 20, 24, 40kPa CVP (cmH ₂ O): 20, 40cmH ₂ O NIBP: 20, 50, 100, 150, 200, 300mmHg 4, 8, 16, 20, 24, 40kPa	100bpm ±0.5mV ±5mm 20 beats 150mmHg 20kPa 40cmH ₂ O 150mmHg 20kPa	No Change

Item	Details	Default	Setting at Discharge
Scale	TEMP: 0 to 40, 20 to 45, 30 to 40°C 32 to 104, 68 to 113, 86 to 104°F SpO ₂ -1/ SpO ₂ -2 : 0 to 100, 50 to 100, 80 to 100% PR-1/PR-2 : 100, 200, 300bpm RR: 50, 100, 150Bpm APNEA: 15, 30, 70 sec. CO ₂ : 50, 100mmHg 4, 8, 10.0kPa 4, 8, 10% SvO ₂ : 0 to 100, 50 to 100, 80 to 100% CCO: 0.0-6.0, 0.0-12.0, 0.0-20.0L/min CCI: 0.0-6.0, 0.0-12.0, 0.0-20.0L/min/m ² BT: 0 to 40, 20 to 45, 30 to 40°C GAS_CO ₂ : 50, 100mmHg 4.0, 8.0, 10.0kPa 4.0, 8.0, 10.0% GAS_O ₂ : 0 to 50, 0 to 100% ΔO ₂ : 3, 6, 9% GAS_N ₂ O : 0 to 50, 0 to 100% GAS_AGT : 4, 8, 10% BIS 0 to 100 ScvO ₂ 0 to 100, 50 to 100, 80 to 100%	30 to 40°C 86 to 104°F 80 to 100% 100bpm 50Bpm 30 sec. 50mmHg 4.0kPa 4% 0 to 100% 0.0 to 6.0L/min 0.0 to 6.0L/min/m ² 20 to 45°C 50mmHg 4.0kPa 4.0% 0 to 50% 3% 0 to 50% 4% 0 to 100 0 to 100%	No Change

Item	Details		Setting at Discharge	
	PI, PI-2 0 to 10, 0 to 20%			
	PVI 0 to 30, 0 to 60, 0 to 100%			
	SpCO 0 to 20, 0 to 40, 0 to 100%			
	SpMet 0 to 10, 0 to 15, 0 to 100%			
	MAC 5, 10			

Tabular Trend

Item	Details	Default	Setting at Discharge
Time	1, 5, 10, 15, 30, 60 min.	60 min.	No Change
Parameter	HR, ST, VPC, BP1 to 6, SpO ₂ -1, PR-1, RR, APNEA, CO ₂ , TEMP, SvO ₂ , CCO, CCI, BT, GAS_CO ₂ , GAS_O ₂ , GAS_N ₂ O, GAS_AGT, MAC, BIS, BIS_SQI, BIS_EMG, BIS_SR, ScvO ₂ , SpO ₂ -2, PR-2, PI, PI-2, PVI, SpCO, SpMet	HR, ST, VPC, RESP, APNEA, SpO ₂ , PR, BP1, BP2, TEMP	No Change

Recall

Item	Details	Default	Setting at Discharge
Waveform Selection	ECG1, ECG2, BP1 to 6, SpO ₂ -1, RESP, CO ₂ , Alarm AWP, AWF, AWV, SpO ₂ -2	Wave 1: ECG1 Wave 2: OFF	No Change
Display Selection	HR, ST, BP1 to 6, NIBP, SpO ₂ -1, PR-1, RR, APNEA, EtCO ₂ , InspCO ₂ , T1, T2, SpO ₂ -2, PR-2, SpCO, SpMet, MVe, PEAK, PEEP, Ventilator, Periodic, Telemeter, Asystole, VF, VT, Slow VT, Run, Couplet, Pause, Bigeminy, Trigeminy, Frequent, Tachy, Brady	All	No Change

ST Display/12-Lead ST

Item	Details	Default	Setting at Discharge
Ref. Point	-240 to 0ms	-80ms	Default
Meas. Point	0 to 560ms	120ms	Default

□ Full Disclosure Waveform

Item		Details	Default	Setting at Discharge
Waveform Selection	Waveform 1	When using the FCF-1000: ECG1, ECG2, BP1, BP2, SpO ₂ -1, RESP, CO ₂ , OFF When using the FCF-16GA: ECG1, ECG2, BP1, BP2, BP3, BP4, BP5, BP6, SpO ₂ -1, RESP, CO ₂ , GAS-O ₂ , GAS-CO ₂ , GAS-AGT, AWP, AWF, AWV, SpO ₂ -2, OFF	OFF (When the CF card is formatted, ECG1 will be selected.)	No Change
	Waveform 2		OFF	No Change
	Waveform 3		OFF	No Change
Compressed Waveform Display Selection	Waveform 1		OFF	No Change
	Waveform 2		OFF	No Change
	Waveform 3		OFF	No Change
Zoom Waveform Recording	Recording Waveforms	3Wavesx30sec., 6Wavesx10sec.	3Wavesx30sec.	No Change
	Waveform Selection	When using the FCF-1000: ECG1, ECG2, BP1, BP2, SpO ₂ -1, RESP, CO ₂ , OFF When using the FCF-16GA: ECG1, ECG2, BP1, BP2, BP3, BP4, BP5, BP6, SpO ₂ -1, RESP, CO ₂ , GAS-O ₂ , GAS-CO ₂ , GAS-AGT, AWP, AWF, AWV, SpO ₂ -2, OFF	1: OFF (When the CF card is formatted, ECG1 will be selected.) 2: OFF 3: OFF	No Change
Report Recording	Report Period 1		0:00 to 12:00 (12 hours)	No Change
	Report Period 2		0:00 to 12:00 (12 hours)	No Change
	Report Period 3		0:00 to 12:00 (12 hours)	No Change

System Configuration

□ Record

Item		Details	Default	Setting at Discharge
Manual Recording	Waveform Selection	ECG1, ECG2, SpO ₂ -1, RESP, CO ₂ , BP1 to 6, SpO ₂ -2	ECG1	No Change
	Rec. Duration	12 sec., 24 sec., Cont.	24 sec.	No Change
	Delay Time	None, 8 sec.	8 sec.	No Change
Alarm Recording	Mode	ON, OFF	OFF	No Change
	Waveform Selection	ECG1, ECG2, SpO ₂ -1, RESP, CO ₂ , Alarm, BP1 to 6, SpO ₂ -2	ECG1	No Change
	Alarm Factor	HR, ST1, ST2, BP1 to 6, NIBP, SpO ₂ -1, PR-1, RR, APNEA, EtCO ₂ , InspCO ₂ , T1, T2, Asystole, VF, VT, Slow VT, RUN, Tachy, Brady	HR, Asystole, VF, VT, Slow VT, RUN, Tachy, Brady	No Change
Periodic Recording	Mode	Recorder, Recall, OFF	OFF	No Change
	Waveform Selection	ECG1, ECG2, SpO ₂ -1, RESP, CO ₂ , BP1 to 6, SpO ₂ -2	ECG1	No Change
	Interval	1, 2, 3, 5, 10, 15, 20, 30, 60, 120 min.	60 min.	No Change
	Timer	0:00, 1:00, 2:00 ... 21:00, 22:00, 23:00	(No setting)	No Change

Item		Details	Default	Setting at Discharge
12-Lead Record Setup	Rec. Format	3Wavesx4, 3Wavesx4+Rhy., 6Wavesx2, 12Waves	3Wavesx4	No Change
	Position	Center, Proportional, OFF	OFF	No Change
	Wave Format	Regular, Reverse	Regular	No Change
	Recorder Auto Scale	ON, OFF	OFF	No Change
	Cal. Waveform	ON, OFF	OFF	No Change
	Lead Boundary	ON, OFF	OFF	No Change
Output Recorder	Graphic Trend	Built-in, Laser	Built-in	No Change
	Tabular Trend		Built-in	No Change
	NIBP List		Built-in	No Change
	Recall Zoom Wave		Built-in	No Change
	ST Record		Built-in	No Change
	Full Disc. Compressed Wave		Built-in	No Change
	Full Disc. Zoom Wave		Built-in	No Change
	12-Lead Record		Built-in	No Change

Display Configuration

Item		Details	Default	Setting at Discharge
Display Configuration	Layout	1bed 8waves, 2beds 4waves, 2beds 8waves, 4beds 2waves, 4beds 4waves, 6beds 1wave, 6beds 4waves, 8beds 1wave, 8beds 3waves, 12beds 2waves, 16beds 1wave	8beds 1wave	-
	Patient Name	Zoom, Normal	Normal	-
	Bed Name	Zoom, Normal, OFF	OFF	-
	Meas Zoom	All Beds, Each Bed	All Beds	-
	Short Trend	ON, OFF, Overlap	OFF	-
Home Display Configuration	Numeric Data	1, 2, 3, 4, 5, 8	1	No Change
	Waveform Selection	ECG1, ECG2, BP1 to 6, SpO ₂ -1, RESP, CO ₂ , GAS_O ₂ , GAS_CO ₂ , GAS_AGT, OFF, Name, AWP, AWF, AWV, SpO ₂ -2	Wave 1: ECG1 Wave 2: RESP Wave 3: OFF Wave 4: OFF Wave 5: OFF Wave 6: OFF Wave 7: OFF Wave 8: OFF	No Change
	Measurement Selection	HR, HR/Alarm, HR/ST, ST, VPC, ST/VPC, RR, RR/Alarm, BP1 to 6, SpO ₂ , SpO ₂ /PR, PR, SpO ₂ /PI, NIBP, NIBP List, NIBP Meas., CO ₂ , T1/T2, SvO ₂ /CCO, 12ST-A, 12ST-B, 12ST-C, 12ST-D, OFF, GAS_CO ₂ , GAS_O ₂ , GAS_N ₂ O, GAS_AGT, GAS(CO ₂ +AGT+O ₂ +N ₂ O), GAS(AGT+O ₂ +N ₂ O), SpO ₂ -2, SpO ₂ /PR-2, PR-2, SpO ₂ /PI-2, SpCO, SpMet	Numeric 1: HR Numeric 2: RR Numeric 3: SpO ₂ -1/PR-1 Numeric 4: NIBP Numeric 5: OFF Numeric 6: OFF Numeric 7: OFF Numeric 8: OFF	No Change
Individual Bed Display Configuration	Meas. Area Selection	10, 9, 8, 7, 6, 5, 4, 3, 2, 6,	All ON	No Change
	Numeric Data	10, 9, 8, 7, 6, 5, 4, 3, 2	3	No Change
	Waveform Selection	ECG1, ECG2, BP1 to BP6, SpO ₂ -1, RESP, CO ₂ , OFF, Name, AWP, AWF, AWV, SpO ₂ -2	Wave 1: ECG1 Wave 2: SpO ₂ -1 Wave 3: OFF Wave 4: OFF Wave 5: RESP	No Change
	Measurement Selection	HR, HR/Alarm, HR/ST, ST, VPC, ST/VPC, RR, RR/Alarm, BP1 to 6, SpO ₂ , SpO ₂ /PR, PR, SpO ₂ /PI, NIBP, NIBP List, CO ₂ , T1/T2, SvO ₂ /CCO, 12ST-A, 12ST-B, 12ST-C, 12ST-D, OFF, GAS_CO ₂ , GAS_O ₂ , GAS_N ₂ O, GAS_AGT, GAS(CO ₂ +AGT+O ₂ +N ₂ O), GAS(AGT+O ₂ +N ₂ O), SpO ₂ -2, SpO ₂ /PR-2, PR-2, SpO ₂ /PI-2, SpCO, SpMet	Numeric 1: HR/Alarm Numeric 2: RR Numeric 3: SpO ₂ -1/PR-1 Numeric 4: NIBP Numeric 5: NIBP List Numeric 6: BP1 Numeric 7: BP2 Numeric 8: T1/T2 Numeric 9: OFF Numeric 10: OFF	No Change
12L ST Lead Selection	12ST-A	I, II, III, aVR, aVL, aVF, V ₁ , V ₂ , V ₃ , V ₄ , V ₅ , V ₆ , OFF	I, II, III	No Change
	12ST-B		aVR, aVL, aVF	No Change
	12ST-C		V ₁ , V ₂ , V ₃	No Change
	12ST-D		V ₄ , V ₅ , V ₆	No Change

Color

Item	Details	Default	Setting at Discharge
HR, ECG	16 colors	Green	No Change
BP1		Red	No Change
BP2		Blue	No Change
BP3		Yellow	No Change
BP4		Green	No Change
BP5		Orange	No Change
BP6		Pink	No Change
NIBP		White	No Change
SpO ₂ -1, PR-1		Yellow	No Change
RR, APNEA		White	No Change
CO ₂		White	No Change
TEMP		White	No Change
SvO ₂ , CCO		White	No Change
MAC		White	No Change
Patient Name		White	No Change
INVOS		White	No Change
BIS		White	No Change
SpO ₂ -2, PR-2		Yellow	No Change
AWP		Yellow	No Change
AWF		Green	No Change
AWV		Cyan	No Change

 Brightness Setup

Item	Details	Default
Brightness	7 levels	4th level from <Dark>

 Tone/Volume Setup

Item		Details	Default
Pulse Sound	Setup	ON, OFF	ON
	Volume	16 levels	Level 8
	Tone	8 levels	Level 6
Key Sound	Volume	16 levels	Level 6
	Tone	4 levels	Level 2
Alarm Volume	Top Priority	16 levels (Adjustable volume is above the minimum volume set on the pre-set menu.)	Level 8
	High Priority		Level 8
	Medium Priority		Level 8
	Low Priority		Level 8
Alarm Tone	Top Priority	4 levels	Level 2
	High Priority		Level 1
	Medium Priority		Level 1
	Low Priority		Level 1

❑ Sweep Speed

Item	Details	Default
ECG, BP, SpO ₂	12.5, 25mm/s	25mm/s
Respiration Waveform	6.25, 12.5, 25mm/s	6.25mm/s

❑ Monitor Suspend Setup

Item	Details	Default
Label 1 to 15	Use/Not Use Label: Max. 15 characters Color: 16 colors	Not used

❑ Nurse Team Setup

Item	Details	Default
Team Name 1 to 8	Use/Not Use Label: Max. 15 characters Color: 16 colors	Not used
Sort patients by nurse teams.	ON, OFF	OFF

Chapter 13 Accessories

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Chapter 13 Accessories

Accessories

The following products are available as accessories for this device.

- ♦ Power Cable: CS-24(3m)
- ♦ Parts Replacement Label
- ♦ Operation Manual



CAUTION

- ♦ Use only the accessories specified for this device. Otherwise, proper function cannot be executed.
 - ♦ For quality improvement, specifications are subject to change without prior notice.
-

Optional Accessories

The following products are available as optional accessories for this device.

Purchase them as required.

 **CAUTION**

- Use only the accessories specified for this device. Otherwise, proper function cannot be executed.
- For quality improvement, specifications are subject to change without prior notice.

Item	Model Type	Note
Recording Paper	OP-124TE	
Cleaning Cloth	OA-57	
CF Card	FCF-1000	For full disclosure waveform, 1GB
CF Card	FCF-16GA	For full disclosure waveform, 16GB
CF Card	FCF-128	For data transfer
Ethernet Branch Cable	CJ-522A	(For DS-LANII/III) Length: 1m
Ethernet Branch Cable	CJ-522B	(For DS-LANII/III) Length: 2m
Ethernet Branch Cable	CJ-522C	(For DS-LANII/III) Length: 4m
Ethernet Branch Cable	CJ-522D	(For DS-LANII/III) Length: 10m
Ethernet Branch Cable	CJ-522E	(For DS-LANII/III) Length: 20m
Connection Cable	CJ-530A	(For DS-LANII/III) Length: 2.5m
Connection Cable	CJ-530B	(For DS-LANII/III) Length: 5m
Connection Cable	CJ-530C	(For DS-LANII/III) Length: 10m
LAN Connection Cable (Cross)	CJ-761	For TCP/IP, Length: 2.5m
RS-232C Cable (Cross)	CJ-725	For serial communication
Patient Nameplate	OAO-09A	
Digital Display Connection Cable	CJZ-01SS3	Length: 3m For connecting the extended display unit, L760T-C (EIZO®)
Digital Display Connection Cable	CJZ-01SS5	Length: 5m Cannot be used for extended display unit connection.
Digital Display Connection Cable	CJZ-01SS10	Length: 10m Cannot be used for extended display unit connection.
PS/2 Splitter Cable	-	For mouse, keyboard connection. Use the product recommended by Fukuda Denshi.
Mouse (PS/2 Mouse)	-	Use the product recommended by Fukuda Denshi.
Keyboard (PS/2 Keyboard)	-	Use the product recommended by Fukuda Denshi.
Ethernet HUB	-	Use the product recommended by Fukuda Denshi.
Relay Cable (Straight)	CJ-726	For connecting the extended display unit, L760T-C (EIZO®)
DynaBase Software	CVW-6000	For data storage and remote viewing of the data

Chapter 14 Specification

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Chapter 14 Specification

This section states the specification and performance of this equipment.

Specification/Performance

Specification

Size

DS-7700 Series	350±30(W) x 244±30(D) x 387±30(H)mm(not including the protrusion)
DS-7700W Series	434±30(W) x 248±30(D) x 475±30(H)mm(not including the protrusion)

Weight (not including the accessory)

DS-7700 Series	11.5±2.0kg
DS-7700W Series	14.0±2.0kg

Environmental Condition

Operating Environment

Surrounding Temperature	10 to 40°C
Relative Humidity	30 to 85 % (non-condensing)

Transport/Storage Temperature

Surrounding Temperature	-10 to 60°C
Relative Humidity	10 to 95 % (non-condensing)

Safety

General Standard	IEC60601-1:2005 (Medical electrical equipment- Part 1: General requirements for basic safety and essential performance) UL 60601-1: 2003, with updates to 2006* (Medical Electrical Equipment - Part 1: General Requirements for Safety) CAN/CSA C22.2 No. 601.1-M90, with updates to 2005* (Medical Electrical Equipment - Part 1: General Requirements for Safety) *The above 2 standards applies only for the product with UL/cUL classification mark on the rating label.
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EMC Standard

IEC60601-1-2:2001+A1:2004 (Medical electrical equipment - Part 1-2: General requirements for basic safety and essential performance- Collateral standard: Electromagnetic compatibility - Requirements and tests)
--

The type of protection against electric shock	Class I
---	---------

Waterproof Level	IPX0 (no protection)
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Usage in Presence of Flammable Gas	Equipment inappropriate to use in presence of air/flammable anesthetics, or oxygen or nitrous oxide/flammable anesthetics.
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Operation Mode	Continuous Operating Equipment
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Power Requirements

Voltage	AC 115V
Frequency	50/60 Hz
Power Consumption	150 VA

Usable Life

6 years

According to self-certification.
 (☞ Maintenance Manual "Periodic Replacement Parts" P8-1)

Performance**Display**

Display	TFT Color LCD	
Size	DS-7700 Series	15 inch (diagonal)
	DS-7700W Series	19 inch (diagonal)
Resolution	DS-7700 Series	1024 x 768 XGA
	DS-7700W Series	1280 x 1024 SXGA
Waveform Trace	Stationary Trace	
Waveforms	Max. 24 waveforms	
Parameter	ECG, RESP, TEMP, SpO ₂ -1/SpO ₂ -2, BP1-6, NIBP, CO ₂ , O ₂ , N ₂ O, AGENT, MAC, SvO ₂ (mixed venous oxygen saturation), CCO (continuous cardiac output), CCI (continuous cardiac index), BT(blood temperature), SpCO(carboxyhemoglobin concentration), SpMet(methemoglobin concentration), TVe (expiratory tidal volume), TVi (inspiratory tidal volume), MVe (minute ventilation volume), PEAK (maximum airway pressure), PEEP(positive end-expiratory pressure ventilation), ScvO ₂ (central venous oxygen saturation), rSO ₂ (regional oxygen saturation), BIS	
Waveform	ECG, RESP, BP, SpO ₂ -1/SpO ₂ -2, CO ₂ , O ₂ , AGENT, AWP, AWF, AWV	
Sweep Speed	ECG, SpO ₂ -1/SpO ₂ -2, BP	12.5, 25mm/sec.
	RESP, CO ₂ , O ₂ , AGENT, AWP, AWF, AWV	
	6.25, 12.5, 25mm/sec.	

 **CAUTION**

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

Function Control

Touch Screen Method

Input/Output Interface

Main Unit

- Serial Connector (COM1, COM2, COM3)
- Status Input/Output Connector (STATUS II-1)
- DS-LAN Connector
- Slave Monitor Connector
- Extended Display Unit Connector (DS-7700W series only)
- Serial Connector (COM4) (DS-7700W series only)
- Status Input/Output Connector (STATUS II-2) (DS-7700W series only)
- LAN Connector
- PC Card, CF Card
- Antenna Input

Display

- Infrared Remote Control Input
- External Equipment Connector

Analysis Process

Arrhythmia Analysis

ST Measurement

ECG

HR Measurement Range	Adult/Child	0, 12 to 300bpm
	Neonate	0, 30 to 300bpm
HR Measurement Accuracy	± 3% or ±5bpm, whichever is greater	
Waveform Size	1/4, 1/2, 1, 2, 4	
Voltage Receiving Range	±6.4mV	
Lead Type	Depends on the transmitter, bedside monitor.	
Frequency Characteristic	Depends on the transmitter, bedside monitor.	
AC Filter	50Hz/60Hz	
Drift Filter	Shuts off 1.1Hz and below	
Pacemaker	Artificial pacemaker pulse display	

Respiration

Measurement Method	Depends on the transmitter, bedside monitor.
Measurement Range	0, 4 to 150Bpm
RR Measurement Accuracy	±3Bpm
Frequency Characteristic	Depends on the transmitter, bedside monitor.
Measurement Current	Depends on the transmitter, bedside monitor.

BP

Measurement Range	Depends on the transmitter, bedside monitor.
Frequency Characteristic	Depends on the transmitter, bedside monitor.
Measurement Accuracy	Depends on the transmitter, bedside monitor.
Max. No. of Channels	6 channels

Non-Invasive Blood Pressure

Measurement Method	Depends on the transmitter, bedside monitor.
Receiving Range	Depends on the transmitter, bedside monitor.
Measurement Accuracy	Depends on the transmitter, bedside monitor.

Arterial Oxygen Saturation(SpO₂-1, SpO₂-2)

Measurement Method	Depends on the transmitter, bedside monitor.
SpO ₂ Receiving Range	Depends on the transmitter, bedside monitor.
PR Receiving Range	Depends on the transmitter, bedside monitor.
SpCO Receiving Range	Depends on the bedside monitor.
SpMet Receiving Range	Depends on the bedside monitor.
Measurement Accuracy	Depends on the transmitter, bedside monitor.

TEMP

Measurement Method	Depends on the transmitter, bedside monitor.
Receiving Range	Depends on the transmitter, bedside monitor.
Measurement Accuracy	Depends on the transmitter, bedside monitor.
Max. No. of Channels	2 channels

CO₂ Concentration

Measurement Method	Depends on the transmitter, bedside monitor.
Measurement Range	Depends on the transmitter, bedside monitor.
Frequency Characteristic	Depends on the transmitter, bedside monitor.
Measurement Accuracy	Depends on the transmitter, bedside monitor.

Gas Concentration

Measurement Method	Depends on the bedside monitor.
Measurement Range	Depends on the bedside monitor.
Measurement Accuracy	Depends on the bedside monitor.

INVOS

Measurement Method	Depends on the bedside monitor.
Measurement Range	Depends on the bedside monitor.
Measurement Accuracy	Depends on the bedside monitor.

BIS

Measurement Method	Depends on the bedside monitor.
Measurement Range	Depends on the bedside monitor.
Measurement Accuracy	Depends on the bedside monitor.

SPIRO

Measurement Method	Depends on the bedside monitor.
Measurement Range	Depends on the bedside monitor.
Measurement Accuracy	Depends on the bedside monitor.

SvO₂/CCO

Measurement Method	Depends on the bedside monitor.
Measurement Range	Depends on the bedside monitor.
Measurement Accuracy	Depends on the bedside monitor.

Full Disclosure Waveform Recording

Continuous Storing of Patient 24 hours or more (When CF card is used)
 Data

3ch Recorder

Recording Waveforms	Max. 3 waveforms
Recording Method	Thermal Recording
Paper Width	50mm
Print Width	48mm
Recording Speed	25mm/sec.
Waveform Type	ECG, RESP, SpO ₂ , IBP, CO ₂
Status	Paper out, page mark, check cassette, printhead temperature
Protective Circuit	Printhead overcurrent, printhead overheating, motor overcurrent, surge current

Reception

No. of Receiving Beds	DS-7780: Max. 8 beds DS-7780W: Max. 8 beds DS-7700L: none DS-7700WL: none
Frequency	608 to 614MHz
Method	Crystal Controlled PLL Type Double Super Heterodyne
Transmitter	LX-7120, LX-7230, LX-5160, LX-5630, HLX-561, Bedside Monitor (with HLX-561 or equivalent)
Antenna Connector	F Type
DC Power Output	+12V 100mA (Default: OFF)

Receiving Device

Spurious Emission	100µV/m (30 to 88MHz), 150µV/m (88 to 216MHz), 200µV/m (216 to 960MHz), 500µV/m (above 960MHz)
Sensitivity	+10dBµV and below ("Too Far" level)

External Connection

This section lists the connector pin assignments.

RS-232C Connector Output Signal (Serial Connector)

□ COM1 Connector

No.	Signal Type	Note	Signal Level
1	RESET	Port Reset	TTL Hi Level Reset
2	NC	Not connected	-
3	TxD	Serial Transmit Data Output	RS232C
4	SG	Signal GND	
5	RxD	Serial Reception Data Input	RS232C
6	+5V	+5V	+5V power supply (150mA)
7	NC	Not connected	-
8	NC	Not connected	-

□ COM2 Connector

No.	Signal Type	Note	Signal Level
1	RESET	Port Reset	TTL Hi Level Reset
2	DIG_L	Digital Output (LOAD)	TTL (Extended Function)
3	TxD	Serial Transmit Data Output	RS232C
4	SG	Signal GND	
5	RxD	Serial Reception Data Input	RS232C
6	+5V	+5V	+5V power supply (150mA)
7	DIG_D	Digital Output (DATA)	TTL (Extended Function)
8	DIG_C	Digital Output (CLK)	TTL (Extended Function)

COM3 Connector

No.	Signal Type	Note	Signal Level
1	RESET	Port Reset	TTL Hi Level Reset
2	Reserve	Reserved	
3	TxD	Serial Transmit Data Output	RS232C
4	SG	Signal GND	
5	RxD	Serial Reception Data Input	RS232C
6	+5V	+5V	+5V power supply (150mA)
7	Reserve	Reserved	
8	NC	Not connected	-

Status I/O Signal (Status II Connector)

NOTE

- This connector does not function for the DS-7700 system.

No.	Signal Type	Description
1	Reserve	Reserved
2	Reserve	Reserved
3	Reserve	Reserved
4	Reserve	Reserved
5	Reserve	Reserved
6	Reserve	Reserved
7	+5V	+5V power supply (150mA)
8	Reserve	Reserved
9	GND	Power Supply Ground

Measurement Unit for Each Parameter

The measurement units for this equipment are as follows.

(_: Default)

Parameter (Default Color)	Details	Display	Unit
ECG (Green)	HR	HR	bpm(beats per minute)
	ST Level	ST1/ST2	mm/ <u>mV</u>
	12-lead ST Level	STI, STII STIII, ST aVR, ST aVL, ST aVF, ST V ₁ , ST V ₂ , ST V ₃ , ST V ₄ , ST V ₅ , ST V ₆ ,	mm/ <u>mV</u>
Respiration (White)	Respiration Rate	RR(RESP)	Bpm (breaths per minute)
	Apnea	APNEA	s(second)
BP	Blood Pressure 1 to 6	BP1 to 6	<u>mmHg</u> / kPa
	Central Venous Pressure	CVP	mmHg / cmH ₂ O*
Non-Invasive Blood Pressure (White)	Non-Invasive Blood Pressure	NIBP	<u>mmHg</u> / kPa
SpO ₂ (Yellow)	Arterial Oxygen Saturation	SpO ₂ -1, SpO ₂ -2	%
	Pulse Rate	PR-1, PR-2	bpm(beats per minute)
	carboxyhemoglobin concentration	SpCO	%
	methemoglobin concentration	SpMet	%
	Perfusion Index	PI	%
	Pleth Variability Index	PVI	%
TEMP (White)	Temperature 1	T1	° <u>C</u> /°F
	Temperature 2	T2	° <u>C</u> /°F
CO ₂ Concentration (White)	End Tidal CO ₂ Concentration	EtCO ₂	<u>mmHg</u> / kPa / %
	Inspiratory CO ₂ Concentration	InspCO ₂	<u>mmHg</u> / kPa / %

Parameter (Default Color)	Details	Display	Unit
Gas Data CO ₂ : White O ₂ : Green N ₂ O: Blue AGT: White ISO: Purple HAL: Red ENF: Orange SEV: Yellow DES: Light Blue	End-tidal Carbon Dioxide	CO ₂ -E	mmHg / kPa / %
	Inspired Carbon Dioxide	CO ₂ -I	mmHg / kPa / %
	End Tidal Oxygen	O ₂ -E	%
	Inspired Oxygen	O ₂ -I	%
	Expired Nitrous Oxide	N ₂ O-E	%
	Inspired Nitrous Oxide	N ₂ O-I	%
	End Tidal Anesthetic Gas	AGT-E	%
	Inspired Anesthetic Gas	AGT-I	%
	Expired Isoflurane	ISO-E	%
	Inspired Isoflurane	ISO-I	%
	Expired Halothane	HAL-E	%
	Inspired Halothane	HAL-I	%
	Expired Enflurane	ENF-E	%
	Inspired Enflurane	ENF-I	%
	Expired Sevoflurane	SEV-E	%
	Inspired Sevoflurane	SEV-I	%
	Expired Desflurane	DES-E	%
	Inspired Desflurane	DES-I	%

*: Depends on the setting on the transmitting side.

NOTE

- In case of DS-LAN network, 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.

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