

DYNASCOPE 8000 Series Central Monitor

DS-8900 System

Ver. 06

Operation Manual



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

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



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

CAUTION

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

© 2014 Fukuda Denshi Co., Ltd.

No part of this document may be reproduced or transmitted in any form without the prior written permission of Fukuda Denshi Co., Ltd.

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

Contents

Preface

Introduction.....	i
Important Notice	i
For Safe Operation of the Equipment.....	i
Intended Use of this Equipment	i
Copyright	ii
Maintenance, Repair, Replacement	ii
Contact	ii
About This Manual	iii
Expression Used in This Manual.....	iii
Composition of This Manual.....	v
System Construction and Installation	vi

Safety

About the Safety Precautions	i
The Meaning of Each Safety Precaution.....	i
Warning Labels Attached to the Equipment.....	i
Graphic Symbols	ii
Precautions for Safe Operation	iii
Precautions for Safe Operation of Medical Electrical Equipment.....	iii
Maintenance.....	iv
Precautions about the Network System	iv
Medical Telemetry	iv
Bidirectional Wireless Communications Module (TCON).....	v
Precautions when Using with Other Equipment	vi
Pacemaker	vi
Non-Explosion Proof	vii
Defibrillator	vii
MRI (Magnetic Resonance Imaging).....	vii
Precautions for Using the Equipment.....	viii
This System.....	viii
Wired Network System.....	xii
Wireless Network System	xiii
TCON System	xiii
RTC and Data Backup	xiii
Cables	xiv
Precautions about the Peripheral Device, Accessories, Optional Accessories	xiv
Connection to Peripheral Device.....	xiv
Fuse	xiv
Accessories and Optional Accessories	xiv
Recording Paper	xv
Precautions about Disposing of the Equipment, Accessories, or Components.....	xv
Precautions about Transportation	xv
Electromagnetic Compatibility	xv
Precautions for Safe Operation under Electromagnetic Influence	xv
EMC Guidance	xvii
Telemetry Precautions.....	xxi
Declaration of Conformity	xxii

Chapter 1 General Description

General Description	1-1
Composition of the System.....	1-1
Features.....	1-1
Various Display Configuration	1-2
Operation Flow	1-3

Chapter 2 Name of Parts and Their Functions

Chapter 3 Description of the Display

Home Display and Individual Bed Display	3-1
About the Home Display	3-1
Description of the Home Display	3-2
Individual Bed Display	3-5
Description of the Individual Bed Display	3-5
Alarm Occurrence.....	3-7
Menu Screen	3-7
To Display the Menu.....	3-7
Menu Configurations (Central Monitor Display).....	3-8
Menu Configurations (Individual Bed Display).....	3-9
Description of the Setup Window.....	3-10
Display on the Extended Display Unit and External Monitor	3-11

Chapter 4 Basic Operation

Operation Procedure	4-1
Fixed Keys.....	4-1
Touch Key.....	4-1
Mouse/Keyboard.....	4-1
Remote Control.....	4-2
Operation on the Home Display/Individual Bed Display	4-3
To Change the Quantity of Displayed Numeric Data.....	4-3
To Enlarge/Reduce the Numeric Data Box Size.....	4-4
Short Cut Keys Display.....	4-4
Operation on the Window	4-5
Moving the Floating Window.....	4-5
Switching the Page/Screen.....	4-5
To Minimize/Restore the Window.....	4-6
Subwindow Display.....	4-7
Another Window Display.....	4-7

To Enter Characters	4-8
For Easier Use.....	4-8
User Key.....	4-8

Chapter 5 Preparation

Turning ON/OFF the Power.....	5-1
Installing the Recording Paper (Optional).....	5-3
Daily Check	5-5
Nurse Call Daily Check.....	5-5

Chapter 6 Admit/Discharge

What You Can Do on the Admit/Discharge Menu	6-1
Admit	6-2
Entering the Patient Information.....	6-2
To Enter the Patient Information from the Magnetic Card or Barcode	6-4
Entering Patient Information from the Patient Data Server	6-4
To Change the Admit Date.....	6-7
EMR Link Function	6-7
Restrictions of EMR Link Function	6-8
Admit/Discharge on the EMR	6-8
Suspend Monitoring	6-9
To Suspend Monitoring	6-9
To Resume Monitoring	6-11
Bed Transfer and Bed Exchange	6-11
Discharge	6-12
Discharging Procedure.....	6-12

Chapter 7 Alarm Function

General Description.....	7-1
Classification and Level of the Alarm	7-2
Alarm System	7-2
Alarm Message Display Area	7-3
Alarm Limit Setup	7-4
Alarm Limit Setup for Each Parameter	7-4
Arrhythmia Alarm Setup	7-6
List of Alarm Settings	7-9
All Beds Alarm Settings.....	7-10
Alarm Occurrence.....	7-11
Alarm Suspend.....	7-13

Alarm Silence and Alarm Sound Suspend.....	7-13
Alarm Silence.....	7-13
Alarm Sound Suspend.....	7-15
Too-Far Alarm.....	7-16
ECG Alarm at Lead-Off Condition	7-16
All Beds Alarm Events	7-17
Alarm History	7-19
Displayed Items	7-19
Alarm History Setup and Printing.....	7-22

Chapter 8 Parameter Setup

To Display Each Parameter Setup Screen	8-1
ECG	8-2
Arrhythmia Relearn.....	8-2
ST Setup.....	8-3
Size / Lead.....	8-5
Detail Setup	8-7
RESP	8-11
Waveform Size	8-11
Common Setup / Impedance Setup.....	8-12
NIBP	8-13
NIBP Periodic Measurement	8-13
Detail Setup	8-14
BP	8-15
Scale.....	8-15
Label.....	8-16
Detail Setup	8-17
SpO2	8-18
Waveform Size	8-18
Label.....	8-18
Detail Setup	8-19
TEMP	8-19
CO2	8-20
Measurement Unit and Scale	8-20
GAS, SPIRO	8-21
Scale.....	8-21
Detail Setup	8-22
Ventilator Data	8-23
Scale.....	8-23
SvO2/CCO Monitor Data	8-24
BIS Monitor Data	8-24
INVOS Monitor Data.....	8-24
Parameter ON/OFF	8-24

Chapter 9 Data Review

Common Operation	9-1
Graphic Trend	9-2
Displayed Items	9-2
Graphic Trend Setup and Printing	9-4
Description for Each Parameter	9-5
Tabular Trend	9-7
Displayed Items	9-7
Tabular Trend Setup and Printing	9-8
Parameter Selection for Tabular Trend	9-9
Recall	9-11
Displayed Items	9-11
Recall Condition Setup	9-12
Recall Setup and Printing	9-13
Divider Function	9-15
Review Data Display for Discharged Patient	9-16
Alarm History	9-17

Chapter 10 Waveform Review

Full Disclosure Waveform	10-1
To Select the Waveform to Store	10-1
Displayed Items	10-3
Full Disclosure Waveform Setup	10-4
To Print the Full Disclosure Waveform	10-6
To Search by Time	10-7

Chapter 11 Printing

Types of Printing and Output Printer	11-1
Printing Condition/Output Destination Setup	11-2
Manual Printing Setup	11-2
Alarm Printing Setup	11-3
Periodic Printing Setup	11-5
12-Lead Printing Setup	11-7
Output Printer Setup for Review Data Printing	11-9
To Start/Stop the Printing	11-10
Manual Printing	11-10
Alarm Printing, Periodic Printing	11-12
Remote Printing	11-12
Review Data Printing	11-14
Measurement Status	11-15
Operation Procedure for HR-800	11-16
Paper Feed, Stop Printing	11-16

Status Message	11-16
Laser Printer Operation	11-17
Status Message	11-17
Stacked Data	11-17
To Delete the Stacked Data.....	11-17

Chapter 12 Menu Items

Display Configuration for Individual Bed.....	12-2
Layout.....	12-3
Numeric Data/Waveform	12-4
User Key Display on the Numeric Data Box.....	12-6
Detail Setup	12-6
To Set the Same Setting for All Beds	12-9
Bed Transfer/Bed Exchange.....	12-9
Night Mode	12-12
Discharged List	12-13
Nurse Call Daily Check.....	12-15
Printing Setup	12-15
Color	12-15
Nurse Call Setup.....	12-17
Full Disclosure Waveform Setup	12-19
Data Server Output Waveform Setup	12-19
Parameter ON/OFF	12-20
Display Configuration of the Home Display	12-20
Setting/Registering the Layout.....	12-21
Selecting the Displaying Bed.....	12-23
Numeric Data Box Size.....	12-24
Numeric Data/Waveform	12-25
Detail Setup	12-27
Exiting the Display Configuration Setup	12-29
Tone/Volume	12-29
Brightness.....	12-30
Monitor Suspend Setup	12-31
Nurse Team Setup.....	12-32

Chapter 13 Troubleshooting

Message List	13-1
Messages Displayed inside the Numeric Data Box.....	13-8
Troubleshooting	13-12
Wired Network (DS-LANIII), TCP/IP Network.....	13-12
Telemetry, TCON.....	13-12

Bed Register.....	13-14
Alarm.....	13-14
Display.....	13-15
General.....	13-16
Recorder Unit (HR-800)	13-17
Laser Printer.....	13-17
CF Card.....	13-18
Remote Control	13-19
PHS Nurse Call System	13-19
EMR Link Function	13-20
Mouse/Keyboard	13-20
Slave Monitor	13-21
Bed Transfer/Exchange.....	13-21
Extended Display Unit	13-22

Chapter 14 Setup Item/Default Value

Patient Admit/Discharge	14-1
Alarm Setup.....	14-1
Parameter Setup	14-2
Review Function.....	14-5
Basic Setup for Individual Bed Display.....	14-9
Menu (Central Monitor Display).....	14-11
Functions.....	14-11
Each Bed Setup	14-11
Common Setup	14-15

Chapter 15 Accessories

Accessories	15-1
Optional Accessories.....	15-1

Chapter 16 Specification

Specification/Performance.....	16-1
Specification	16-1
Performance.....	16-2
Measurement Unit for Each Parameter.....	16-3
External Connection	16-4
RS-232C Connector Output Signal (Serial Connector)	16-4
Technical Information	16-5
Settings for Each Alarm System.....	16-5

Contents

Alarm Limit Range for Each Parameter	16-6
Arrhythmia Type	16-8
Numeric Data Box Size Range	16-8

Preface

Introduction	i
Important Notice	i
For Safe Operation of the Equipment.....	i
Intended Use of this Equipment	i
Copyright	ii
Maintenance, Repair, Replacement	ii
Contact	ii
About This Manual.....	iii
Expression Used in This Manual	iii
Composition of This Manual	v
System Construction and Installation	vi

Preface

Introduction

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

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

Important Notice

For Safe Operation of the Equipment

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

Intended Use of this Equipment

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

<Intended Use>

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

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

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

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

Copyright

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

Maintenance, Repair, Replacement

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

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

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

Contact

If you need more detailed information, please contact following.

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

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

(2) Sales Representative

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

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

About This Manual

Expression Used in This Manual

Meaning of the Symbols

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

Indications for the Screens and Keys

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

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

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

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

Restriction of the Function

Various network system such as wired, wireless, TCON can be constructed with this equipment.

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

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

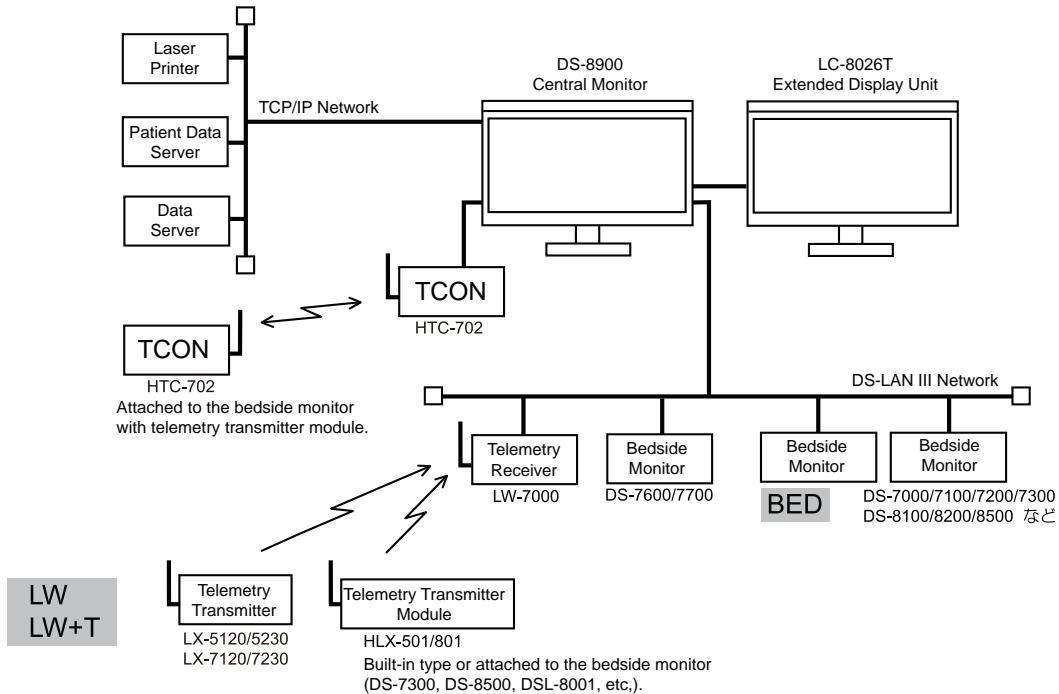
General Term	Expression	Description
Wired Network Bed	BED	Bedside monitor connected to the wired network The monitoring data is transmitted to this equipment through the wired network (DS-LAN III).
	LW Bed	Telemetry Bed The monitoring data is transmitted to the telemetry receiver which is then transmitted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

NOTE

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

be displayed.

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



Composition of This Manual

The operation manual is composed of the following chapters.

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

The maintenance manual is composed of the following chapters.

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

System Construction and Installation

WARNING

- ♦ The installation of this equipment should be performed by our service representative. The users should not attempt it.
 - ♦ The system construction and network setup of this equipment should be performed by our service representative or system administrator of your institution.
( Maintenance Manual "Installation of the Unit" P1-1)
( Maintenance Manual "System Construction" P2-1)
 - ♦ Verify that the initial settings are properly set before monitoring.
( Maintenance Manual "Initial Settings" P6-1)
-

Safety

About the Safety Precautions	i
The Meaning of Each Safety Precaution	i
Warning Labels Attached to the Equipment	i
Graphic Symbols	ii
Precautions for Safe Operation	iii
Precautions for Safe Operation of Medical Electrical Equipment	iii
Maintenance	iv
Precautions about the Network System.....	iv
Medical Telemetry	iv
Bidirectional Wireless Communications Module (TCON)	v
Precautions when Using with Other Equipment	vi
Pacemaker	vi
Non-Explosion Proof.....	vii
Defibrillator	vii
MRI (Magnetic Resonance Imaging)	vii
Precautions for Using the Equipment.....	viii
This System	viii
Wired Network System	xii
Wireless Network System.....	xiii
TCON System	xiii
RTC and Data Backup.....	xiii
Cables	xiv
Precautions about the Peripheral Device, Accessories, Optional Accessories	xiv
Connection to Peripheral Device	xiv
Fuse.....	xiv
Accessories and Optional Accessories	xiv
Recording Paper.....	xv
Precautions about Disposing of the Equipment, Accessories, or Components	xv
Precautions about Transportation	xv
Electromagnetic Compatibility	xv
Precautions for Safe Operation under Electromagnetic Influence... ..	xv
EMC Guidance	xvii
Telemetry Precautions.....	xxi
Declaration of Conformity	xxii

Safety

About the Safety Precautions

The Meaning of Each Safety Precaution

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

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

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

Warning Labels Attached to the Equipment

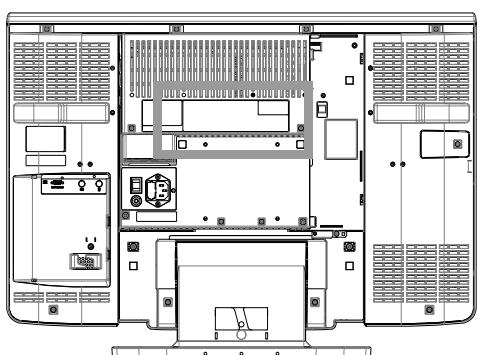
Make sure to read the warning label attached to the equipment and comply with the requirements while operating the equipment.



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

□ DS-8900 Main Unit

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



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.

Graphic Symbols

□ Symbols Indicated on the Power Supply Part

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

□ Symbols Indicated on the Equipment

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

Precautions for Safe Operation

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

Precautions for Safe Operation of Medical Electrical Equipment

CAUTION

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

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

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

□ Precautions Before Using the Equipment

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

□ Precautions During Using the Equipment

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

□ Precautions After Using the Equipment

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

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

□ Precaution when Equipment Failure Occurs

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

□ Precaution about Disassembling/Remodeling the Equipment

- ♦ Do not disassemble or remodel the equipment.

□ Precautions about Maintenance Check

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

Maintenance

⚠ WARNING

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

⚠ CAUTION

Precautions about Safety Check

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

Precautions about the Network System

Medical Telemetry

⚠ CAUTION

Precautions about the Installation

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

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

⚠ CAUTION Precautions about the Management

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

Bidirectional Wireless Communications Module (TCON)

⚠ CAUTION Precautions about the Installation

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

⚠ CAUTION Precautions about the Management

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

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



Precautions for Operation

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

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

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

Precautions when Using with Other Equipment

Pacemaker



WARNING

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

Reference

"Minute Ventilation Rate-Adaptive Pacemakers"

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

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

Non-Explosion Proof

⚠ DANGER

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

Defibrillator

⚠ WARNING

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

MRI (Magnetic Resonance Imaging)

⚠ WARNING

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

Precautions for Using the Equipment

This System

WARNING

- ♦ Do not connect any equipment or cable not authorized by Fukuda Denshi to any I/O connector.
Also, do not connect any damaged equipment or cable. If done so by mistake, not only that the equipment cannot deliver its maximum performance, the equipment may be damaged and safety cannot be ensured.
- ♦ For the connector with "  " mark, only the peripheral devices specified by Fukuda Denshi should be connected with the given procedure explained on the operation manual. Use of an unspecified device may cause electric shock to the patient and/or operator due to excessive leakage current.
- ♦ If the equipment is used under an environment not fulfilling the specified condition, not only that the equipment cannot deliver its maximum performance, the equipment may be damaged and safety cannot be ensured.
- ♦ When using multiple ME equipment simultaneously, perform equipotential grounding to prevent potential difference between the equipments.
Even a small potential difference may result in electric shock to the patient and the operator.
- ♦ Use only the supplied 3-way AC power cable. Use of other cables may result in electric shock to the patient and the operator.
- ♦ The power cable must be connected to a hospital grade outlet of AC 100-240V. When connecting, do not use a multiple portable socket-outlet.
- ♦ The PHS nurse call system should be used as supplementary function of alarm notification. Make sure to monitor the alarm on this equipment as it may not be notified to the PHS depending on the nurse call system condition.
- ♦ When using the PHS nurse call system, make sure to set the "Bed Name" as it will be used for alarm notification to the PHS. If the "Bed Name" is not set, the patient cannot be specified on the nurse call system.
- ♦ The pacemaker use selection influences the precision of the QRS detection and arrhythmia analysis. Make sure the correct selection is made.
- ♦ The patient classification selection influences the precision of the QRS detection and NIBP measurement range. Make sure the correct selection is made.
- ♦ When [Suspend] is selected for "Setup at Discharge" ("Initial Settings" > "User I/F"), the suspend condition on this equipment will continue until the [Resume] key is pressed, even if the monitoring is performed on the bedside monitor.
- ♦ If a low battery condition occurs for the battery operating bedside monitor or telemetry transmitter, the waveforms and numeric data for the corresponding bed will not be displayed.
For the telemetry transmitter and wireless bedside monitor, "Check Battery" mark and a square waveform will be displayed to warn the low battery condition. But for the wired network bedside monitor, "Chk DS-LAN Comm" message will be displayed without prior warning. Therefore, the wired network bedside monitor should be operated by AC power source and not by battery. For the telemetry transmitter and wireless bedside monitor, make sure that "Check Battery" mark is not displayed.
- ♦ Objective and constant arrhythmia detection is possible through the fixed algorithm. However, excessive waveform morphology change, motion artifact, or the inability to determine the waveform pattern may cause an error, or fail to make adequate detection. Therefore, physicians should make final decisions using manual printing, alarm printing and recall waveform for evaluation.
- ♦ If the QRS pace mask function is set to [OFF], the pace pulse may be erroneously detected as a QRS complex, and HR or asystole alarms may not generate due to incorrect HR measurement. Select [OFF] only if you are sure that pacing failure will not occur, or when the patient can be constantly monitored.

- ♦ During TCON connection, make sure to set the channel ID before setting the ID. Miscommunication with a wrong group may occur.
- ♦ The operation cannot be guaranteed if connected to improper TCP/IP network. When changing the network setting, contact your nearest service representative. When connecting to an existing network, follow the instruction of the network administrator.
- ♦ Make sure not to duplicate the IP address for the DS-8900 system, laser printer, and the server.
- ♦ As this system does not support DHCP (Dynamic Host Configuration Protocol) IP address, set the IP address excluded at DHCP if DHCP server is used.
- ♦ When a network setting is changed and [Regist] key is pressed, a warning message will be displayed. All the operation controls will not be possible until the system is restarted.



WARNING Warnings about the Alarm

- ♦ The ventilator alarm on this equipment should be used as supplementary function. Check the patient's condition, ventilator alarm sound and message occasionally.
- ♦ Depending on the bedside monitor type and software version, the ventilator alarm factor may not be transmitted to the central monitor.
For details of the bedside monitor type and software version, refer to your nearest service representative.
- ♦ If the upper/lower alarm limit of the individual parameter is set to OFF, alarm will not generate even if the individual parameter alarm is set to ON. Pay attention when setting them OFF.
- ♦ During monitor suspend condition or alarm suspend condition, all the alarms will not generate even if the parameter alarm is set to ON. Also, the alarms will not be stored as recall events. Check the patient's condition frequently.
- ♦ If [Displayed Data] is selected for "Numeric Data External Output" on the bedside monitor, the alarm for the parameter not displayed on the bedside monitor will not generate on the central monitor.
Make sure to display the parameter on the bedside monitor if alarm monitoring on the central monitor is required for that parameter.
- ♦ When a parameter monitored on a bedside monitor or telemetry transmitter is in a connector-off condition, the numeric data and waveform for that parameter will not be displayed on the central monitor. Also the alarm will not generate for that parameter. Make sure that the connectors are securely connected.
- ♦ If the parameter is not selected for the "HR/PR Alarm Source" (ECG/SpO₂/BP) on wired bedside monitor, the alarm for that parameter will be set to OFF on this equipment.
- ♦ When "Chk TLM Receive" or "Chk DS-LAN Comm" is displayed, alarm will not function.
- ♦ If the "Alarm Judgment" for "During Lead OFF" is set to OFF, HR alarm and arrhythmia alarm will not be generated at lead-off condition. If this condition is left unresolved, a sudden change of the patient may not be noticed. Take prompt action when the lead-off condition is detected.
- ♦ Some delay may occur until the alarm generated on the bedside monitor is displayed on the central monitor.
- ♦ The alarm generation will differ for the bedside monitor, telemetry transmitter, and central monitor depending on the communication specification (wired or wireless). Read the operation manual thoroughly before setting the alarm.
- ♦ Do not assess the patient's condition only by the alarm generated on this equipment. If the alarm is set to OFF or if low priority is set for the alarm, the alarm condition of the patient may not be noticed.
- ♦ If an alarm generates, check the patient's condition first and ensure the safety. Depending on the alarm, take appropriate measures to remove the problem. If the problem lies with the alarm setting, set the alarm properly.
- ♦ During monitoring, set the alarm volume according to the surrounding environment so that the alarm sound can be always recognized.



CAUTION

- ♦ Use only the spare parts specified for this equipment. Otherwise, proper function cannot be executed.
- ♦ For quality improvement, specifications are subject to change without prior notice.

- ♦ The maintenance and internal switch setting will be performed by our service representative. Users should not perform this procedure as malfunction may occur.
- ♦ Do not use the touch panel with the film attached. Malfunction of the touch panel or damage may result.
- ♦ As the touch panel is made of glass, a strong impact may cause damage. Pay attention not to hit or drop the touch panel.
- ♦ Always operate the touch panel with fingers or a touch panel pen. Do not touch with a pen-point or other hard-edged instruments. It may cause malfunction. In addition, do not apply pressure to whole or part of the panel for a prolonged time.
- ♦ Do not press the touch panel with strength or twist your finger on the panel. It may cause malfunction or damage the touch panel.
- ♦ Due to its material characteristic, the touch panel expands/contracts depending on the temperature/humidity.
- ♦ The LCD of this equipment utilizes LED for the backlight. Since this LED deteriorates by the life cycle, the display may become dark, scintillate, or may not light by the long term use. In such case, contact your nearest service representative.

CAUTION Precautions about the System

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

CAUTION Precautions about the CF Card, Data Transfer

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

CAUTION Precautions about the Patient Admit/Discharge

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

- ♦ If monitoring is suspended on the bedside monitor, the data for that patient will not be transmitted to the central monitor. When monitoring is resumed on the bedside monitor, the data transmission to the central monitor will also resume.
- ♦ To display the pacemaker pulse, select [Used] for "Pacemaker" on the "Admit/Discharge" menu, and select [ON] or [Distinct Color] for "Pacemaker Pulse". ("Parameter" > "ECG" > "Detail Setup") It is also necessary to select [Used] for "Pacemaker" on the bedside monitor.
- ♦ When a patient ID is searched from the patient data server, admit operation should be performed with the patient information acquired from the patient data server. Also, Bed ID of the bedside monitor should not be changed during monitoring.
- ♦ When the monitoring is suspended, the trend data and full disclosure waveform data will not be acquired.
- ♦ Resuming monitoring will also resume the suspended alarm.
- ♦ The monitor suspend operation will not be synchronized between the central monitor and the bedside monitor.
- ♦ When a bed transfer procedure is performed, all setup data for the new bed will be updated.
The data for the wired network bed and the same data monitored on other central monitor will be initialized.
- ♦ Bed transfer/exchange of monitoring data is not possible among different central monitors.
- ♦ Depending on the bedside monitor type and software version, the discharge procedure for the TCON bed can not be performed on this equipment. Even if the TCON bed patient is discharged on this equipment, the patient will not be discharged on the bedside monitor, and vice versa.
For details of the bedside monitor type and software version, refer to your nearest service representative.
- ♦ When the discharge process is performed on the bedside monitor or other central monitors, the monitoring on this equipment will not be suspended even if [Suspend] is selected for "Setup at Discharge" ("Initial Settings" > [Display/Print] "User I/F").
- ♦ When EMR link function is used, the patient admitted on EMR will be also admitted on the central monitor. But it is also necessary to perform admit process for this patient on the central monitor as some items may not be transmitted.
Make sure that the pacemaker usage and patient classification are properly set as these will affect the monitoring accuracy.
- ♦ The discharge process on EMR will initialize the patient information and monitoring data, but will not initialize the alarm settings on the central monitor. To initialize these data, it is necessary to perform discharge process on the central monitor.



Precautions about the Parameter Monitoring

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



Precautions about the Alarm Setup

- ♦ The adjustable alarm limit increment is different between the DS-7000 series and the DS-8000 series monitors. Therefore, the set alarm limit may change to the adjustable value depending on the monitor type constructing the network system.
- ♦ The alarm messages will be displayed according to the priority.
- ♦ For the same alarm priority, the alarm message for the newer alarm will be displayed.
- ♦ The alarm message for the arrhythmia alarm (except Tachy, Brady) will continue to be displayed for 30 seconds even after the alarm condition dissolves.
- ♦ Even during "LEARN" status, alarm for HR, Asystole, VF, Tachy, Brady, Pause will be generated.
- ♦ Even during "Cannot analyze" status, alarm for HR, Asystole, VF, Tachy, Brady will be generated.
- ♦ If "Suspend Arrhy. Analysis during Noise Interference" ("Initial Settings" > [Alarm Setup]) is set to [ON], the "Cannot analyze" alarm will generate when analysis is suspended for 30 seconds and longer.
- ♦ Depending on the bedside monitor type and software version, BP7, BP8, TEMP3-8, SpMet, SpCO, SpHb alarm will not be generated on the central monitor.

- ♦ If the same or similar equipments with different alarm settings are used in the same facility or same department, pay attention not to misjudge the alarms.

⚠ CAUTION Precautions about the PHS Nurse Call System

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

⚠ CAUTION Precautions about the TCP/IP Network

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

⚠ CAUTION Precautions about the Maintenance

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

Wired Network System

⚠ WARNING

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

⚠ CAUTION

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

Wireless Network System

DANGER

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

WARNING

- Make sure to set the correct channel ID.
- Some combinations of channels may generate interference with other telemetry transmitters. Before selecting a channel, verify it will not interfere with other channels.
- Make sure the telemetry manager of your system is aware of any changes to the telemetry channels.
- If transmitters are used in a neighboring medical facility, your facility and neighboring facility must make agreements on the setting of telemetry channels to prevent telemetry interference.
- If the channel ID of the transmitter is changed, make sure to replace the channel label attached to the transmitter with a new one.
- If the channel ID is changed without notifying, it will result in monitoring an incorrect patient. To avoid incorrect diagnosis, make sure that the channel ID corresponds to the patient.

CAUTION

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

TCON System

CAUTION

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

RTC and Data Backup

CAUTION

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

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

Cables

CAUTION

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

Precautions about the Peripheral Device, Accessories, Optional Accessories

Connection to Peripheral Device

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

When connecting peripheral devices to this equipment, it is the user's responsibility to verify that the overall system complies with ES 60601-1 Clause 16 "ME SYSTEMS".

WARNING

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

Fuse

DANGER

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

Accessories and Optional Accessories

WARNING

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

Recording Paper



CAUTION

Precautions about the Recording Paper

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



CAUTION

Storing the Recording Paper

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

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

Precautions about Disposing of the Equipment, Accessories, or Components



CAUTION

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

Precautions about Transportation



CAUTION

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

Electromagnetic Compatibility

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

Precautions for Safe Operation under Electromagnetic Influence

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

The following are examples of the common cause and countermeasures.



DANGER

Static Electricity

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

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

- ♦ Humidify the room.

⚠ WARNING Cellular Phone

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

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

⚠ WARNING Lightning

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

- ♦ Use the uninterruptible power supply system.

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

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

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

- ♦ Use other power outlet.

EMC Guidance

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

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

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

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

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

Compliance to the Electromagnetic Emissions

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

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

Compliance to the Electromagnetic Immunity (1)

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

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

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

Compliance to the Electromagnetic Immunity (2)

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

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

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

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

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

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

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

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

Telemetry Precautions

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

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

WARNING

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

CAUTION

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

Declaration of Conformity

Device: Central Monitor

Model Name: DS-8900

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1) This device may not cause harmful interference.
- 2) This device must accept any interference received, including interference that may cause undesired operation.

The responsible party for this device is:

Fukuda Denshi USA, Inc.

17725-C NE 65th Street

Redmond, WA 98052

Phone: (425) 881-7737, US Agent

⚠️ WARNING

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

Chapter 1 General Description

General Description	1-1
Composition of the System.....	1-1
Features	1-1
Various Display Configuration	1-2
Operation Flow	1-3

Chapter 1 General Description

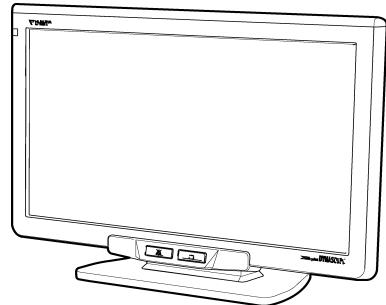
General Description

Composition of the System

The DS-8900 System Central Monitor is a central monitor which supports various system construction of wired and wireless network in general ward, ICU, etc.

The parameters acquired from the bedside monitor are sent via network to the central monitor, and displayed/printed in various formats.

Maximum of 32 beds can be monitored on this equipment.



This system is composed of the following equipments.

Item	Model Type	Note
Central Monitor	DS-8900	26 inch
Extended Display Unit (Optional)	LC-8026T	26 inch
Recorder Unit (Optional)	HR-800	50mm Roll Paper, 3 waveforms printing

Other display units, mouse, keyboard can be also connected.

Features

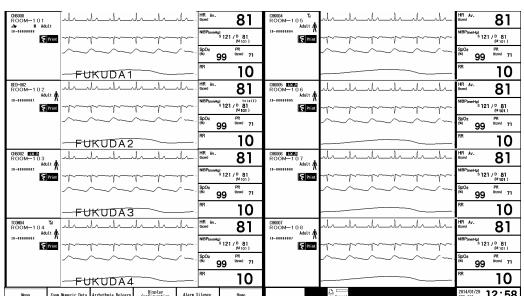
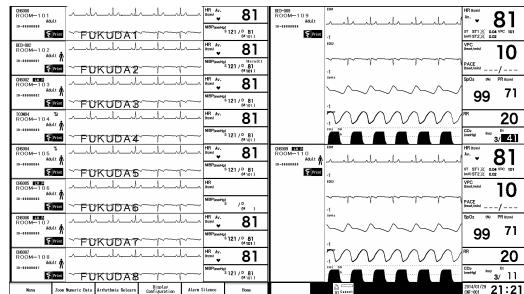
- A 26-inch wide color LCD is used.
 - Through the wired network (DS-LANIII), the parameters of maximum 32 beds are transmitted and displayed on this equipment.
 - By using the Bidirectional Wireless Communication Module (TCON), patient information and alarm settings can be synchronized with the bedside monitor constructing a wireless network.
 - The patient data can be displayed in various configurations using the free layout function. The individual bed display and review display are just the same as those on the bedside monitor.
 - The operation is performed using the touch panel.
 - An alarm indicator is equipped, which notifies the alarm with different flash patterns according to the priority level.
 - 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).
 - By using the optional HR-800 Recorder Unit, maximum of 3 channels of waveform, graphic trend, etc. can be printed.
 - By using the optional magnetic card reader, patient information (patient ID, patient name, birth date, etc.) can be read from the magnetic card.
 - By using the optional CF card, patient data and setup data can be written/read.
 - By using the nurse call system, the alarm information can be transmitted to the PHS.
 - Through the TCP/IP network connection, laser printer (A4/letter size) can be used.
- Also, by connecting to the network server, storing of patient data, time synchronization, admit/discharge process linked to the electronic medical record (EMR), and bed transfer/exchange between the other central

monitors can be performed.

Various Display Configuration

The patient data can be displayed in various configurations using the free layout function. The individual bed display and review display are just the same as those on the bedside monitor.

Customizable Home Display (Chapter 3)



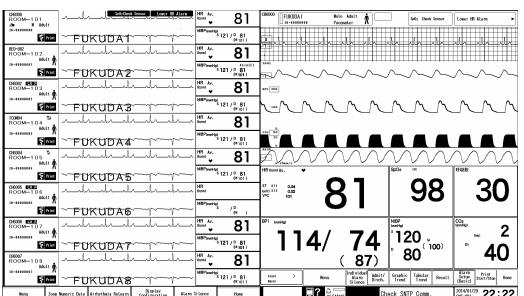
<<Free Layout Function>>

The beds, waveforms, and numeric data can be freely assigned to the left and right side of the screen.

The example shown on the left is 10 beds configuration with 8 beds displayed on the left, and 2 beds displayed on the right. Depending on the degree of severity of the patient, the display can be freely customized.

Like the other central monitors of existing model, the display configuration of all beds in equal size is also possible.

Individual Bed Display (Chapter 3)

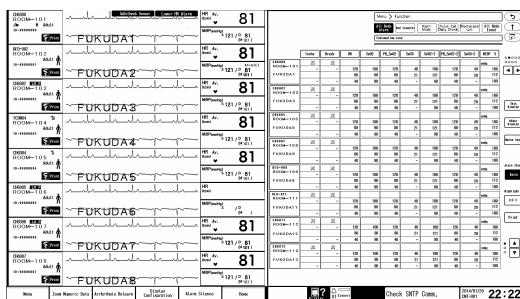


<<Same Display as the Bedside Monitor>>

The individual bed display is the same as that of the bedside monitor.

It can be operated as though operating the bedside monitor. Not just the display, but also various functions of the bedside monitor can be operated from the central monitor.

□ List of Alarm Settings/Events for All Beds (Chapter 7)



<<All Beds Alarm Settings/All Beds Alarm Events>>

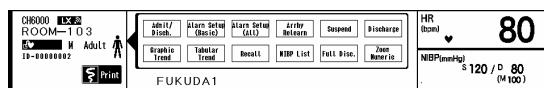
(☞ "All Beds Alarm Settings" P7-10)

(☞ "All Beds Alarm Events" P7-17)

By making use of the wide screen, alarm settings and alarm events for all beds can be listed for verification.

The risk of erroneously setting an alarm can be prevented by checking the alarm settings for all beds in a list format.

□ Shortcut Keys (Chapter 4)



<<Shortcut Menu>>

By using the shortcut key, admit/discharge display, trend display, monitor suspend display, etc. can be directly accessed without opening the individual bed display.

Operation Flow

NOTE

- Before monitoring, system construction, power supply connection, initial settings are required.

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

1 Admit the patient.

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

2 Start monitoring.

- Monitor on the home display.
- Parameter ON/OFF Setup
- Configure the numeric data to be displayed on the home display.
- Configure the numeric data to be displayed on the individual display.
- Adjust the size/scale/baseline position of the waveform.
- Parameter Setup

3 Discharge the patient.

NOTE

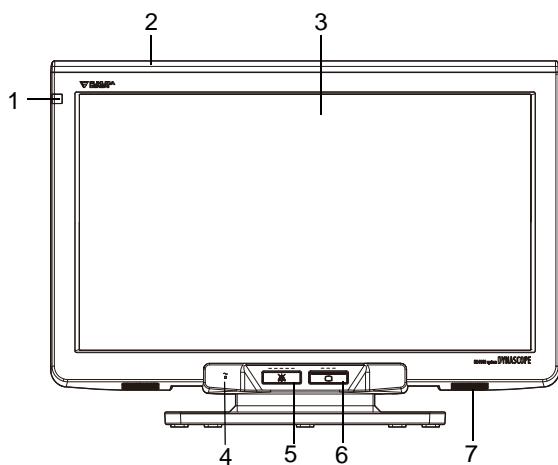
- The short-term backup battery used on this equipment needs to be periodically replaced (every 3 years depending on the frequency of usage). On the supplied Parts Replacement

Label, write down the replacement period and label it on the main unit for indication of replacement period.

Chapter 2 Name of Parts and Their Functions

Chapter 2 Name of Parts and Their Functions

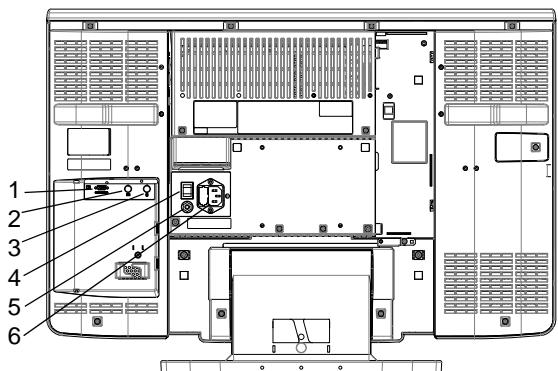
□ Front Side



- 1 Remote Control Sensor
Receives the infrared remote control signal.
- 2 Alarm Indicator
Notifies the alarm by flashing.
The flashing pattern can be changed.
- 3 LCD Touch Panel
Displays the waveforms and numeric data in various formats. The operation can be performed using the touch panel.
- 4 Power Supply LED
Indicates the power supply status. Lights when the AC power is supplied and main power switch is turned ON.

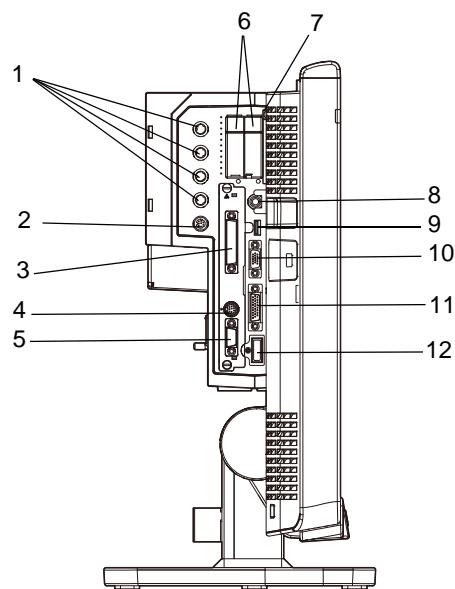
Green: In normal operation
Red: Operation error
Light OFF: AC power is not supplied or main power supply switch is turned OFF.
- 5 Alarm Silence Key
Temporarily silences the alarm sound generated on all the beds.
- 6 Home Key
Displays the home display.
- 7 Speaker
Generates the alarm sound and key sound.

□ Rear Side



- 1 Slave Output Connector
Connects the external monitor to be used for slave display.
- 2 Keyboard Connector
Connects the PS/2 keyboard. For the recommended product, refer to your nearest service representative.
- 3 Mouse Connector
Connects the PS/2 mouse. For the recommended product, refer to your nearest service representative.
- 4 Main Power Supply Switch
Turns ON/OFF the power of this equipment.
- 5 Potential Equalization Terminal
Used for equipotential connection with other equipment.
- 6 Power Supply Connector (with fuse holder)
Connects the power supply cable.

□ Left Side

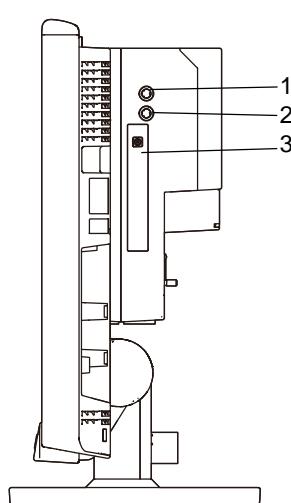


- 1 Serial Connector (COM1 to 4)
Connects the specified equipment.
- 2 Status Input/Output Connector (Status II)
Connects the specified equipment.
- 3 Extended Display Unit Connector (DISPLAY OUT)
Connects the Extended Display Unit (LC-8026T).
- 4 Serial Connector (COM A)
Connects the specified extended display unit, and performs serial communication.
- 5 Extended Display Unit Connector (VIDEO OUT A)
Connects the specified extended display unit.
- 6 CF Card Slot (CF1, CF2)
Card slot for the specified CF card
- 7 Cover for Maintenance
- 8 DS-LAN Connector
Connects to the wired network (DS-LANIII).
- 9 I/O Connector
Connects the specified equipment.
- 10 External Monitor Connector
Connects the specified external monitor.
- 11 U-LINK Connector
Connects the optional Recorder Unit (HR-800).
- 12 LAN Connector
Connects the specified network equipment.

NOTE

- The DS-LAN connector cannot connect to the DS-LANII network.

□ Right Side



- 1 Serial Connector (COM5)
Connects the specified equipment.
- 2 External Equipment Connector
Connects the specified equipment.
- 3 Battery Cover
Stores the battery for the backup memory.

Chapter 3 Description of the Display

Home Display and Individual Bed Display	3-1
About the Home Display.....	3-1
Description of the Home Display	3-2
Individual Bed Display	3-5
Description of the Individual Bed Display	3-5
Alarm Occurrence.....	3-7
Menu Screen	3-7
To Display the Menu.....	3-7
Menu Configurations (Central Monitor Display).....	3-8
Menu Configurations (Individual Bed Display).....	3-9
Description of the Setup Window	3-10
Display on the Extended Display Unit and External Monitor	3-11

Chapter 3 Description of the Display

This section explains about the items displayed on the home display, individual bed display, and menu display.

Home Display and Individual Bed Display

This section explains about the home display which can monitor multiple patients at the same time, and about the individual bed display which can monitor one patient specifically.

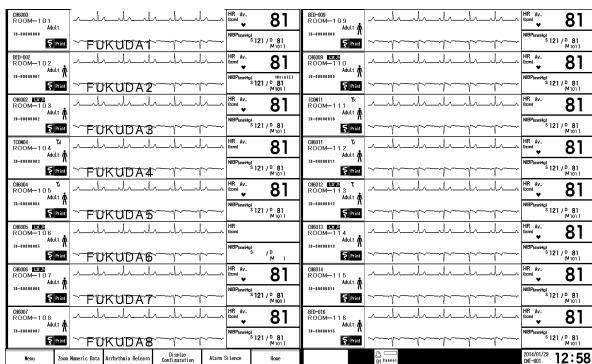
About the Home Display

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

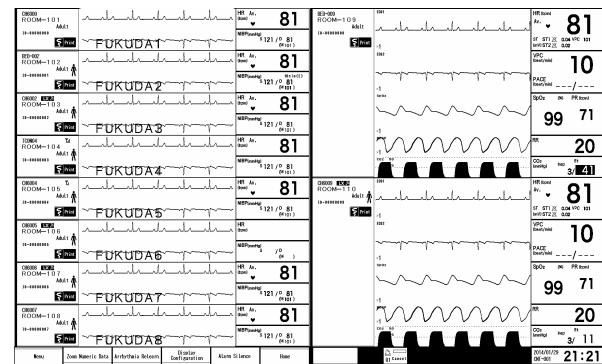
The display can be configured according to the monitoring purpose.

- The waveforms/numeric data of up to 32 beds can be displayed.
By using the LC-8026T Extended Display Unit, dual display monitoring is also possible.
- A flexible display layout is possible which allows to set the display configuration (parameter, quantity of displaying waveform/numeric data, etc.) for each bed.

To return to the home display, press the [Home] key (fixed key or user key).



Example of 16 Beds Display



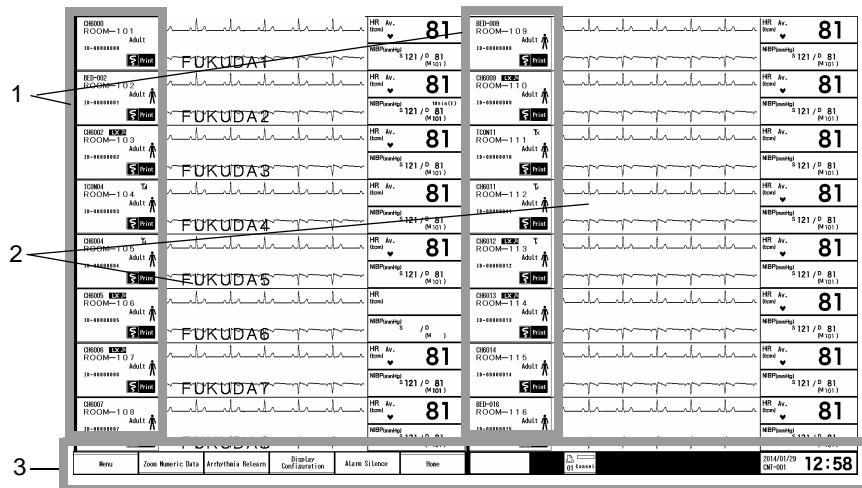
Example of 8 Beds + 2 Beds Display

Description of the Home Display

Other than waveforms and numeric data, patient name, alarm message, status message will be displayed.
The items displayed on each area are explained below.

Area on the Home Display

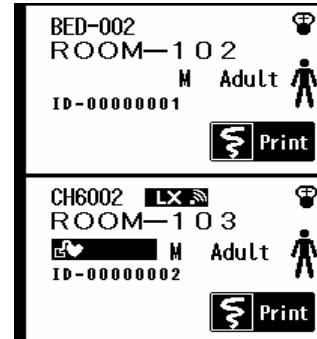
- 1 Information Display Area for Each Bed
- 2 Waveform/Numeric Data Area
- 3 Control Keys, Central Monitor Information Area



Information Display Area for Each Bed

The information for each bed will be displayed. Pressing this area will display the shortcut keys for each bed.

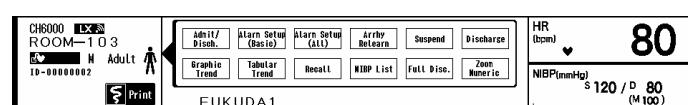
- ♦ Room/Bed ID, Telemetry Transmitter Channel ID, TCON
- ♦ Transmitter Type (LX/HXL)
- ♦ TCON Signal Strength, TCON Mark
- ♦ Nurse Call Mark
- ♦ Patient Name/Bed Name
- ♦ Pacemaker Mark
- ♦ Sex
- ♦ Patient Type (Adult / Child / Neonate) and Icon
- ♦ Patient ID (Max. 20 characters)
- ♦ Print Key (Displayed only when printer is connected.)
- ♦ Nurse Team Color (Displayed only when nurse team is set.)



Example of Shortcut Keys

The example shown at right are the shortcut keys displayed when the information display area is pressed.

(☞ "Short Cut Keys Display" P4-4)



Icons Displayed on Information Display Area

Icon	Description
	HLX Bed / LX Bed Indicates that the HLX-501/801 Telemetry Transmitter Module or LX series Telemetry Transmitter Module is used on the bedside monitor.
	TCON (☞ "Information Display Area" P3-5) Indicates the signal strength of Bidirectional Wireless Communication Module (TCON).
	Nurse Call (☞ "Nurse Call Setup" P12-17) Indicates that the nurse call function is used.
	Pacemaker (☞ "Entering the Patient Information" P6-2) Indicates that the pacemaker is used.
	Patient Classification (☞ "Entering the Patient Information" P6-2) Indicates the patient classification (adult, child, neonate).
	Print Start/Stop (☞ "To Start/Stop the Printing" P11-10) Starts/stops the printing.

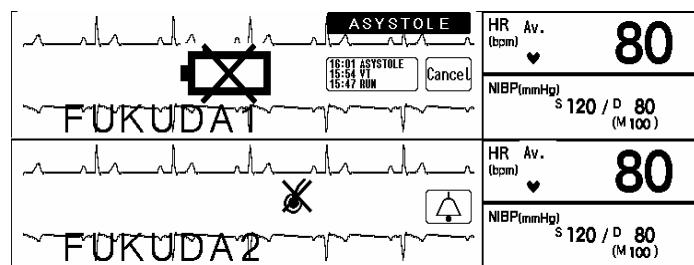
□ Waveform/Numeric Data Area

♦ Waveform

Other than the waveforms, patient name/bed name, parameter, waveform size/scale are displayed.

Depending on the situation, alarm messages and icons may be displayed.

The waveform display area will also function as the bed selection key. During the individual bed display, the displayed patient can be switched by pressing the waveform display area for the corresponding patient.



♦ Numeric Data

The numeric data for the monitoring parameters are displayed. The numeric data box will also function as the individual bed display key. To display the individual bed display, press the numeric data box for that bed.

Depending on the situation, messages and icons (Alarm OFF, HR synchronization mark, etc.) may be displayed.

Icons Displayed on Waveform Area

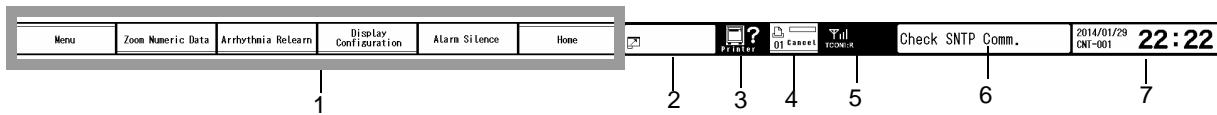
Icon	Description
	Lead OFF Indicates the lead-off condition.
	Check Battery Indicates the low battery condition of the telemetry transmitter.
	Event Key (☞ "Alarm Occurrence" P7-11) Indicates that the alarm has been generated.
	EMR Communication (☞ "EMR Link Function" P6-7) Indicates the communication with EMR.
	EMR Disconnected Indicates that the communication with the EMR is disconnected.
	Event List Key (☞ "Alarm Occurrence" P7-11) The latest 3 events will be displayed.

Icons Displayed on Numeric Data Box

Icon	Description
	Alarm OFF Indicates the alarm is OFF.
	Message Icon (☞ Maintenance Manual "Display/Print" P6-9) Indicates that an alarm message is present for that parameter. Whether or not to display this icon can be selected on the Initial Settings.
	HR/PR Synchronization Mark (☞ "Detail Setup" P8-7) Flashes synchronizing to the heartbeat or pulse wave.
	RR Synchronization Mark (☞ "Common Setup / Impedance Setup" P8-12) Flashes synchronizing to the respiration.

Control Keys, Central Monitor Information Area

The control keys are displayed. The central monitor information is also displayed.



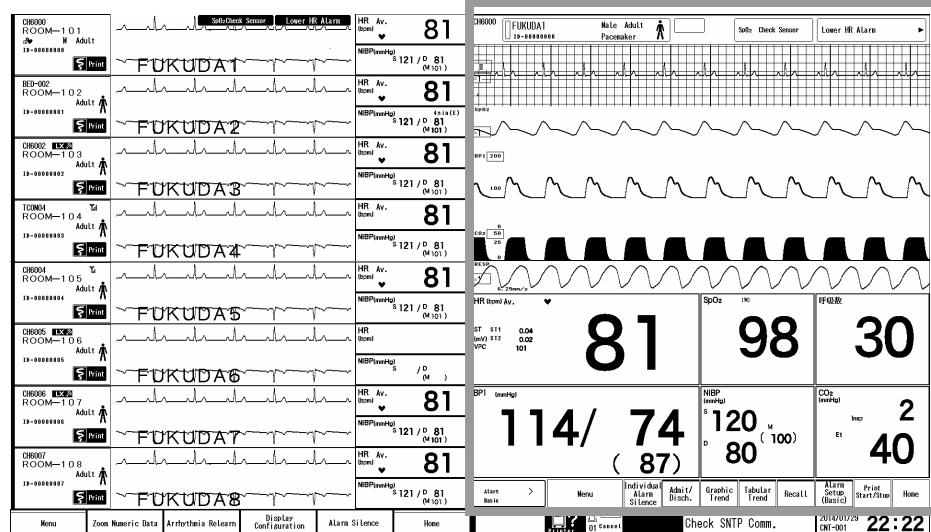
	Description
1	Central Monitor User Key (☞ Maintenance Manual "User Key" P6-15) Preprogrammable user keys to control the central monitor display. The [Menu] key (Central Monitor Display) is fixed.
2	Central Monitor Minimize Key (☞ "To Minimize/Restore the Window" P4-6) Maximum of 8 windows on the central monitor display can be minimized. The minimized window list will be displayed in dropdown list format.
3	Recorder Unit Status Display Area (☞ "Message List" P13-1) The status of HR-800 Recorder Unit (optional) such as <Recorder Busy>, <Check Recorder> will be displayed.
4	Laser Printer Status Display Area The quantity of stacked data, printing progress, status message will be displayed.
5	TCON Mark Display Area The TCON communication status will be displayed. On the TCON remote station, an icon indicating the signal strength of the communication with the base station will be displayed. On the TCON base station, only the TCON group ID will be displayed.
6	System Status Display Area The system status message will be displayed. The displayed color will change depending on the status priority.
7	Clock (☞ Maintenance Manual "Time/Date" P6-23) The current date/time, central ID will be displayed. If the time is displayed in yellow, it indicates that the time synchronization with the server has failed.

Individual Bed Display

By pressing the numeric data box, the individual bed display for that patient will be displayed on the right half of the screen.

The detailed information for the specific patient can be verified. The individual bed display is similar to the one displayed on the bedside monitor. The waveforms and numeric data to be displayed can be set differently for each patient.

(☞ "Display Configuration for Individual Bed" P12-2)



Description of the Individual Bed Display

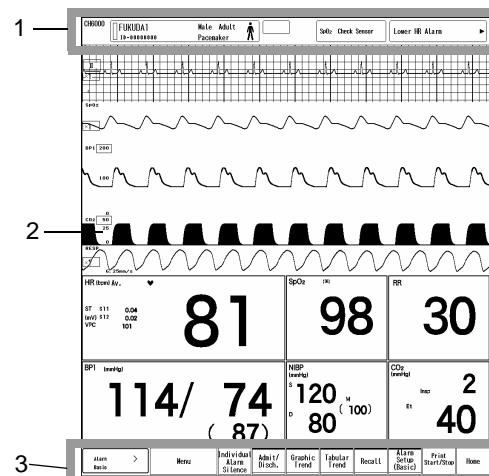
Other than waveforms and numeric data, alarm message, status message will be displayed.

The keys to control the individual bed display will be also displayed.

The items displayed on each area are explained below.

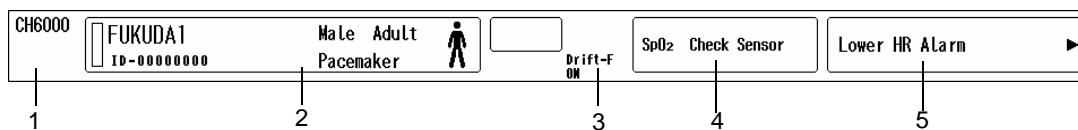
□ Area on the Individual Bed Display

- 1 Information Display Area
- 2 Waveform/Numeric Data Area
- 3 User Key Area



□ Information Display Area

The patient information will be displayed.



- 1 Room/Bed ID, Telemetry Transmitter Channel ID, TCON signal strength icon

- The signal strength icons are displayed as follows.

Display				
Communication Condition	Good	Moderately Good	Bad	Cannot Communicate

- 2 Nurse team color, patient information (patient name, patient ID, sex, patient classification and icon, pacemaker usage) ("Entering the Patient Information" P6-2)
- 3 ON/OFF of ECG drift filter ("Detail Setup" P8-7)
- 4 Status Message ("Message List" P13-1)
- 5 Alarm Message

□ Waveform/Numeric Data Area

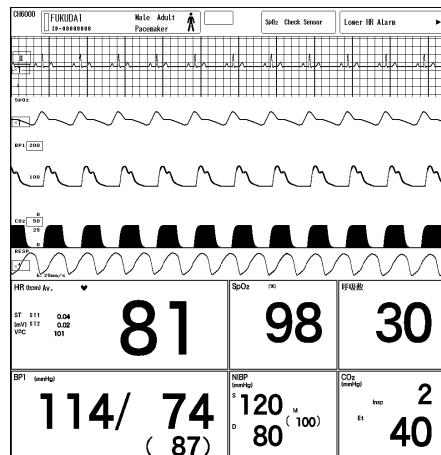
The display configuration can be changed.

- Waveform

Other than the waveforms, parameter, lead type, waveform size/scale are displayed.

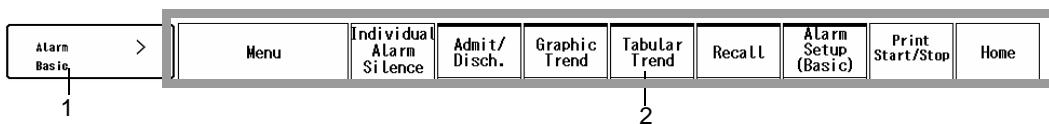
- Numeric Data

The numeric data for the monitoring parameters are displayed. Depending on the situation, messages and icons (Alarm OFF, HR synchronization mark, etc.) may be displayed. The user keys can be assigned to the numeric data box.



□ User Key Area

The control keys are displayed.



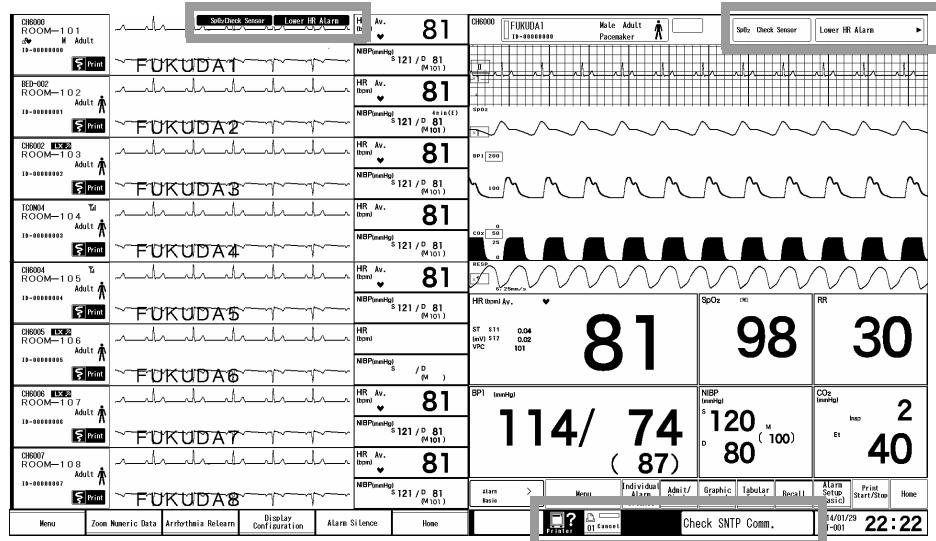
- 1 Minimize Key ("To Minimize/Restore the Window" P4-6)

Maximum of 8 windows on the individual bed display can be minimized. The minimized window list will be displayed in dropdown list format.

- 2 User Key ("User Key" P4-8)

Alarm Occurrence

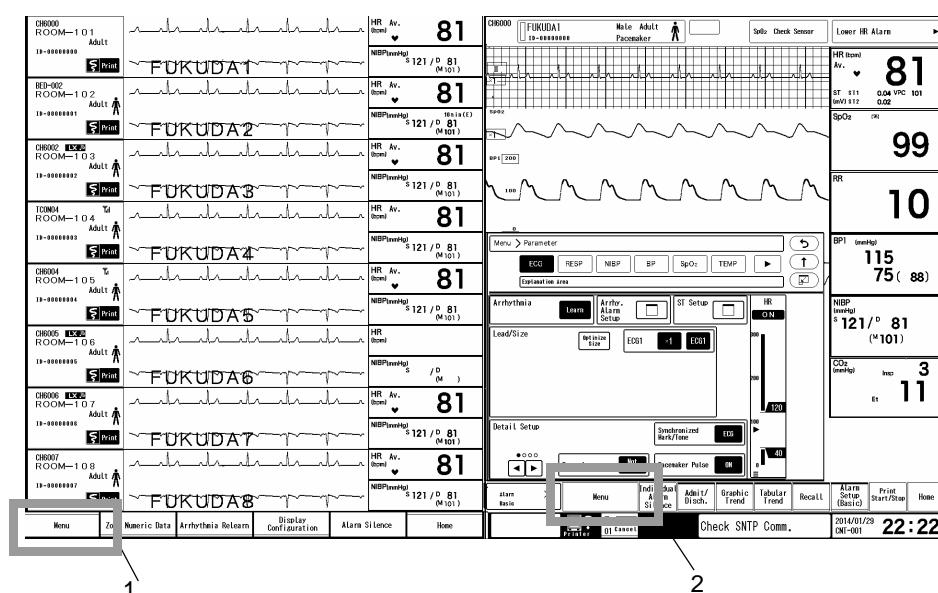
When an alarm occurs, alarm message will be displayed on various parts of the display.
 (☞ "Alarm Function" P7-1)



Menu Screen

To Display the Menu

Each of the individual bed display and central monitor display has its own menu items.
 The [Menu] keys are provided on each display. Pressing the [Menu] key will display the menu items.



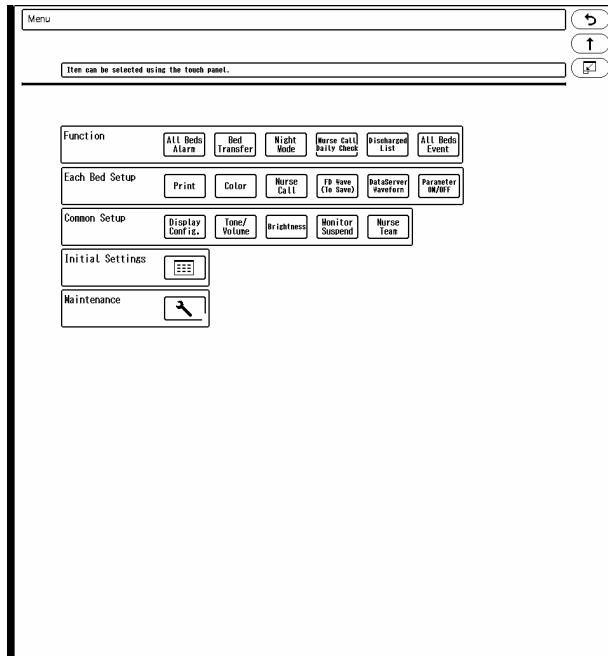
1 [Menu] key on the central monitor display

2 [Menu] key on the individual bed display

Menu Configurations (Central Monitor Display)

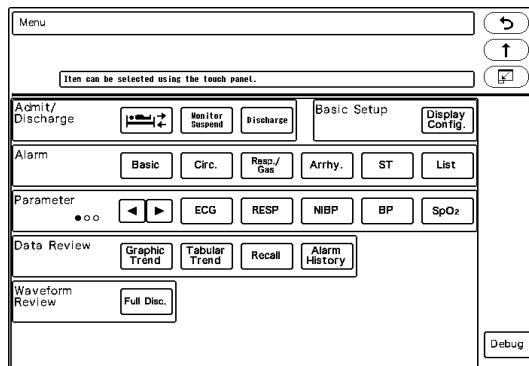
The menu for the central monitor display consists of the following 5 groups.

The "Initial Settings" menu consists of another 6 groups.



Function Groups	Displayed Menu	
Function (☞ "Menu Items" P12-1)	All Beds Alarm, Bed Transfer/Exchange, Night Mode, Nurse Call Daily Check, Discharged List, All Beds Event	
Each Bed (☞ "Menu Items" P12-1)	Print, Color, Nurse Call, Full Disclosure Waveform, Data Server Waveform, Parameter ON/OFF	
Common Setup (☞ "Menu Items" P12-1)	Display Configuration, Tone/Volume, Brightness, Monitor Suspend, Nurse Team	
Initial Settings (☞ Maintenance Manual "Initial Settings" P6-1)	Alarm	Alarm
	Measurement	Unit, Other
	User I/F	Display/Print, Admit, User Key
	External Device	Serial Communication, Network, Extended Display, Remote Control
	System	Central ID, Bed Register, Channel Setup, Bed Name Regist, Other
	Administrator Setup	Key Lock, Password Setup
Maintenance (☞ Maintenance Manual "Maintenance Check" P10-1)	Program Version, CF Card, Test Menu, LAN Information	

Menu Configurations (Individual Bed Display)



The menu for the individual bed display consists of the following 6 groups.

Function Groups	Displayed Menu
Admit/Discharge (Chapter 6)	Admit, Monitor Suspend, Discharge
Alarm (Chapter 7)	Basic, Circ., Resp/Gas, Arrhy., ST, List
Parameter (Chapter 8)	ECG, RESP, NIBP, BP, SpO ₂ , TEMP, GAS, CO ₂ , External Device, SpO ₂ -2, Sp*
Data Review (Chapter 9)	Graphic Trend, Tabular Trend, Recall, Alarm History
Waveform Review (Chapter 10)	Full Disclosure Waveform
Basic Setup (Chapter 12)	Display Configuration

Description of the Setup Window

The setup windows will be displayed during the operation of home display or individual bed display.

The windows that appear by pressing the numeric data box are called floating windows as they can be moved to any desired position.

To open a window, select from the menu, or press the numeric data box or user key.

Window Display

The displayed items are not the same for all the windows, but common items are explained below.

1 Hierarchical Level Display

The hierarchical level of the current window is displayed. The level is expressed using the ">" symbol.

This area also functions as keys, making it possible to return from the lowermost to topmost window in a one-touch operation.

2 Tab Display Area

This shows the list of screens in the same hierarchy.

The screens belonging to the same hierarchy can be switched by one-touch operation without returning to the menu.

3 Operation Guide Message

4 Page Switch Key

These keys will appear when the setup items or display data are on multiple pages. The currently displayed page is indicated by "●".

5 Previous Display

Pressing this key will return the display to the previous window.

6 Upper Level Key

Returns to the upper level display.

7 Minimize Key

Pressing this key will minimize the currently displayed window and will be stored to the user key.

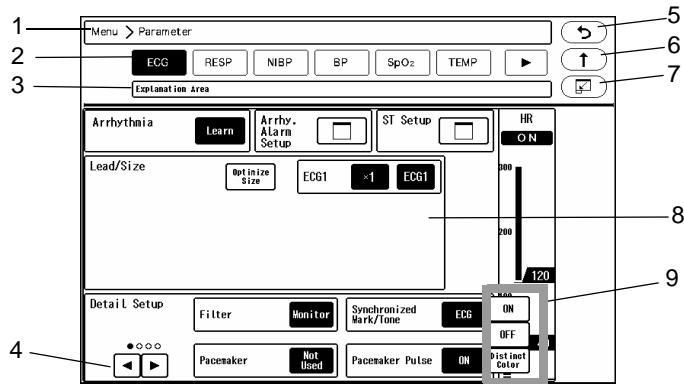
8 Setup Item

Most setup items can be selected from the dropdown list.

The dropdown list will close once a setup item has been selected.

Pressing the item again or selecting a different item will also close the list.

9 Dropdown List

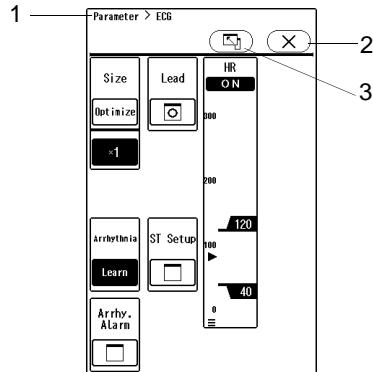


Floating Window

Pressing the numeric data box on the individual bed display will open the floating window for the corresponding parameter.

Minimum items are displayed on the floating window and they differ depending on the parameter, but there are some common items as follows.

- 1 Window Title
The windows can be moved to any desired position by dragging the window title.
- 2 Close Key
Pressing the  key will close the floating window.
- 3 Detail Key
To access the setup items which are not shown, press the  key to switch to the standard setup window.



Display on the Extended Display Unit and External Monitor

For the DS-8900 system, another display unit can be used for extended display.

For the installation procedure, refer to the operation manual of the extended display unit.

( Maintenance Manual "Using the Extended Display Unit" P1-10)

( Maintenance Manual "Using the Slave Monitor" P1-11)

Display Unit that can be Connected	Connector	Displayable Screen (Yes: Can be displayed, No: Cannot be displayed)	
		Dual Display	Slave Display
Extended Display Unit LC-8026T	Extended Display Unit Connector (LVDS)	Yes	No
General-purpose LCD	External Monitor Connector of DS-8900	No	Yes
General-purpose LCD	External Monitor Connector of LC-8026T	No	Yes

Dual Display

- The touch panel operation on the main display unit and the extended display unit can be performed independently.
- The mouse control on the main display unit and the extended display unit can be performed independently.
- The alarm indicators on the display units will light independently.

CAUTION

- When 32 beds are displayed on the main display unit, display on the extended display unit is not possible.

Slave Display

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

Chapter 4 Basic Operation

Operation Procedure	4-1
Fixed Keys.....	4-1
Touch Key	4-1
Mouse/Keyboard	4-1
Remote Control	4-2
Operation on the Home Display/Individual Bed Display	4-3
To Change the Quantity of Displayed Numeric Data.....	4-3
To Enlarge/Reduce the Numeric Data Box Size	4-4
Short Cut Keys Display.....	4-4
Operation on the Window	4-5
Moving the Floating Window	4-5
Switching the Page/Screen	4-5
To Minimize/Restore the Window.....	4-6
Subwindow Display	4-7
Another Window Display	4-7
To Enter Characters	4-8
For Easier Use.....	4-8
User Key.....	4-8

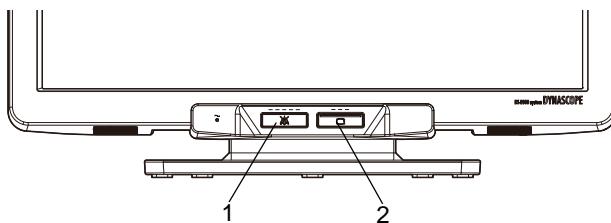
Chapter 4 Basic Operation

Operation Procedure

Operation can be performed using the fixed keys, touch keys, or mouse and keyboard (both optional). CF-820 Remote Control Unit is also available which enables to remotely control the equipment.

Fixed Keys

There are 2 fixed keys located at the lower part of the monitor display.



1. Alarm Silence Key
Temporarily silences all the alarms generated on the displayed beds.

2. Home Key
Displays the home display.

CAUTION

- Pressing the [Alarm Silence] key will silence all the alarms generated on the displayed beds.
Pay attention not to miss any important alarms.

REFERENCE

- When [Disable] is set for "All Beds Alarm Silence Key" (Initial Settings > Alarm), [Alarm Silence] key for the fixed key, user key, remote control unit will be disabled.
(Maintenance Manual "Alarm" P6-2)

Touch Key

Operation can be performed by pressing the displayed 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.
- Do not use the touch panel with the film attached. Malfunction of the touch panel or damage may result.
- Due to its material characteristic, the touch panel expands/contracts depending on the temperature/humidity.

Mouse/Keyboard

WARNING

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

malfuction or failure.

□ Mouse

An optional mouse (PS/2 mouse or USB mouse) can be connected allowing touch key control using the mouse. By moving the pointer on the displayed keys, and left-clicking the mouse, the operation can be performed just the same as by directly touching the displayed keys.

The pointer will be hidden if the mouse is not used for 30 seconds. (default operation)

The hidden mouse pointer will be displayed again by moving the mouse.

Either PS/2 mouse or USB mouse can be connected to the central monitor.

Only PS/2 mouse can be connected to the extended display unit.

The following combinations are possible for mouse connection.

Display Unit		Remark
Main Unit	Extended Display Unit	
PS/2 Mouse	None	The mouse can control both the main display unit and extended display unit.
None	PS/2 Mouse	The mouse can control both the main display unit and extended display unit.
PS/2 Mouse	PS/2 Mouse	Each mouse can control the corresponding display unit.
USB Mouse	None	The mouse can control both the main display unit and extended display unit.
USB Mouse x2 (via USB Hub)	None	One mouse can control the main display unit, and the other can control the extended display unit.
USB Mouse	PS/2 Mouse	Each mouse can control the corresponding display unit.

Which display unit to control using the USB mouse can be selected on the "USB" menu under "Initial Settings" menu.

(☞ Maintenance Manual "Connecting the Mouse and Keyboard" P1-5)

□ Keyboard

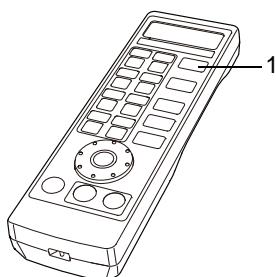
The keyboard can be used when entering patient information.

NOTE

- ◆ The keyboard operation is possible only when the alphanumeric keyboard is displayed. (patient name, monitor suspend setup, etc.) It is not possible for the display such as password entering window with only numeric keys displayed.

Remote Control

The alarm sound on the DS-8900 system can be silenced using the optional CF-820 Remote Control Unit.



1. Alarm Silence
Silences the alarm sound for all the displayed beds.

CAUTION

- Pressing the [Alarm Silence] key on the remote control unit will silence all the alarms generated on the displayed beds. Pay attention not to miss any important alarms.

REFERENCE

- When [Disable] is set for "All Beds Alarm Silence Key" (Initial Settings > Alarm), [Alarm Silence] key for the fixed key, user key, remote control unit will be disabled.
([Maintenance Manual "Alarm" P6-2](#))

Operation on the Home Display/Individual Bed Display

Various operation can be performed using the touch panel.

This section describes the touch panel operation on the home display and individual bed display.

To Change the Quantity of Displayed Numeric Data

The quantity of displayed numeric data can be changed.

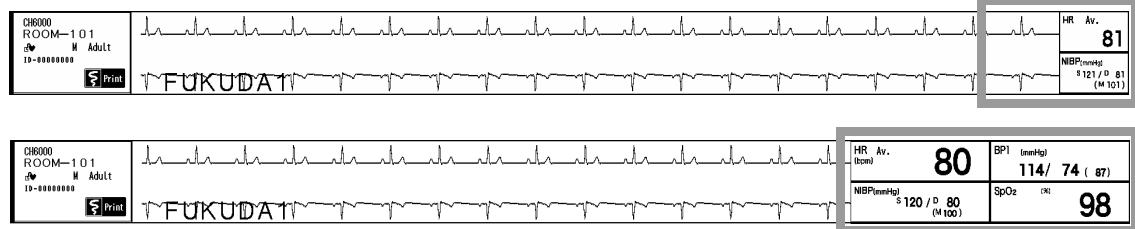
REFERENCE

- It is necessary to assign [Numeric Data Quantity] key as user key in advance.
([Maintenance Manual "User Key" P6-15](#))
- The quantity of numeric data can be also changed on the "Display Config." menu.
(["Numeric Data/Waveform" P12-25](#))
- It will not function during individual bed display.
- It will not function when the home display layout with center split is set.

1

Press the [Numeric Data Quantity] key preassigned as user key.

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



To Enlarge/Reduce the Numeric Data Box Size

The numeric data box size can be enlarged/reduced without changing the area size of all numeric data.

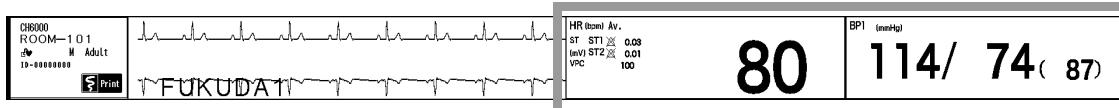
REFERENCE

- ♦ It is necessary to assign [Zoom Numeric Data] key as user key in advance.
- ♦ Depending on the setting, enlarging/reducing the numeric data box size can be either applied to all beds or to individual bed. (Refer "Numeric Data Box Size" P12-24)
- ♦ It will not function during individual bed display.
- ♦ It will function only when the display height for all beds are equal.

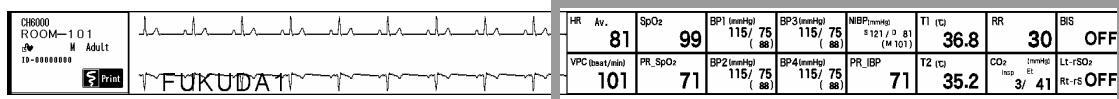
1

Press the [Zoom Numeric Data] key preassigned as user key.

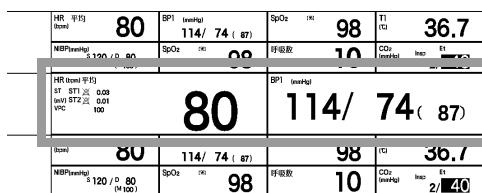
- ▶ The numeric data box size will enlarge/reduce. The size of the whole numeric data display area will not change.
- ▶ Pressing the [Zoom Numeric Data] key will sequentially enlarge/reduce the numeric data box size.
- ▶ If the numeric data box size is enlarged, the quantity of displayed numeric data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



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



- ▶ When [Each Bed] is set for "Zoom Numeric Data", the numeric data box size for only the selected bed will be enlarged/reduced.



Enlarged Numeric Data Box



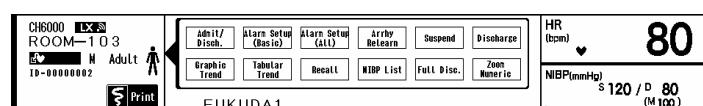
Reduced Numeric Data Box

Short Cut Keys Display

Pressing the patient information area will display 12 short cut keys for each bed. Pressing one of the keys will display the corresponding menu.

The short cut key display will close for the following cases.

- ♦ When the short cut key is pressed.
- ♦ When operation was not performed for 1 minute.
- ♦ When the patient information area was pressed again.
- ♦ When other key such as user key, other patient information area, etc. was pressed.



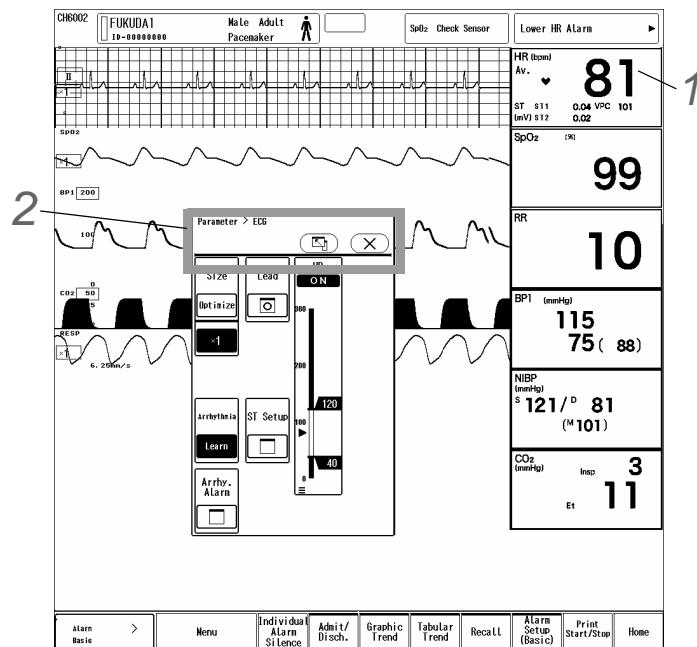
Operation on the Window

The operation procedure is not the same for all windows, but common operation procedure is explained below.

Moving the Floating Window

The floating window can be moved by dragging the window title bar. This operation is possible on the touch panel.

- 1** Press the numeric data box on the individual bed display to display the floating window.
- 2** Place the finger on the window title and drag to the desired position.



NOTE

- The floating window cannot be overlapped to the numeric data area or information display area.

Switching the Page/Screen

The keys used for displaying other page/screen is explained below.

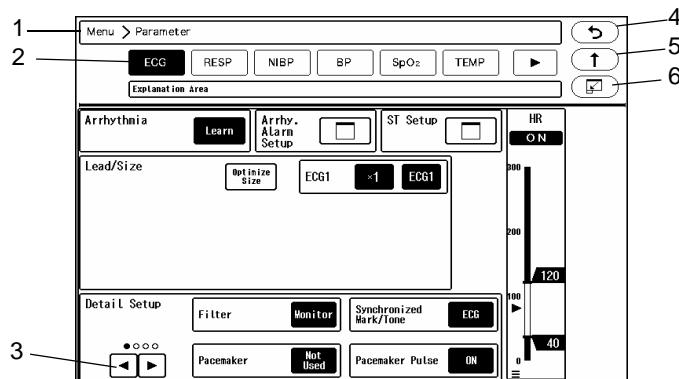
1 Hierarchical Level Display

The hierarchy level of the current window is displayed.
This area also functions as keys, making it possible to return from the lowermost to topmost window in a one-touch operation.

2 Tab

The menus belonging to the same hierarchy are displayed. It can be switched from each other in a one-touch operation without returning to the menu.

For example, pressing the [BP] while ECG setup menu is displayed will change the display to BP setup menu.



For the review screens, the date/time of each review data are linked and allows to switch the display of the tabular trend, graphic trend, waveform of the same date/time in one-touch operation.

3 Page Switch Key 

These keys will appear when the setup items or display data are on multiple pages. The currently displayed page is indicated by "●".

4 Pressing the  **(Return) key will return to the previous window.**

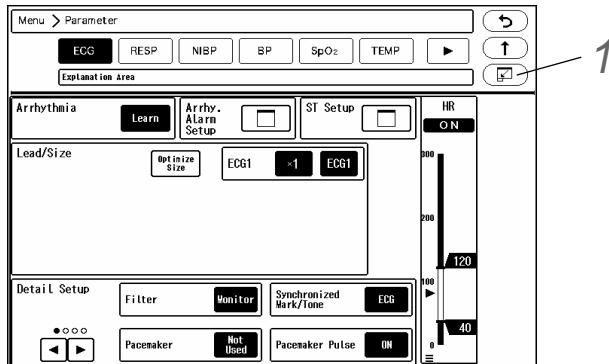
5 Pressing the  **(Upper Level) key will return to the upper level display.**

6 Minimize Key
( "To Minimize/Restore the Window" P4-6)

To Minimize/Restore the Window

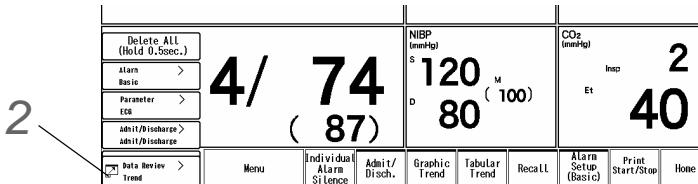
To temporarily display the home display during the setup, press the  **(Minimize) key**. The current window will be minimized. By pressing the minimized window, the window will be redisplayed.

1 Press the  **(Minimize) key.**



► The window will be minimized.

2 Press the minimized window.



► The original window will be displayed again.

NOTE

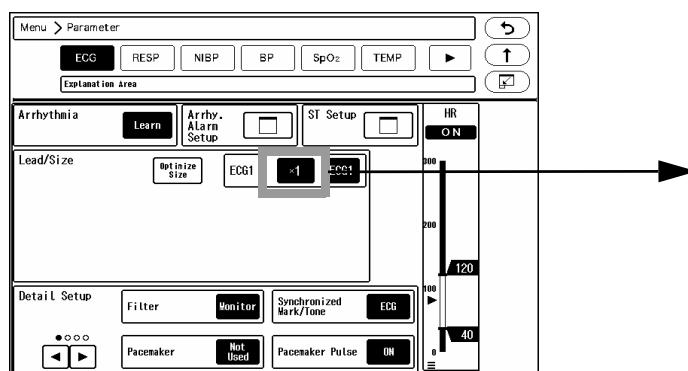
- Maximum of 8 windows can be minimized. If exceeded, the oldest window will be deleted.
- To delete all minimized window, press the [Delete All] key which will be displayed when  is pressed for more than 0.5 second.

Subwindow Display

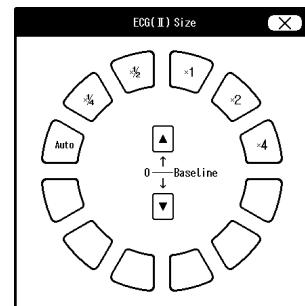
Some menu may display a subwindow to perform the setup.

The subwindow to set the waveform size is shown as an example.

To close the subwindow, press either the key, [Home] or [Prev. Disp.] key.



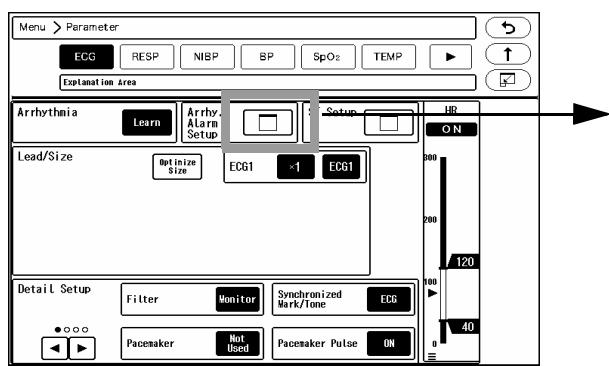
Example of Subwindow



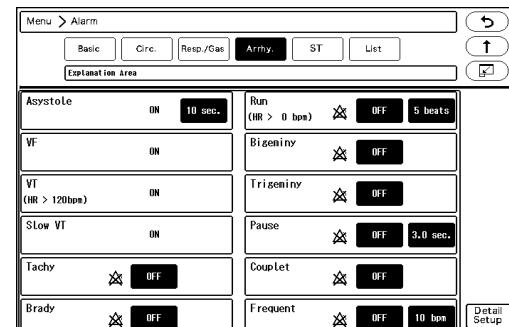
Another Window Display

Pressing the key with the icon will display another window or subwindow.

To return to the original display, press . To close the subwindow, press .



Example of Another Window Display
(Arrhythmia Alarm Setup)



To Enter Characters

Alphanumeric characters and symbols can be entered using the displayed keyboard.

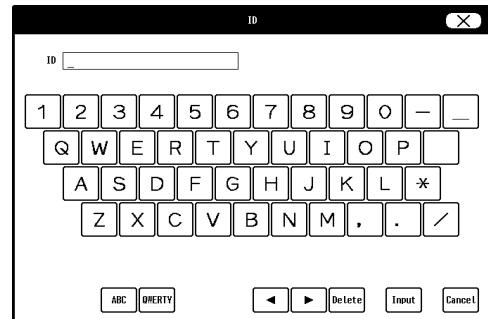
The procedure to enter characters is explained below using the example of patient admit menu.

□ Entering Alphanumeric Characters

Enter alphabets, numerics, or symbols.

- 1 Press [ABC] or [QWERTY] to switch the displayed keyboard.

Enter the alphanumeric characters.

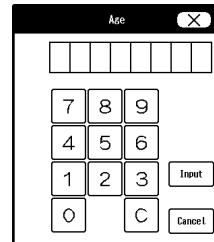


□ Entering Numerics

Setup windows for age, telemetry channel ID, etc. can enter only numerics.

In such case, only numeric keys will be displayed.

Enter the numerics.



For Easier Use

The user keys can be customized according to the monitoring purpose.

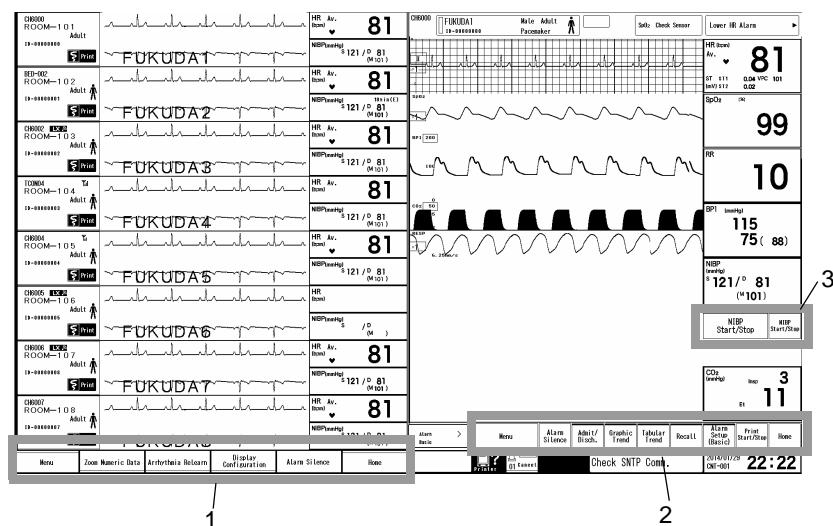
User Key

The user keys can be customized according to the monitoring purpose. The user keys can be assigned for home display and for individual bed display. (☞ Maintenance Manual "User Key" P6-15)

1 User Keys for Home Display

2 User Keys for Individual Bed Display

3 Numeric Data Area User Key



By assigning the [User Key] to the user key area, 2 pages of user keys can be registered. Press the [User Key] to switch the pages. The user key can be enlarged by using 2 display areas.

The user key can be also assigned to the numeric data area. It is useful if the key related to numeric data is assigned near the numeric data.

Chapter 5 Preparation

Turning ON/OFF the Power	5-1
Installing the Recording Paper (Optional)	5-3
Daily Check	5-5
Nurse Call Daily Check.....	5-5

Chapter 5 Preparation

Turning ON/OFF the Power

□ To Turn ON the Power

The procedure to turn ON the power of the DS-8900 system is explained below.

CAUTION

- The power cable must be connected to a hospital grade outlet.
- If not using for a long period, turn OFF the main power supply switch, and disconnect the power cable from the equipment.

1

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

*Power Supply Cable (CS-24)

*Recorder Unit (HR-800)

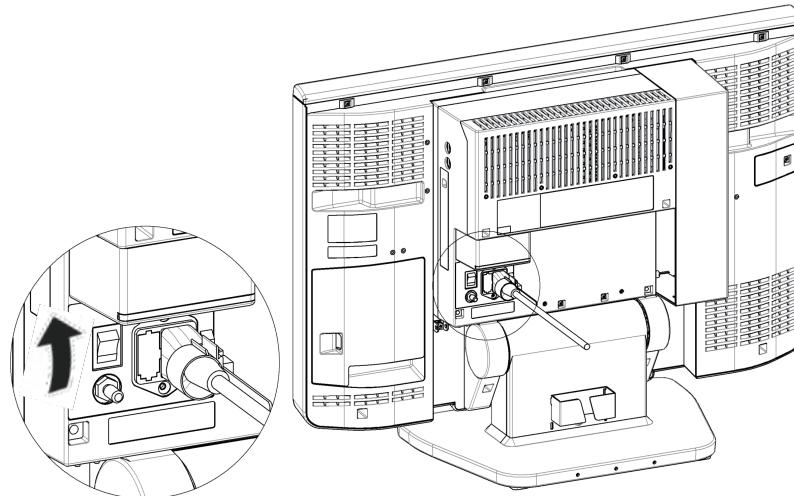
*Extended Display Unit, Slave Monitor

*Network System, etc,

( Maintenance Manual "Installation of the Unit" P1-1,  Maintenance Manual "System Construction" P2-1)

2

Turn ON the main power supply switch.



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

3

Adjust the angle of the display for optimum view.

NOTE

- When adjusting the angle of the display, do not apply excessive force.

4

Adjust the brightness and color of the display, and perform initial settings, etc.

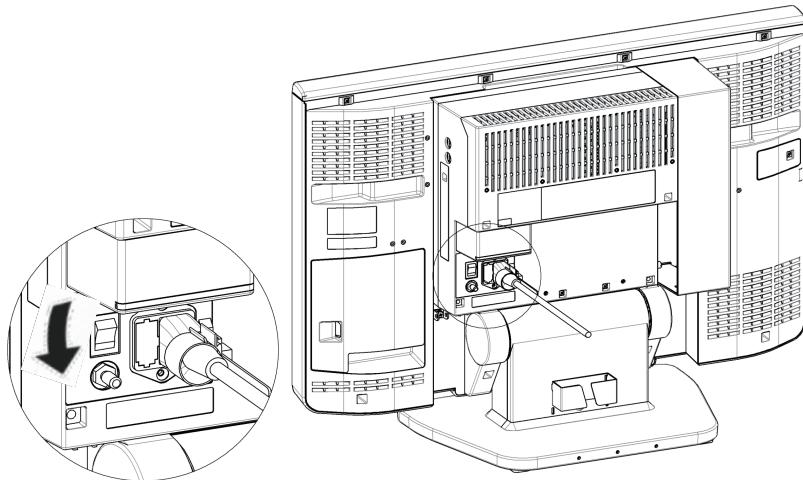
( Maintenance Manual "Initial Settings" P6-1)

□ To Turn OFF the Power

The procedure to cease the monitoring is explained below.

1

Turn OFF the main power supply switch.



▶ The power supply LED will turn OFF.

CAUTION

- After using the equipment, turn OFF the main power supply switch. If not using for a long period, disconnect the power cable from the equipment.
- 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.

Installing the Recording Paper (Optional)

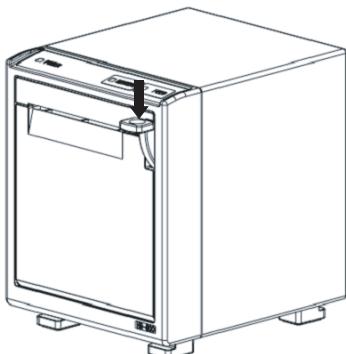
When using the optional Recorder Unit (HR-800), install the paper using the following procedure.

⚠ CAUTION

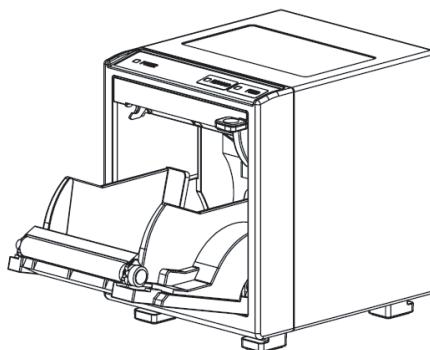
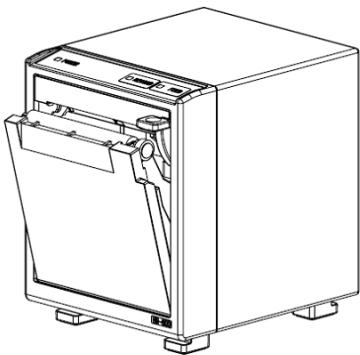
- ♦ Recording paper
 - ♦ Use only "OP050-01TDR" for the recording paper.
The surface treatment and thickness of the recording paper affects the printing quality.
- ♦ Storing the Recording Paper
As thermal type recording paper is used, improper storage may change the quality of the recorded content, and 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/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.
- ♦ Installing the Recording Paper
 - ♦ When installing the recording paper, pay attention not to touch the thermal head or sensor. The temperature of those parts rises immediately after printing and may cause burn injury. Also, it may cause failure to the thermal head and sensor.
 - ♦ Do not operate the equipment with wet hand. Doing so may short the thermal head.

Install the recording paper with the following procedure.

- 1 Press the Open/Close Lever.

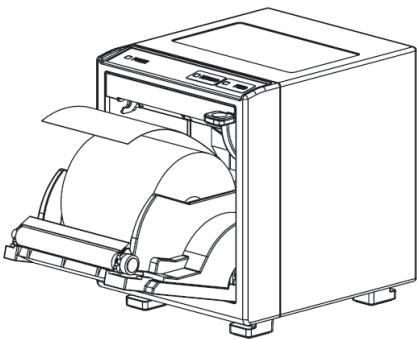


- ▶ The paper holder opens.



2 Set the recording paper.

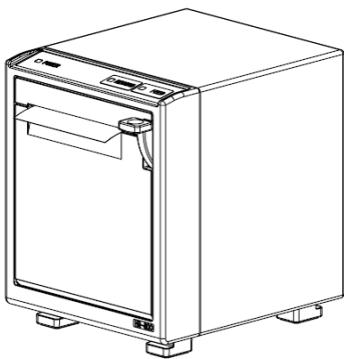
The outside surface of the paper is heat-sensitive. Make sure to place the outside surface of the paper facing up.



NOTE

- ◆ Place the paper so that the "FUKUDA DENSHI" logo is outside and facing up.

3 Close the paper holder.



NOTE

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

Daily Check

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

(Maintenance Manual "Daily Check List")

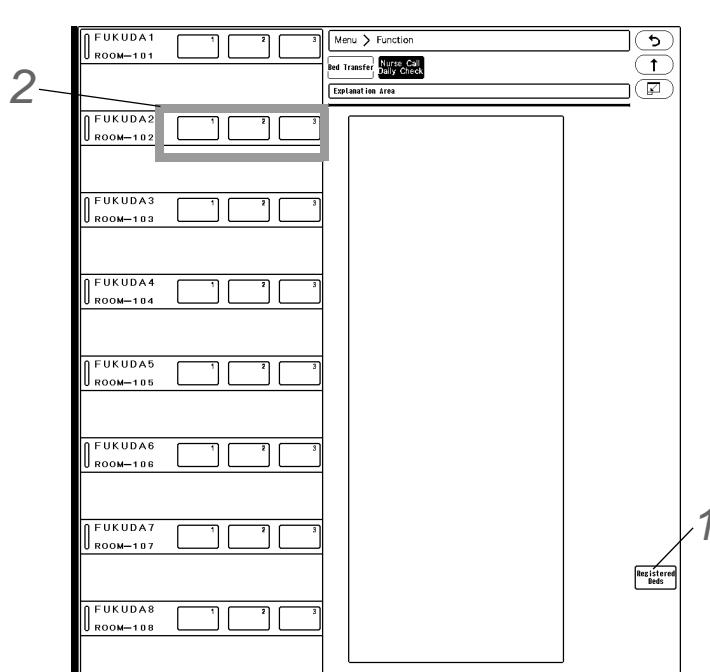
Take necessary measures for the items with the "NG" judgement, and use the equipment only if the judgements for all the items are "OK".

Nurse Call Daily Check

Before monitoring, perform nurse call daily check to make sure that the nurse call is properly notified.

- 1** Press the [Menu], [Nurse Call Daily Check] ("Function") keys.

- ▶ The "Nurse Call Daily Check" screen will be displayed.
- ▶ The nurse call setup status for all the patients monitored on the DS-8900 system will be displayed.
- ▶ The display can be switched between [Displayed Bed] and [Registered Bed].



- 2** Check the nurse call connection status of each bed. Press the check key [1] / [2] / [3].

The displayed number (1 to 3) inside the check key indicates the urgency level.

- ▶ The key will turn blue when pressed.
- ▶ Nurse call will start.
- ▶ The key will remain blue until the nurse call connection is verified at the call target (base station, PHS, etc.). When the connection is verified, "Connected" will be displayed.
- ▶ On the nurse call system (base station, PHS, etc.), "TEST1/2/3" will be displayed.

NOTE

- ♦ If "Failed" is displayed, the connection may not be proper.
("Troubleshooting" P13-1)

Chapter 6 Admit/Discharge

What You Can Do on the Admit/Discharge Menu	6-1
Admit	6-2
Entering the Patient Information	6-2
To Enter the Patient Information from the Magnetic Card or Barcode.....	6-4
Entering Patient Information from the Patient Data Server.....	6-4
To Change the Admit Date	6-7
EMR Link Function	6-7
Restrictions of EMR Link Function	6-8
Admit/Discharge on the EMR	6-8
Suspend Monitoring	6-9
To Suspend Monitoring	6-9
To Resume Monitoring	6-11
Bed Transfer and Bed Exchange	6-11
Discharge	6-12
Discharging Procedure	6-12

Chapter 6 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 temporarily cease the measurement and alarm generation.

- 1** On the Individual Bed Display, press the [Menu], [] (Admit/Discharge) keys.

- ▶ The "Admit/Discharge" screen will be displayed.
- Enter the patient information.

- 2** Monitoring can be suspended by pressing the [Monitor Suspend] key.

- 3** Monitoring data of the patient can be deleted by pressing the [Discharge] key.

CAUTION

- When a patient is discharged, delete the patient's monitoring data by performing the discharging procedure. If monitoring of new patient is started without performing a discharge procedure of 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.
- Before monitoring, make sure the current alarm setting is suitable for the patient's condition.

2

3

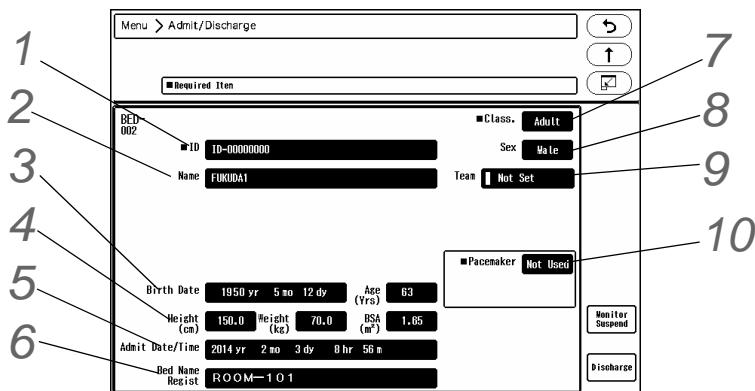
Admit

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

Patient ID	Patient Information (Sex, Birth Date, Age, Height, Weight, BSA)
Name	Patient Classification (Adult / Child / Neonate)
Nurse Team	Pacemaker (Used / Not Used)

Entering the Patient Information

Enter the patient's information.



1 Patient ID.

Up to 20 characters of alphabets, numbers, or symbols can be used.

After entering the ID, press the [Set] key. If the [Set] key is not pressed, the entered ID will not be finalized.
(☞ "To Enter Characters" P4-8)

2 Patient Name

Up to 16 characters of alphabets, numbers, or symbols can be used.

The entered name will be displayed on the home display. (☞ "To Enter Characters" P4-8)

3 Birth Date/Age

There are two ways to enter the patient's age. One is to enter the birth date which will automatically calculate the age, and the other is to directly enter the age using the numeric keypad. If [Neonate] is selected for patient classification, age will be displayed in days.

4 Height/Weight/BSA

The BSA (Body Surface Area) will be automatically calculated from the height and weight.

5 Admit Date/Time

The patient's admit date/time will be displayed.

The admit date/time can be changed when a data server is used through the TCP/IP network.
(For data server setup, ☞ Maintenance Manual "Data Server" P2-14)

6 Bed Name

Select the bed name from the displayed list.

The bed name displayed in gray indicates that it is already used by other bed.

The bed name displayed in blue indicates that it is selected for that bed. The bed names need to be registered in advance on the "Initial Settings".

(☞ Maintenance Manual "Bed Name Registration" P6-22)

WARNING

- When using the PHS nurse call system, make sure to set the "Bed Name" as it will be used for alarm notification to the PHS. If the "Bed Name" is not set, the patient cannot be specified on the nurse call system.

7

Patient Classification [Adult]/ [Child]/ [Neonate]

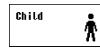
The patient classification selection will affect the accuracy of NIBP, HR, RR measurement. It will also affect the delay time of numeric data alarm.

► The selected patient classification and icon will be displayed on the home display.

For adult:



For child:



For neonate:



WARNING

- The patient classification selection influences the precision of the QRS detection and NIBP measurement. Make sure the correct selection is made.

8

Sex [Male] / [Female]

9

Nurse Team

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.

The nurse teams need to be registered in advance on the "Initial Settings".

(☞ "Nurse Team Setup" P12-32)

10

Pacemaker

Select from [Used] / [Not Used].

WARNING

- The pacemaker use selection influences the precision of the QRS detection and arrhythmia analysis. Make sure the correct selection is made.

- When [Used] is selected, the monitor will identify the pacemaker pulse and insert an artificial pulse onto the ECG waveform for easy identification. When pacing waveform does not appear (pacing failure), erroneously detecting the pacemaker pulse as QRS will be prevented.
- The arrhythmia analysis will detect pacing beat as P (Pacemaker Beat) or F (Fusion Beat) to prevent erroneous judgment of VPC.

To Enter the Patient Information from the Magnetic Card or Barcode

By using the magnetic card reader or barcode reader, patient information can be automatically entered at patient admittance. The admittance process will speed up compared to manually entering each information.

NOTE

- To automatically enter the patient information from the magnetic card or barcode, it is necessary to perform the setup in advance.

1

Display the "Admit/Discharge" menu for the patient to perform the admit process.

2

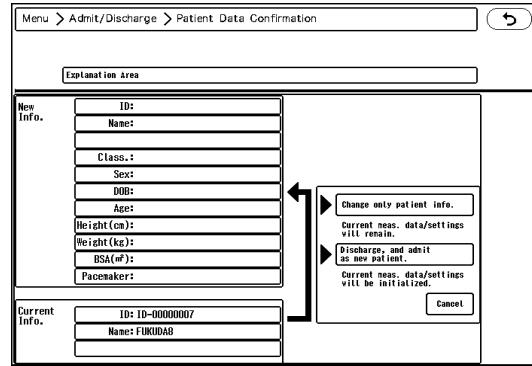
Read the data from the magnetic card or barcode.

- ▶ The read data will be displayed.

3

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 admits the searched patient as new patient.
- ▶ [Cancel] : Cancels the acquired information.



NOTE

- The item not acquired from the magnetic card or barcode will be left blank. For the blank item, manually enter the information.
(☞ "Entering the Patient Information" P6-2)

Entering Patient Information from the Patient Data Server

By searching the information on the patient data server, the patient admit/discharge process linked to the electronic medical record (EMR) can be performed.

When a patient data server and magnetic card reader (or barcode reader) are used simultaneously, the information on the patient data server can be searched using the information on the magnetic card (or barcode).

NOTE

- To use the patient data server, it is necessary to perform network setup in advance.
(☞ Maintenance Manual "Patient Data Server" P2-16)

CAUTION

- The item not acquired from the patient data server will be left blank. For the blank item, manually input the information.
(☞ "Entering the Patient Information" P6-2)
- After the information for a new patient 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.

REFERENCE

- The following messages will be displayed in the "New Information" area.
 "Searching patient": In process of searching the patient data server.
 "No relevant patient information was found for the entered ID.": No relevant patient has been found on the patient server.
 "Failed to find patient information for the entered ID."
 "Failed to find patient information for the entered ID (Time-out).": Patient information could not be found.

When Using the Patient Data Server and Magnetic Card Reader (or Barcode Reader)

1 Display the "Admit/Discharge" menu.

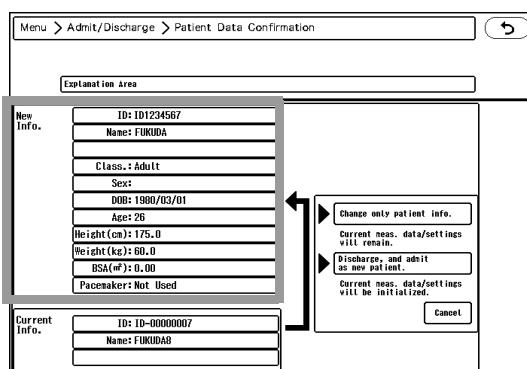
2 Acquire the patient information.

The procedure differs depending on the ON/OFF setting of "Search Patient ID Linked to Magnetic Card Reader (Barcode Reader)" for the patient data server setup.

When [ON] is selected for "Search Patient ID Linked to Magnetic Card Reader (Barcode Reader)"

1 Read the data from the magnetic card or barcode.

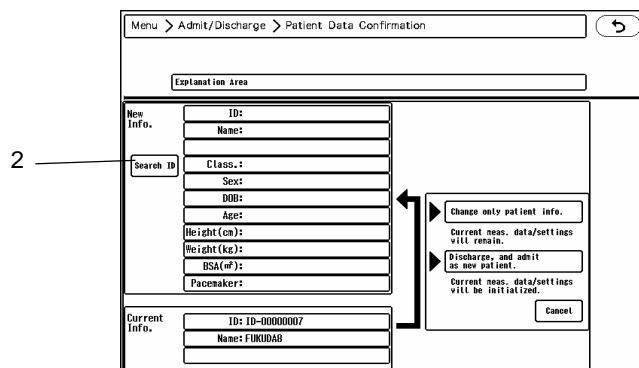
- The searched patient data will be displayed in the "New Information" area.



When [OFF] is selected for "Search Patient ID Linked to Magnetic Card Reader (Barcode Reader)"

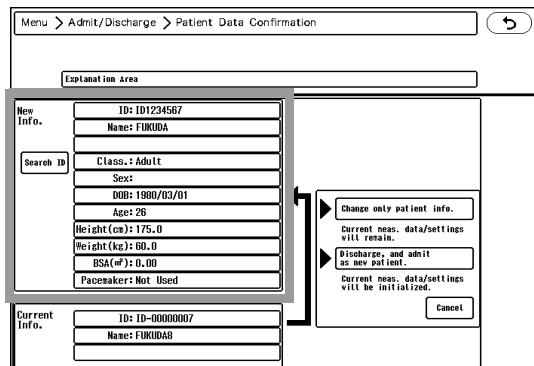
1 Read the data from the magnetic card or barcode.

- The read patient data will be displayed.



2 Press the [Search ID] key.

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



3 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 admits the searched patient as new patient.
- [Cancel] : Cancels the acquired information.

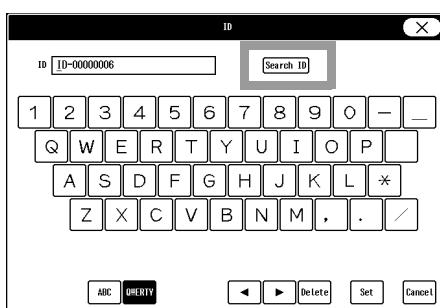
□ When Using Only the Patient Data Server

1 On the "Admit/Discharge" menu, press the key for "ID".

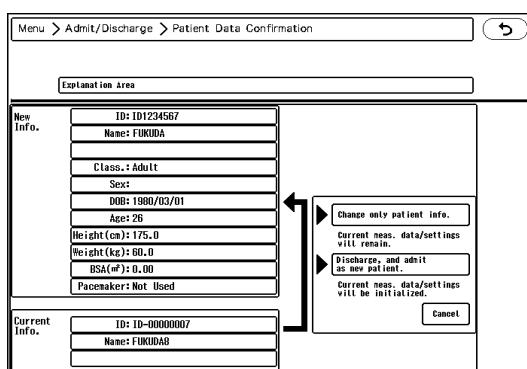
- The "ID" window will be displayed.

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

3 Press the [Search ID] key.



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



4 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.

To Change the Admit Date

The admit date/time can be changed when a data server is used through the TCP/IP network or when EMR link function is used with the patient data server.

NOTE

- ♦ To change the admit date/time, it is necessary to perform network setup for the data server and the patient data server in advance. (☞ Maintenance Manual "TCP/IP Network" P2-11)

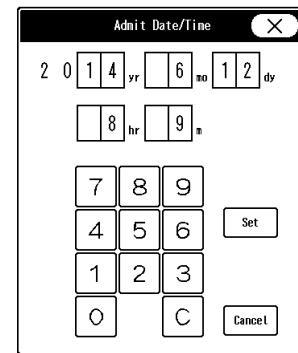
1 Press the key for "Admit Date/Time" on the "Admit/Discharge" menu.

- ▶ The "Admit Date/Time" window will be displayed.

2 Enter the year, month, day, hour, and minute. It is not possible to set a future date/time.

- 1 Enter the numeric where blue cursor is displayed.
Enter the year, month, day, hour, and minute using the numeric keys.
- 2 Press the [Set] key.

- ▶ The entered numbers will be finalized.



EMR Link Function

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

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



CAUTION

- ♦ If there are items not transmitted from the EMR, change those manually on the "Admit/Discharge" menu. Make sure that the pacemaker usage and patient classification are properly set as these will affect the monitoring accuracy.
- ♦ The discharge process on EMR will initialize the patient information and monitoring data, but will not initialize the alarm settings on the central monitor. To initialize these data, it is necessary to perform discharge process on the central monitor.

NOTE

- ♦ To use the EMR link function, it is necessary to select [Link with EMR] on the "Network Configuration (Patient Data Server)".
(☞ Maintenance Manual "Patient Data Server" P2-16)

Restrictions of EMR Link Function

These are the following restrictions when using the EMR link function.

Function	Item	EMR Link Function		
		EMR Admitted	EMR Discharged	EMR Offline
"Admit/Discharge"	ID	No	No	Yes
	Search ID	No	No	No
	Name	No	No	Yes
	Discharge	No	Yes	Yes
	Monitor Suspend	Yes	Yes	Yes
	Admit Date/Time	No	No	Yes
	Bed Name	Yes	Yes	Yes
	Other patient information	Yes	Yes	Yes
	Confirmation window display during reading data from the magnetic card	No	No	Yes
"Menu"	Discharge	No	Yes	Yes
"Menu" (Central)	Bed Transfer	No	No	Yes
DS-LAN/TCON Network (Operation on the bedside monitor)	Change of patient ID	No	No	Yes
	Change of patient name	No	No	Yes
	Change of admit date	No	No	Yes
	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

□ Connection Procedure

When a patient is admitted on the EMR, EMR notice icon will be displayed on the home display.

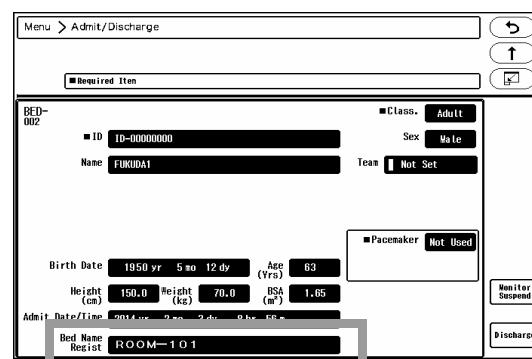


- 1** Press the EMR notice icon.

- ▶ The "Admit/Discharge" screen will be displayed.
- ▶ The patient's admit date/time on the EMR will be displayed for "Admit Date/Time".

- 2** The patient information will be acquired from the EMR.

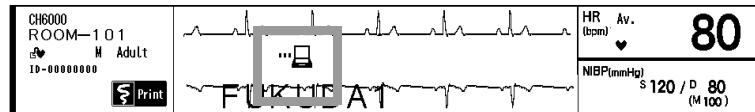
- ▶ The monitoring for the patient will start.
When EMR link function is used, patient ID, patient name, and admit date from the EMR cannot be changed on the central monitor, but other patient information can be manually changed.



When a Patient is Discharged from the EMR

When a patient is discharged from the EMR, "Discharged on EMR" icon 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.

Suspend 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 printing can be suspended without erasing any data and setup condition.

By selecting ON for "Monitor Suspend's Message Selection", different messages in different colors according to the patient's destination can be displayed during the monitoring suspended 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

- During the monitoring suspended condition, the trend data and full disclosure waveform data will not be acquired.
- Resuming monitoring will also resume the suspended alarm.
- 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.

REFERENCE

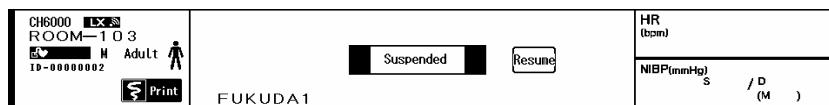
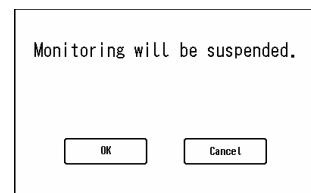
- To display the detailed message during monitoring suspended condition, select ON for "Monitor Suspend's Message Selection", and set the details under [Menu] > [Monitor Suspend] ("Common Setup"). (["Monitor Suspend Setup" P12-31](#))

To Suspend Monitoring

- 1 On the "Admit/Discharge" menu, press the [Monitor Suspend] key.

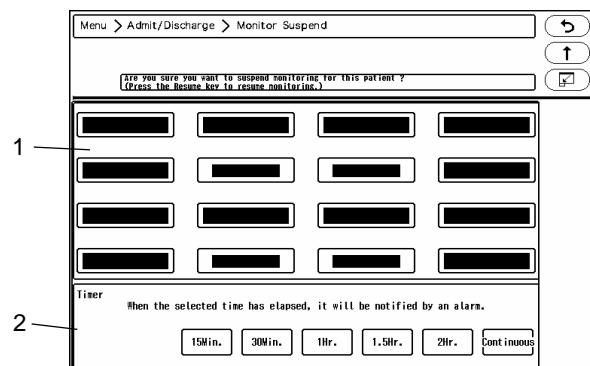
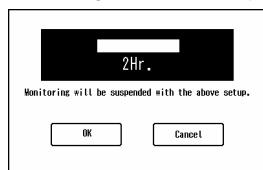
If "Monitor Suspend's Message" is OFF:

- ▶ "Monitoring will be suspended." message will be displayed. (shown on right)
- ▶ To cancel the monitor suspend operation, press the [Cancel] key.
- ▶ Pressing the [Suspend] key will suspend the monitoring, and the [Resume] key will be displayed.



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

- ▶ The "Monitor Suspend" screen will be displayed.
- 1** Select the monitor suspend's message.
- 2** Select the monitoring suspend duration from [15Min.]/[30Min.]/[1Hr.]/[1.5Hr.]/[2Hr.].
[Continuous] will start to suspend monitoring without setting the duration.
- ▶ Confirmation window to suspend monitoring will be displayed.



- ▶ Pressing the [Suspend] key will suspend the monitoring.
- 3** Verify that the monitoring is suspended on the home display.
The selected monitor suspend's message with the set color will be displayed on the home display.
- ▶ On the home display, the time will start counting for the set duration.



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

REFERENCE

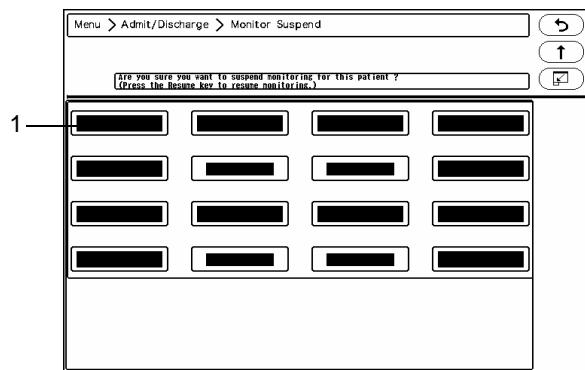
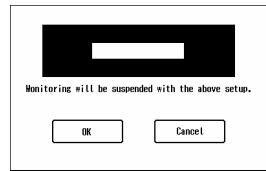
- To extend the monitoring suspended duration, press to display the timer selection.

If "Monitor Suspend's Message" is ON and "Monitor Suspend Time" is OFF:

► The "Suspend" screen will be displayed.

1 Select the monitor suspend's message.

► A confirmation message will be displayed.



► Pressing the [OK] key will suspend the monitoring.

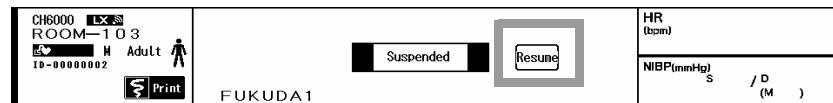
► The selected monitor suspend's message with the set color will be displayed on the home display.

To Resume Monitoring

Resume the monitoring in suspended condition.

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

► The monitoring will resume.



► The monitoring can be also resumed by pressing the [Monitor Resume] key displayed on the "Admit/Discharge" screen of the Individual Bed Display.

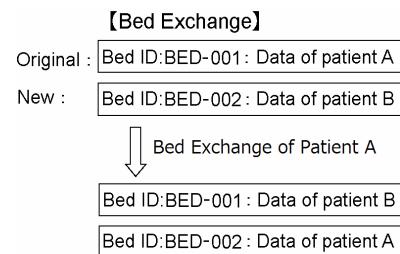
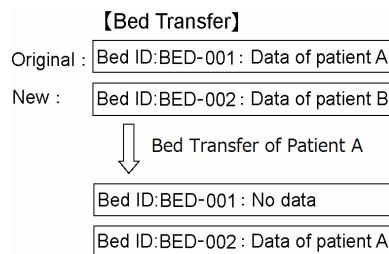
Bed Transfer and Bed Exchange

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

The bed transfer/exchange operation can be performed on the "Function" menu for the Central Monitor Display.
(☞ "Bed Transfer/Bed Exchange" P12-9)

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

NOTE

- ♦ The review data cannot be transferred/exchanged among the central monitors.
The review data can be transferred/exchanged within the same central monitor.

Discharge

The patient information, monitoring data, monitoring condition will be cleared to prepare for monitoring the next patient. The following data will be cleared after the discharge procedure.

- ♦ Patient information entered 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 the central monitor. The discharge operation on the bedside monitor and central monitor will be independent. For details of the bedside monitor type and software version, refer to your nearest service representative.
- ♦ When a EMR link function is used, the discharge operation cannot be performed.

NOTE

- ♦ The alarm limit will be initialized to the value set under [Menu] > "Initial Settings" > [Admit] ("User I/F") > [Alarm].
( Maintenance Manual "Admit" P6-12)
- ♦ When the discharge operation is performed on the bedside monitor, the settings will be initialized according to the "Power ON/Discharge" setting on the bedside monitor.

REFERENCE

- ♦ The monitoring condition after discharge can be selected from [Admit] or [Suspend] for "Setup at Discharge" under [Menu] > "Initial Settings" > [Display/Print] ("User I/F").
( Maintenance Manual "Display/Print" P6-9)

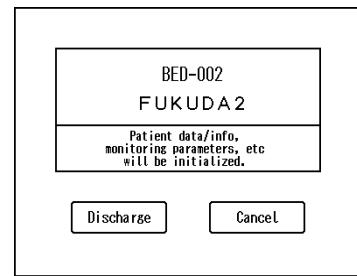
Discharging Procedure

⚠ CAUTION

- ♦ If monitoring of new patient is started without discharging the previous patient, the measurement data of the previous and new patient will become mixed up on the recall and trend data.
- ♦ When the discharge procedure is performed, patient data such as recall and trend will be initialized. The parameter and alarm will be reset according to the settings made under [Menu] > "Initial Settings" > [Admit] ("User I/F").
( Maintenance Manual "Admit" P6-12)

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

- ▶ The discharge confirmation window will be displayed.
- ▶ If [Cancel] is pressed, the discharge process will be cancelled and the confirmation window will close.



2 Press the [Discharge] key.

- ▶ The patient data, patient information will be initialized.
- ▶ The alarm settings will be initialized to the settings made under [Menu] > "Initial Settings" > [Admit] ("User I/F").

Chapter 7 Alarm Function

General Description	7-1
Classification and Level of the Alarm	7-2
Alarm System	7-2
Alarm Message Display Area	7-3
Alarm Limit Setup	7-4
Alarm Limit Setup for Each Parameter	7-4
Arrhythmia Alarm Setup	7-6
List of Alarm Settings.....	7-9
All Beds Alarm Settings	7-10
Alarm Occurrence.....	7-11
Alarm Suspend	7-13
Alarm Silence and Alarm Sound Suspend.....	7-13
Alarm Silence	7-13
Alarm Sound Suspend.....	7-15
Too-Far Alarm	7-16
ECG Alarm at Lead-Off Condition	7-16
All Beds Alarm Events	7-17
Alarm History	7-19
Displayed Items	7-19
Alarm History Setup and Printing	7-22

Chapter 7 Alarm Function

General Description

CAUTION

- This equipment is provided with the equipment status alarm judgement function, but not provided with other alarm judgement and arrhythmia analysis function. These results are transmitted from the bedside monitor or telemetry transmitter.
- On a wired network (DS-LANIII), the alarm generated on the bedside monitor will be transmitted to this equipment with maximum of 5 seconds delay (at NIBP alarm generation).
- On a wireless network, the alarm generated on the bedside monitor will be transmitted to this equipment with maximum of 15 seconds delay.
- The adjustable alarm limit increment is different between the DS-7000 series and the DS-8000 series monitors. Therefore, the set alarm limit may change to the adjustable value depending on the monitor type constructing the network system.
- The alarm messages will be displayed according to the priority. For the same alarm priority, the alarm message for the newer alarm will be displayed.
- For the SV-900 ventilator, alarm factor will not be transmitted to the central monitor.
- Depending on the bedside monitor type and software version, the ventilator alarm factor may not be transmitted to the central monitor.
For details of the bedside monitor type and software version, refer to your nearest service representative.
- The alarm message for the arrhythmia alarm (except Tachy, Brady) will continue to be displayed for 30 seconds even after the alarm condition dissolves.
- During arrhythmia learning, the arrhythmia alarms other than Asystole, VF, Pause, Tachy, Brady will not be generated.
- If "Suspend Arrhy. Analysis during Noise Interference" ("Initial Settings" > [Alarm Setup]) is set to [ON], the "Cannot analyze" alarm will generate when analysis is suspended for 30 seconds and longer.
- Even during "Cannot analyze" status, alarm for HR, Asystole, VF, Tachy, Brady will be generated.

REFERENCE

- The alarm sound can be turned ON on the "Tone/Volume" menu.
( "Tone/Volume" P12-29)
- On the "Alarm Setup" under the "Initial Settings" menu, detailed alarm setup can be performed.
This setup should be performed by our service representative or system administrator of your institution.
( Maintenance Manual "Alarm" P6-2)

Classification and Level of the Alarm

The classification and level of the alarms are explained below.

□ Alarm Classification

The alarms displayed on this equipment are classified as follows.

Alarm Classification	Details
Vital Alarm	Alarms generated based on vital information. Includes numeric data alarms and arrhythmia alarms.
Arrhythmia Alarm	Alarms based on arrhythmia analysis. (Ex.: Asystole, VF)
Numeric Data Alarm	Alarms based on numeric data. (ex.: Upper HR, Lower BP1)
Equipment Alarm	Alarms based on measurement status. Includes alarms of arrhythmia status, measurement status, external equipment.
Arrhythmia Status	Arrhythmia analysis condition such as noise, etc. (Ex.: ECG Low, ECG Artifact)
Measurement Status	Measurement status condition such as noise, etc. (Ex.: Lead-OFF, Check SpO ₂ Sensor)
External Equipment Alarm	Alarms output from external equipment. (Ex.: Ventilator Alarm)
System Status	Alarms related to the main unit and connected equipment. (Ex.: Check PHS comm., Check Data Server Comm.)
Printer Status	Alarms related to printer. (Ex.: Check Cassette)

□ Alarm Level

The alarms are classified to Level S (top priority), Level H (high priority, urgent), Level M (medium priority, caution), Level L (low priority, status), and Notification, and the message will be displayed according to the priority of Level S > Level H > Level M > Level L > Notification.

The displayed messages will flash in red and white for Level S, red for Level H, yellow for Level M, blue for Level L, and white for Notification.

Alarm Priority, Level		Details	Alarm Sound	Displayed Color
Top Priority	S	Top Priority Alarm	Continuous	Red/white
High Priority	H	Life Threatening Alarm	Continuous	Red
Medium Priority	M	Cautionary Alarm	5 seconds interval	Yellow
Low Priority	L	Treatment Needed Alarm	15 seconds interval	Blue
Notification	N	Notification Alarm	Display Only	White

CAUTION

- When more than one alarms of the same priority are generated, the newer alarm message will be displayed.

Alarm System

The alarm system can be selected from Fukuda Tone / Melodic Tone / Standard Tone.

The default setting is Standard Tone mode.

The alarm sound differs for each alarm system.

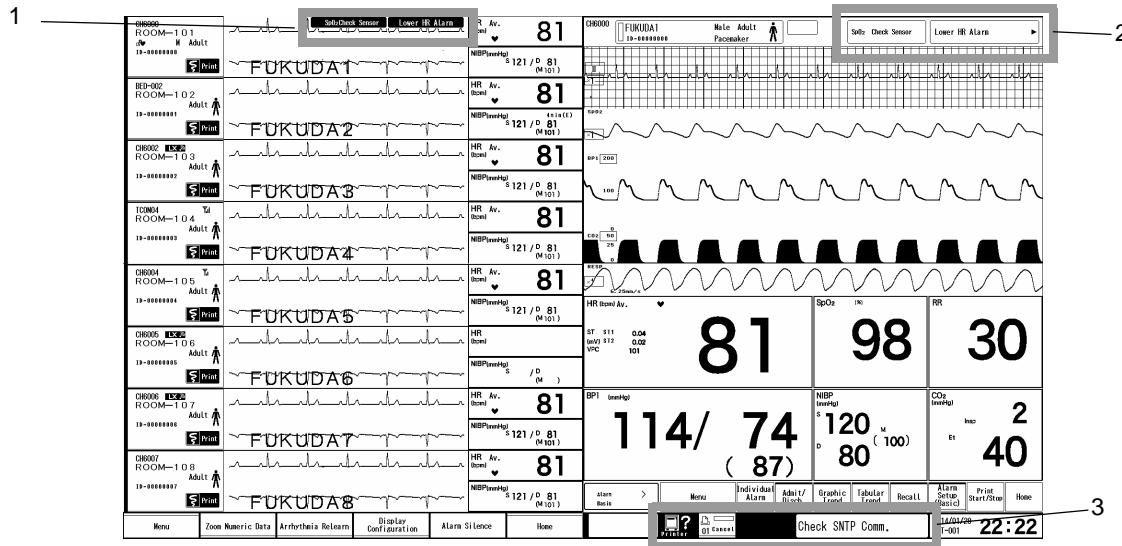
(☞ "Settings for Each Alarm System" P16-5)

REFERENCE

- The alarm system can be set on the "Alarm Setup" under the "Initial Settings" menu.
(Maintenance Manual "Alarm" P6-2)

Alarm Message Display Area

The alarm messages will be displayed in the area shown below.

**1 All Beds Display Message Area**

The messages such as equipment alarm, vital alarm, alarm silence, alarm suspend, etc. will be displayed. If more than one alarms generate at the same time, the alarm messages will be displayed alternately in 2-seconds intervals. In such case, ► mark will be displayed on the right side of the message.

2 Individual Bed Display Message Area

The messages such as equipment alarm, vital alarm, external equipment alarm, alarm silence, alarm suspend, etc. will be displayed.

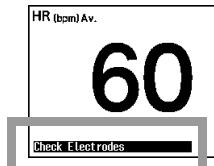
If more than one alarms generate at the same time, the alarm messages will be displayed alternately in 2-seconds intervals. In such case, ► mark will be displayed on the right side of the message.

3 System Status Area

The system status message, printer status message will be displayed.

4 Numeric Data Box Message Area

The vital alarm, equipment alarm of each parameter will be displayed inside the corresponding numeric data box. (shown on right)



Alarm Limit Setup

Alarm Limit 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, an alarm will generate.

WARNING

- Set the appropriate upper and lower alarm limit for each parameter according to the monitoring condition.
- When the system alarm is suspended, all the alarm will be suspended even if the parameter alarm is set to ON. Also, the alarms will not be stored as recall events.
- If the upper/lower alarm limit of the parameter is set to OFF, or arrhythmia alarm is set to OFF, alarm will not function even if the system alarm is set to ON. Pay attention when setting them OFF.
- If the parameter is not selected for the "HR/PR Alarm Source" (ECG/SpO₂/BP) on a wired or TCON network bedside monitor, the alarm for that parameter will be set to OFF on this equipment.

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 equipment.

Even if alarm ON/OFF setting or threshold is changed, it will automatically turn OFF after 3 seconds.

CAUTION

- On a wired network (DS-LANIII), the alarm generated on the bedside monitor will be transmitted to this equipment with maximum of 5 seconds delay (at NIBP alarm generation).
- On a wireless network, the alarm generated on the bedside monitor will be transmitted to this equipment with maximum of 15 seconds delay.

NOTE

- The adjustable alarm limit range for this equipment and the bedside monitor may differ.

Example:

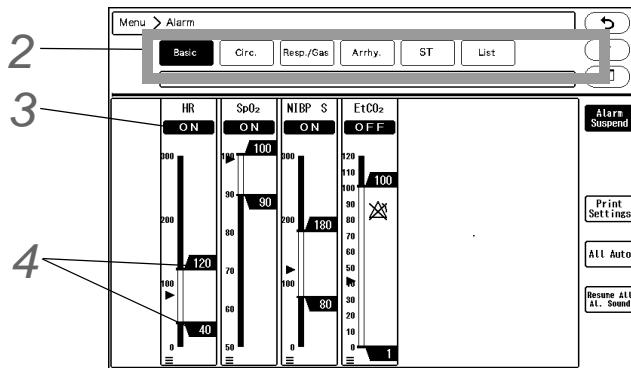
Upper alarm limit of 300bpm can be set for PR on this equipment, but there are some bedside monitors which can measure only up to 250bpm. In such case, there is a possibility of setting the alarm limit exceeding the measurement range of the bedside monitor.

When setting the alarm limit on this equipment, make sure to set it within the measurement range of the bedside monitor.

1

Press the [Menu], [Basic] ("Alarm") key on the Individual Bed Display.

- The alarm setup screen will be displayed.



REFERENCE

- ♦ The standard parameters will be displayed on the Menu screen. The parameters to be displayed here are selectable.
(Maintenance Manual "Alarm" P6-2)

2 Select the parameter group from the tab.

3 Select ON/ OFF for the individual alarm.

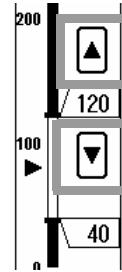
- [ON]: Alarm of the corresponding parameter will generate.
- [OFF]: Alarm of the corresponding parameter will not generate.

4 Set the upper/ lower limit. ► indicates the current measurement value.

1 Slide the keys on the right side of the bar.

- : Adjusts the upper limit.
- : Adjusts the lower limit.

► By releasing the finger from the key, fine-tune keys will appear for a fixed period of time. (shown on right)



2 The limits can be adjusted using the fine-tune keys.

3 Press the to set the limits automatically.

REFERENCE

- ♦ On the DS-8900 system, the set alarm limits will be retained even after the power is turned OFF.
- ♦ When the discharge operation is performed on the central monitor, the alarm limits will be reset according to the "Admit Setup" settings.
(Maintenance Manual "Admit" P6-12)
When the discharge operation is performed on the bedside monitor, the alarm limits will be reset according to the settings made on the bedside monitor.
- ♦ For ST level alarm setup, refer to "ST Setup" P8-3.

Alarm Limit Range

Item	Description	
HR/PR/PR_IBP	ON, OFF	20 to 300bpm
BED ST(I) to ST(V6)	ST All Alarms	ON/OFF
	ST1 to ST12	± 2.0mV, ± 20.0mm Indiv. Alarm ON, OFF
BP1 to BP8	ON, OFF	0 to 300mmHg 0 to 40.0kPa, 0 to 40.0cmH ₂ O
SpO ₂	ON, OFF	50 to 100%
RR	ON, OFF	5 to 150Bpm
APNEA (Upper Limit)	ON, OFF	10 to 60 sec.
TEMP1 to TEMP8	ON, OFF	30 to 45°C
NIBP	ON, OFF	10 to 300mmHg 1.5 to 40.0kPa
EtCO ₂	ON, OFF	1 to 100mmHg 0.1 to 13.3kPa 0.1 to 13.3%
InspCO ₂ (upper limit)	ON, OFF	1 to 4mmHg 0.1 to 0.4kPa 0.1 to 0.4%
O ₂	ON, OFF	18 to 100%
N ₂ O	ON, OFF	0 to 100%
SEV	ON, OFF	0.5 to 8.0%
ISO, HAL, ENF	ON, OFF	0.5 to 6.0%
DES	ON, OFF	0.5 to 18.0%
SpHb	ON, OFF	1.0 to 24.5g/dL
SpCO	ON, OFF	1 to 40%
SpMet	ON, OFF	1 to 15%
ExpMV (Adult) ExpMV (Child/Neonate)	ON, OFF	2.0 to 20.0L/min 0.5 to 5.0L/min
PEAK	ON, OFF	8 to 100cmH ₂ O
PEEP	ON, OFF	2 to 50cmH ₂ O

If the value exceeds the adjustable range, the limit within the range will be set.

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

Arrhythmia Alarm Setup

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.

 Arrhythmia Alarm

NOTE

- For "Asystole", "Run", "Pause", "Frequent" alarms, set ON/OFF and the threshold level.

1

Press the [Menu], [Arrhy.] ("Alarm") key on the Individual Bed Display.

- The arrhythmia alarm setup screen will be displayed.

2 Set each arrhythmia alarm.

- [ON]: Arrhythmia alarm will generate.
- [OFF]: Alarm will not generate.

3 Set the threshold level for "Asystole", "Run", "Pause", "Frequent".

- Press the threshold level key for each arrhythmia.

2 Set the threshold level.

- For "Asystole", "Run", "Pause", select the threshold level from the dropdown list.
- For "Frequent", enter the threshold level on the displayed window.
After entering, press the [Set] key.

Asystole : Select the Asystole threshold level from 3 to 10 sec. (Default: 5 sec.)
 Run : Select the Run threshold level from 2 to 8 beats. (Default: 3 beats)
 Pause : Select the Pause threshold level from 1.5 to 5 sec. (Default: 3 sec.)
 Frequent : Select the Frequent threshold level from 1 to 50 beats/min. (Default: 10 beats/min.)

NOTE

- If [Always ON] is set for "Asystole/ VF/ VT Alarm" ("Initial Settings" > [Alarm Setup]), "Asystole", "VF", "VT", "Slow VT" alarm cannot be turned OFF.
([Maintenance Manual "Alarm" P6-2](#))

□ HR Lower Limit for VT and RUN

On the "Detail Setup" for arrhythmia alarm, HR lower limit for VT and Run can be set.

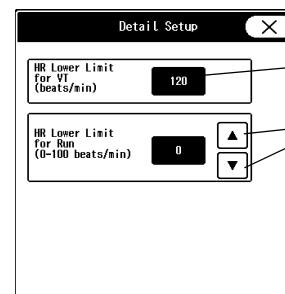
CAUTION

- The settings for the "HR Lower Limit for VT" and "HR Lower 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.

1 Press the [Detail Setup] key on the arrhythmia alarm setup screen. [Menu] > [Arrhy.] ("Alarm") .

2 For "HR Lower Limit for VT", set the VT analyzing condition ([120] / [140]) for the arrhythmia analysis.

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



3 Press the ▲/▼ keys to set the "HR Lower Limit for Run". Set the detection level in the range of 0 to 100bpm.

- When the average HR of continuous VPC exceeds the set value, Run alarm will generate.

2
3

4 After the setting, press the  key and close the window.

□ To Perform Arrhythmia Learning

Learning the 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 learning procedure, arrhythmia alarm other than Asystole, VF, Pause, Tachy, Brady will not generate.

The arrhythmia learning can be performed from the "ECG" screen or from the [Arrhythmia Relearn] key preprogrammed as user key on the central monitor display.

(☞ "User Key Display on the Numeric Data Box" P12-6)

Procedure from the "ECG" Screen:

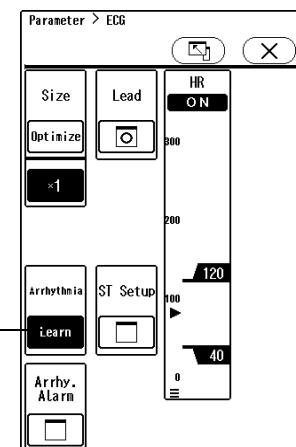
1 Select the patient to perform the arrhythmia learn process by pressing the bed selection area.

2 Press the HR numeric data box.

▶ The ECG floating window will be displayed.

3 Press the [Learn] key for "Arrhythmia".

- ▶ Arrhythmia learning will start.
- ▶ During the arrhythmia learn process, the key will be displayed in blue. Pressing the key while learning arrhythmia will not stop the learning.
- ▶ During arrhythmia learning, <LEARN> will be displayed.
- ▶ When the learn process is completed, the message will disappear.



Procedure from the Central Monitor User Key:



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

▶ [Arrhy Relearn] will be displayed on the all beds display area.

2 Press the [Arrhy Relearn] key on the all beds 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 [Arrhythmia Relearn] key on the central monitor 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: Always ON)

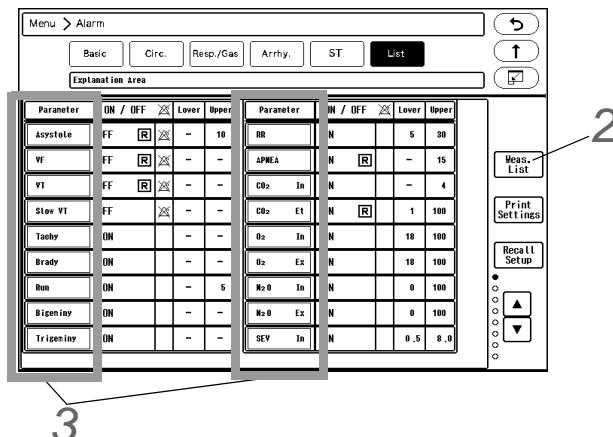
This setup should be performed by our service representative or system administrator of your institution.
(Maintenance Manual "Alarm" P6-2)

List of Alarm Settings

The alarm settings can be verified in list format. The alarm settings for each parameter can be changed on this list.

- 1** Press the [Menu], [List] ("Alarm") key on the individual bed display.

► The alarm settings list will be displayed.



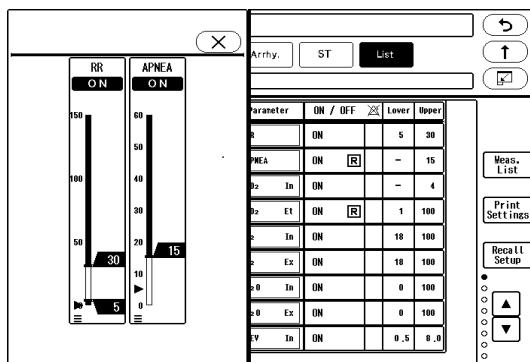
- : Indicates the alarm printing is set for the parameter.
- : Indicates the parameter is set as recall factor.
- : Indicates the alarm is OFF.

- 2** Select from [All List] / [Meas. List].

► [All List]: The settings for all the parameters will be displayed.
► [Meas. List]: The settings for only the measured parameters will be displayed.

- 3** To change the alarm threshold, select the parameter.

► The alarm setup window will be displayed.



► Press / to set the threshold level.

All Beds Alarm Settings

The alarm settings for all beds can be verified in a list format.

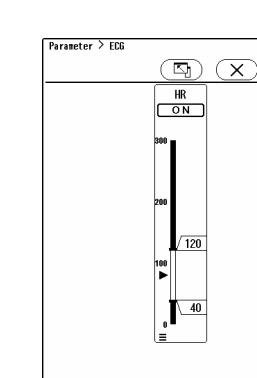
Maximum of 8 beds, 10 parameters can be displayed on one display.

- 1** Press the [Menu], [All Beds Alarm] ("Function") keys.

► The alarm settings for all beds will be displayed.

Menu > Function
All Beds Alarm Bed Transfer Night Mode Nurse Call Daily Grid Discharged List All Beds Event
Explanation Area

	Tachy	Brady	HR	SpO2	PnL_SpO2	SpCO	SpO2-Z	PnL_SpO2-Z	SpCO-Z	NIOP	S
C66800 ROOM-101 FUKUDA1	✗	✗	-	120	100	120	40	100	120	40	180
	-	-	-	80	98	80	21	121	80	20	112
	-	-	40	90	40	-	90	40	-	100	
C66802 ROOM-103 FUKUDA3	✗	✗	-	120	100	120	40	100	120	40	18
	-	-	-	80	98	80	21	121	80	20	11
	-	-	40	90	40	-	90	40	-	10	
C66804 ROOM-105 FUKUDA5	✗	✗	-	120	100	120	40	100	120	40	18
	-	-	-	80	98	80	21	121	80	20	11
	-	-	40	90	40	-	90	40	-	10	
C66807 ROOM-108 FUKUDA8	✗	✗	-	120	100	120	40	100	120	40	18
	-	-	-	80	98	80	21	121	80	20	11
	-	-	40	90	40	-	90	40	-	100	
BED-009 ROOM-109 FUKUDA9	✗	✗	-	120	100	120	40	100	120	40	180
	-	-	-	80	98	80	21	121	80	20	112
	-	-	40	90	40	-	90	40	-	100	
BED-011 ROOM-111 FUKUDA11	✗	✗	-	120	100	120	40	100	120	40	180
	-	-	-	80	98	80	21	121	80	20	112
	-	-	40	90	40	-	90	40	-	100	
C66811 ROOM-112 FUKUDA12	✗	✗	-	120	100	120	40	100	120	40	180
	-	-	-	80	98	80	21	121	80	20	112
	-	-	40	90	40	-	90	40	-	100	
C66812 ROOM-113 FUKUDA13	✗	✗	-	120	100	120	40	100	120	40	180
	-	-	-	80	98	80	21	121	80	20	112
	-	-	40	90	40	-	90	40	-	100	



- For each parameter, upper/lower alarm limit, current value, alarm OFF icon, nurse call mark will be displayed.
- Pressing the parameter area will display the floating window for the corresponding parameter. (shown on right)
- The alarm settings (upper/lower limit, ON/OFF) can be changed.

- 2** Use the / keys to change the displaying parameters.

- 3** The beds to be displayed can be filtered.

- [This Display]: The beds monitored on the display unit currently displaying the alarm settings for all beds will be displayed.
- [Other Display]: The beds monitored on other display unit will be displayed.
- [Nurse Team]: The beds registered for the selected nurse team will be displayed.

- 4** The parameters to be displayed can be filtered.

- Select from [Basic]/[Circ.]/[Resp./Gas]/[Arrhy.]/[ST]/[List]/[Priority (Top)]/[Priority (High)]/[Priority (Med.)]/[Priority (Low)].

- 5** The specific parameters can be highlighted.

- [Alarm ON]/[Alarm OFF]: The parameter which the alarm is set to ON, or OFF will be highlighted.
- [Nurse Call ON]/[Nurse Call OFF]: The parameter which the nurse call is set to ON, or OFF will be highlighted.
- [OFF]: The highlight display will be cancelled.

6 The currently displayed data will be printed on the laser printer.

NOTE

- If a laser printer is not connected, [Print] key will not function.

7 Use the / keys to change the displaying beds.

Alarm Occurrence

When the measurement data exceeds the alarm limit, or when arrhythmia is detected, or when connection failure of the equipments occur, the alarm will be notified by message and sound.

- When an alarm occurs, the numeric data will be displayed in reversed color or in 3D depending on the setting. (Default: Reversed) ("Detail Setup" P12-6)
- The waveform background will light in the color corresponding to the alarm priority. (Default: Lighting) (Maintenance Manual "Alarm" P6-2)
- The alarm indicator will light. The flashing pattern can be changed. (Maintenance Manual "Alarm" P6-2)
- The event key will be displayed on the home display for the alarm generated bed. By pressing the event key, the alarm can be silenced for that bed.
- When more than one alarms 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.

□ Event Key Display

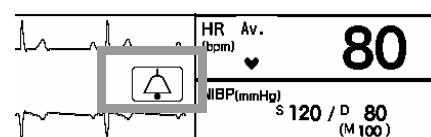
The event key will be displayed on the home display for the alarm generated bed.

The event key icon differs depending on the alarm status.

Status	Event Key Icon	Operation
During Alarm Generation (If no parameter is in alarm silence condition)		Pressing this event key will silence the alarm sound and displays the event list.
During Alarm Generation (If parameter in alarm silence condition is present)		Pressing this event key will display the event list.
End of Alarm Generation (Unchecked), Monitor Suspend Timer, Too Far Alarm		When the monitoring is suspended, pressing this event key will extend the suspended duration. When the Too Far alarm is generated, pressing this event key will display the "Too Far Alarm Silence" window. ("Too-Far Alarm" P7-16)
Alarm Suspend		This key is only for display and will not function.

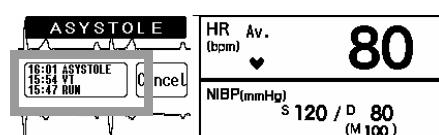
□ Event Key Operation

1 When a parameter alarm is generated, the event key will be displayed on the home display.



2 By pressing the event key, the event list will be displayed and alarm will be silenced for the corresponding bed.

- ▶ On the event list, 3 latest alarm factor will be displayed.



- 3** Pressing the event list will display the recall screen.
 (☞ "Recall" P9-11)

□ Alarm Printing

At alarm generation, the waveform or numeric data of the alarm factor can be printed automatically. When the printer is in "Paper Out" or "Check Cassette" condition, the alarm printing will be in standby state. Also, if alarm generates simultaneously at more than one beds, the data that could not be printed will be in standby state. 1 data per bed can be in standby state for alarm printing. The alarm printing will not be performed for the alarm generated during the standby state.

REFERENCE

- The alarm printing setup can be performed on the "Print Settings". (☞ "Alarm Printing Setup" P11-3)

□ 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" P9-11)

□ Nurse Call System

By connecting the nurse call system to this equipment, the alarm generation can be notified to the nurse call system. PHS nurse call system can be connected to this equipment.
 (☞ Maintenance Manual "Nurse Call System" P5-1)

The alarm factors that can be notified to the nurse call system are as follows. The alarm factors to be notified can be selected from these parameters.

- | | | | |
|--------------|-----------------------|-----------------------|-----------------------|
| ♦ HR | ♦ ST1 | ♦ ST2 | ♦ BP1 to 8 |
| ♦ NIBP | ♦ SpO ₂ -1 | ♦ PR-1 | ♦ RR |
| ♦ Apnea | ♦ EtCO ₂ | ♦ InspCO ₂ | ♦ T1 to T8 |
| ♦ Asystole | ♦ VF | ♦ VT | ♦ Slow VT |
| ♦ Run | ♦ Couplet | ♦ Pause | ♦ Bigeminy |
| ♦ Trigeminy | ♦ Frequent | ♦ Tachy | ♦ Brady |
| ♦ 12-Lead ST | ♦ Ventilator | ♦ Too Far | ♦ SpO ₂ -2 |
| ♦ PR-2 | ♦ SpCO | ♦ SpMet | ♦ Chk Electrode |
| ♦ SpHb | ♦ SpCO-2 | ♦ SpMet-2 | ♦ SpHb-2 |
| ♦ MV | ♦ PEAK | ♦ PEEP | ♦ PR-IBP |

⚠ WARNING

- The PHS nurse call system should be used as supplementary function of alarm notification. Make sure to monitor the alarm on this equipment as it may not be notified to the PHS depending on the nurse call system condition.

Alarm Suspend

The alarm for individual bed can be set to ON or suspend, but it cannot be turned OFF.

⚠ WARNING

- ◆ When the alarm for individual bed is suspended, all the alarms will be suspended even if the parameter alarm is set to ON. In addition, the alarms will not be stored as recall events.
- ◆ If the upper/lower alarm limit of the parameter is set to OFF, or arrhythmia alarm is set to OFF, alarm will not function even if the system alarm is set to ON. Pay attention when setting them OFF.

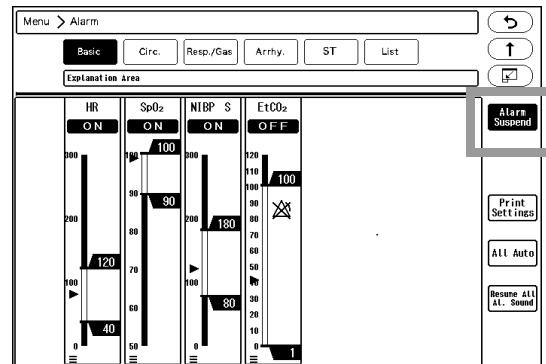
1 Press the [Menu], [Basic] or [Circ.] or [Resp./Gas] ("Alarm") keys on the individual bed display.

- ▶ The alarm setup screen will be displayed.

2 To Suspend the Alarm

1 Press the [Alarm Suspend] key.

- ▶ The key will turn blue, and the alarm will be suspended.
- ▶ <Alarm Susp: xxx sec.> message will be displayed. <xxx sec.> indicates the remaining time. The alarm will turn ON when the suspended time completes.



3 To Turn ON the Alarm

1 Press the [Alarm Suspend] key while in alarm suspended condition.

- ▶ The key will turn gray, and the alarm suspend condition will be cancelled.
- ▶ The set alarm limits for parameters and ON/OFF will be enabled.

Alarm Silence and Alarm Sound Suspend

There are two functions to suspend the alarm sound for fixed amount of time, which are "Alarm Silence" and "Alarm Sound Suspend".

The "Alarm Silence" function suspends the alarm sound for fixed amount of time (1 or 2 min.).

The "Alarm Sound Suspend" function suspends the alarm generation in advance at a time such as during operation when the alarm generation is expected. The alarm monitoring continues while in the "Alarm Sound Suspend" condition. The "Alarm Sound Suspend" cannot be controlled on this equipment but will synchronize with that of the bedside monitor.

Alarm Silence

To Silence Alarm

1 To silence the alarm for all beds, press the [Alarm Silence] key (fixed key or user key).

- ▶ If the alarm cause still remains at completion of silence time, the alarm sound will generate again.

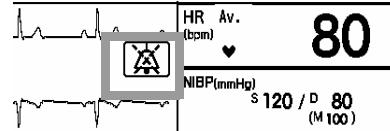
CAUTION

- Pressing the [Alarm Silence] key will silence all the alarms generated on the displayed beds. Pay attention not to miss any important alarms.

REFERENCE

- When [Disable] is set for "All Beds Alarm Silence Key" (Initial Settings > Alarm), [Alarm Silence] key for the fixed key, user key, remote control unit will be disabled.
([Maintenance Manual "Alarm" P6-2](#))

2 To silence the alarm for specific bed, press the event key displayed at alarm generation (shown on right), or [Individual Alarm Silence] key on the individual bed display.



3 When an alarm is silenced on the bedside monitor, the alarm for that bed will be also silenced on this equipment.

Precautions about Silencing the Alarm

- If the alarm cause still remains at completion of alarm silence time (1min. / 2 min.), the alarm sound will generate again.
- If the [Alarm Silence] key is pressed for the alarm of another parameter which occurred during the alarm silence condition, the alarm silence duration for the first alarm will not be extended.
- If another alarm with the same or higher level occurs during the alarm silence condition, the alarm sound for the new alarm will occur.
- Depending on the "Alarm System" setting under "Initial Settings", the alarm operation will differ as follows.

If an alarm condition is resolved for a moment but is generated again during the alarm silence time:	
When [Fukuda Tone] is set	Alarm sound will not generate. Recall and alarm printing will not be performed.
When [Melodic Tone] or [Standard Tone] is set	Alarm sound will generate. Recall and alarm printing will be performed.
If another alarm with lower priority occurs during the alarm silence time:	
When [Fukuda Tone] is set	Alarm sound will not generate. Recall and alarm printing will be performed.
When [Melodic Tone] or [Standard Tone] is set	Alarm sound will generate. Recall and alarm printing will be performed.
If numeric data alarm or arrhythmia alarm with lower priority occurs during the equipment status alarm silenced duration.	
When [Fukuda Tone] or [Melodic Tone] or [Standard Tone] is set	Alarm sound will generate.

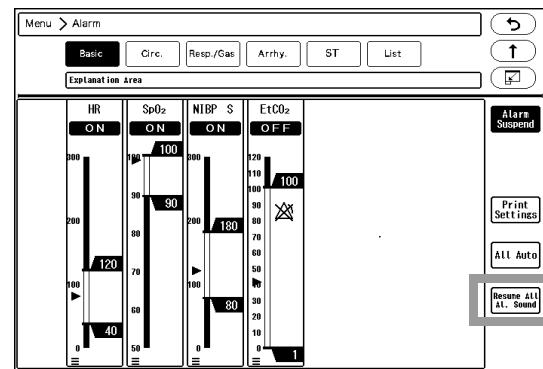
To Cancel the Alarm Silence Condition

The alarm silence condition can be cancelled.

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

The alarm silence condition will be cancelled in the event of any of the following.

- ♦ The alarm silence condition for all parameters will be cancelled for the following case.
 - ♦ When the power is turned ON.
 - ♦ When the system alarm status (ON/Suspend) is changed.
 - ♦ When the monitoring is suspended on the "Admit/Discharge" screen.
 - ♦ When the patient is discharged.
 - ♦ When Bed Transfer/Exchange is performed.
 - ♦ When [Resume All Al. Sound] key on the alarm setup screen is pressed.
- ♦ The alarm silence condition for each parameter will be cancelled for the following case.
 - ♦ When the same alarm is generated again. (During Standard Tone, Melodic Tone mode)
 - ♦ When the alarm silence time for the parameter is completed.
 - ♦ When automatic alarm is set for the parameter.
 - ♦ When the alarm is turned OFF for the parameter.



Alarm Sound Suspend

The "Alarm Sound Suspend" function suspends the alarm generation in advance 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 bedside monitor connected by DS-LAN III network, the alarm sound will be also suspended on this equipment, 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 equipment will resume when the alarm sound on the bedside monitor resumes.

NOTE

- ♦ The "Alarm Sound Suspend" cannot be controlled on this equipment but will synchronize with that of the bedside monitor.
- ♦ During the alarm sound suspended duration, the alarm sound will not generate, but recall and alarm printing will function.
- ♦ The alarm will not be notified to PHS nurse call system during the alarm sound suspended duration.

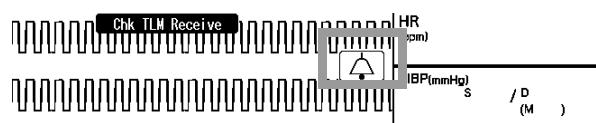
REFERENCE

- ♦ Whether or not to link the alarm sound suspend function with the bedside monitor can be set by selecting ON/OFF for "Link with Alarm Suspend" on the "Alarm Setup" under the "Initial Settings" menu.
(Maintenance Manual "Alarm" P6-2)

Too-Far Alarm

If [ON] is selected for "Too Far Alarm" on the "Alarm Setup" ("Initial Settings"), 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, event key  will be displayed regardless of the setting for "Event Key" on the "Alarm Setup" ("Initial Settings").



1 Press the displayed  key.

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



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

- ▶ [Too Far Alarm Silence]: Too Far alarm will be silenced.
- ▶ [Cancel] : 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.



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.

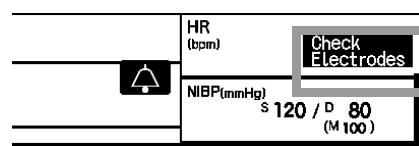
ECG related alarms during Lead-Off condition are as follows.

- ♦ 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" (Initial Settings > Alarm Setup > During Lead OFF) 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 Setup".

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



WARNING

- ♦ If the "Alarm Judgment" for "During Lead OFF" is set to OFF, HR alarm and arrhythmia alarm will not be generated at lead-off condition. If this condition is left unresolved, a sudden change of the patient may not be noticed. Take prompt action when the lead-off condition is detected.
- ♦ The ON/OFF setting of "Alarm Judgment" for "During Lead OFF" is effective for telemetry

beds only. For the wired network beds, HR alarm and arrhythmia alarm will not generate regardless of this setting.

NOTE

- These setups should be performed by our service representative or system administrator of your institution.
(Maintenance Manual "Alarm" P6-2)
- The settings will be synchronized with the administrating central monitor.

All Beds Alarm Events

The alarm events for all beds can be verified in a list format.

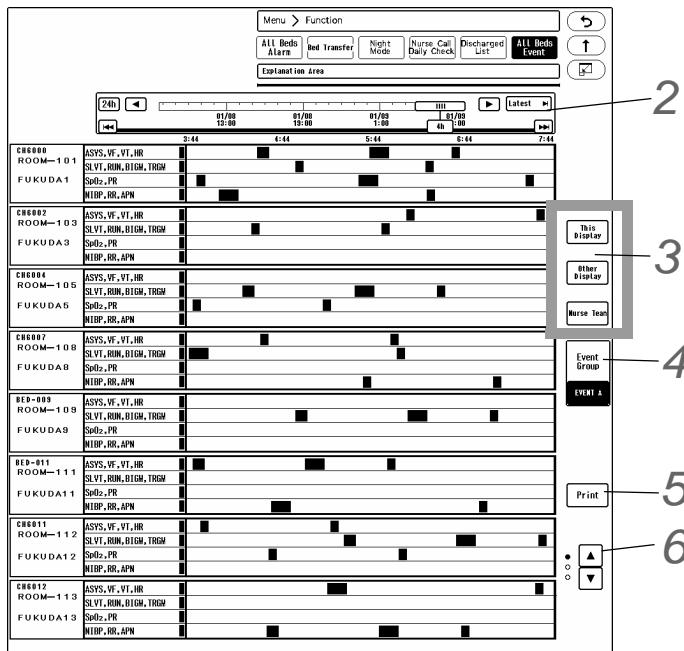
Maximum of 8 beds can be displayed on one display. For each bed, maximum of 16 events (4 events/line x 4 lines) can be displayed.

REFERENCE

- The all beds alarm events are based on alarm history data.

1 Press the [Menu], [All Beds Event] ("Function") keys.

► The alarm events for all beds will be displayed.

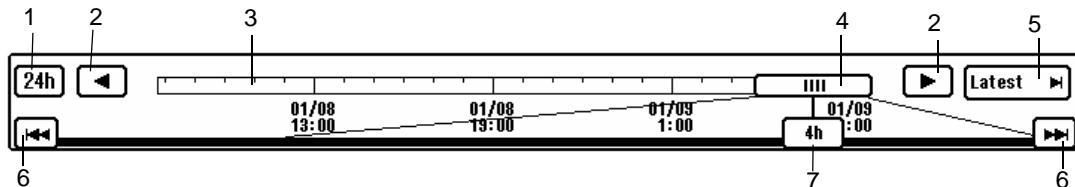


► The alarm event will be displayed with the color set at procedure 4.

2 Changing the time span, scrolling the time, updating the data can be performed.

► The upper row shows the time zone for the whole data.

The lower row shows the time zone for the displayed data.



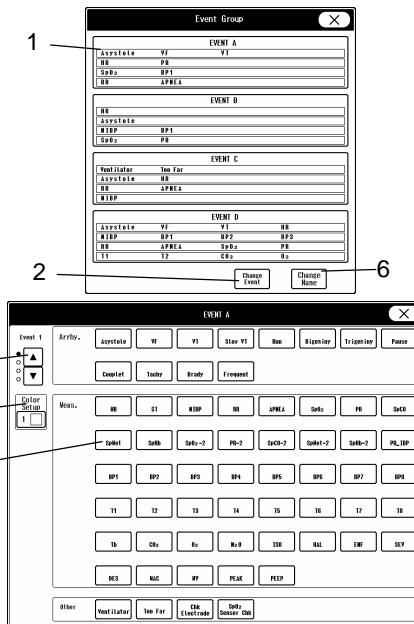
- 1 The time zone scale can be selected from [4h]/[8h]/[12h]/[16h]/[20h]/[24h]/[36h]/[48h].
- 2 The time zone range can be changed.
- 3 The time zone for the whole data is shown. Pressing the time bar will display the data at pressed time.
- 4 Indicates the displayed time range with the bar length
Dragging the slider to the right will display newer data, and dragging it to the left will display older data.
- 5 The latest data will be displayed.
- 6 The display will switch by page.
- 7 The displaying time span can be selected from 20min., 1hr, 2hrs, 4hrs, 8hrs, 12hrs, 16hrs, 24hrs.

3 The beds to be displayed can be filtered.

- ▶ [This Display]: The beds monitored on the display unit currently displaying the alarm events for all beds will be displayed.
- ▶ [Other Display]: The beds monitored on other display unit will be displayed.
- ▶ [Nurse Team]: The beds registered for the selected nurse team will be displayed.

4 Select the event group to be displayed. The display color and group name can be changed.

- 1 Select the group to be changed.



- 2 Press the [Change Event] key to display the event selection screen. (shown on right)
- 3 Use the ▲/▼ keys to switch the page.
Select the events to be displayed for each line.
- 4 Maximum of 4 parameters per line can be selected.
- 5 Select the display color for the selected events from 12 colors.
- 6 Press the [Change Name] key to change the event group name.

5 The currently displayed data will be printed on the laser printer.

NOTE

- ♦ If a laser printer is not connected, [Print] key will not function.

6 Use the ▲/▼ keys to change the displaying beds.

Alarm History

This section explains the alarm history function and printing procedure.

The alarm log of numeric data alarm, arrhythmia alarm, equipment status alarm and change in alarm settings can be displayed. Maximum of 5000 data per bed can be stored.

NOTE

- When the alarm history exceeds 5000 data, the data will be deleted from the oldest one.
- The alarm history data will be deleted when the power of the equipment has been turned OFF for more than 5 minutes.

Displayed Items

Select a bed, and press the [Menu], [Alarm History] ("Data Review") on the individual bed display.

The diagram shows a screenshot of the Alarm History display. The screen is divided into several sections: a header with date and time, a main table of events, and various control buttons on the right. Numbered callouts point to specific parts of the interface:

- 1: Top left corner showing "24h".
- 2: First row of the event table.
- 3: Second row of the event table.
- 4: Third row of the event table.
- 5: Fourth row of the event table.
- 6: "Latest" button at the top right.
- 7: Navigation buttons (left, up, down, right) and "Display Selection" and "Print" buttons.
- 8: Trend selection buttons: "Graphic Trend", "Tabular Trend", and "Recall".

Event Table Data:

Time	Bed ID	Code	Factor	Set
01/02 10:19:15	BED-001	5004	Discharge	Manual
10:17:36	BED-001	4008	Alarm Sound Level	N
10:15:45	BED-001	4008	Alarm Silence/Started	180 Manual
10:15:00	BED-001	4008	Alarm Sound Level	H
10:13:54	BED-001	1001	Lever HR	35 < 40
10:13:20	BED-001	3201	HR Lever Limit Changed	40 Manual
10:12:03	BED-001	3401	HR ON/OFF changed	ON Manual
10:11:40	BED-001	6002	Bed Transfer<-	Manual

36 data per page can be displayed.

1	Time Bar	Changing the time span, scrolling the time, updating the data can be performed. (☞ "Common Operation" P9-1)
2	Time	The time of alarm generation/alarm setting change will be displayed.
3	Bed ID	The bed ID for the alarm generated bed will be displayed. It will be left blank if all beds are applied.
4	Code	The code related to alarm generation or alarm setting change will be displayed in hexadecimal.
5	Factor	<p>The factor of alarm generation/alarm setting change will be displayed. In case of numeric data/arrhythmia alarm, the numeric data and alarm setting at alarm generation will be also displayed. In case of equipment status alarm, a detailed code may be also displayed. In case of alarm setting change, the changed value will be also displayed.</p> <p>The control source of discharging the patient, silencing the alarm, etc. will be displayed as follows.</p> <ul style="list-style-type: none"> From this equipment: Manual Through the DS-LAN III network: DS-LAN Through the TCON network: TCON From the magnetic card reader, barcode reader: ID CARD From the ID search function: ID SEARCH From the EMR link function: EMR
6	Duration (sec.)	<p>The alarm generated duration of numeric data, arrhythmia, equipment status alarm will be displayed in seconds. The maximum displayable value is 99999 sec. For the currently generated alarm factor, it will be displayed in red. It will not be displayed for the alarm setting change.</p>
7	Alarm Level	The alarm level (S/H/M/L/N) will be displayed. It will be left blank if there is no corresponding alarm level.
8	Other Review Data Display	Other review screens at the same time can be displayed. (☞ "Common Operation" P9-1)

Stored Events for Alarm History

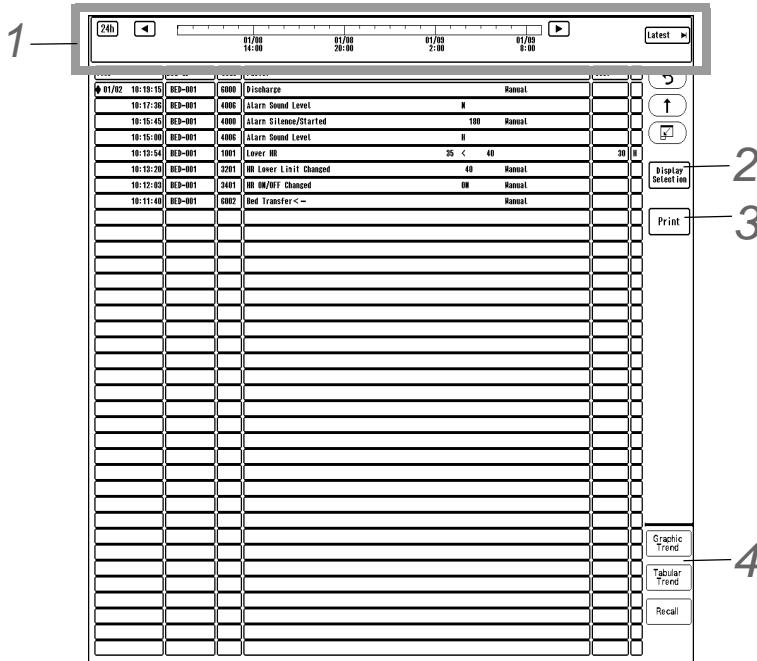
The following events will be stored for alarm history.

Classification	Item	Stored Event, Data
Each Bed	Numeric Data Alarm/Arrhythmia Alarm	Time, duration of alarm occurrence
		Numeric data, alarm setting at alarm occurrence
		Alarm Level
	Equipment Alarm	Time, duration of alarm occurrence
		Alarm Level
	Low Battery Symbol	Time, duration of low battery symbol display
	Telemetry Reception	Time, duration of "Too Far Alarm" occurrence
	Change of Alarm Settings	Change of alarm ON/OFF, upper/lower limit ON/OFF, upper/lower limit value Control Source (Manual*, DS-LAN, TCON)
	Alarm Silence	Starting of Alarm Silence, Control Source (Manual*, DS-LAN)
	Alarm Suspend	Starting of Alarm Suspend, Control Source (Manual*, DS-LAN) Cancelling of Alarm Suspend, Control Source (Manual*, DS-LAN)
All Beds	Alarm Sound Suspend	Time of alarm sound suspend start/cancel
	Discharge, Bed Transfer/ Exchange	Control Source (Manual*, DS-LAN, EMR, etc.)
	Monitor Suspend	Monitor Suspend, Monitor Resume
	Alarm Sound Level	Change of alarm sound level
	Change of Alarm Level	Change of alarm level setting
	Change of Alarm Silence Time	Change of alarm silence time setting
	Change of Alarm Suspend Time	Change of alarm suspend time setting
	Change of Alarm Sound Suspend Setting	Change of alarm sound suspend setting

*: "Manual" for the control source indicates that the operation is performed on this equipment.

Alarm History Setup and Printing

The procedure for the alarm history setup and printing is explained below.

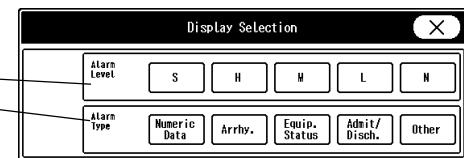


1 Changing the displayed time, scrolling the time, updating the data
(☞ "Common Operation" P9-1)

2 Selecting the display items for alarm history

1 Select the alarm level to be displayed.
The selected item will be displayed in blue.

2 Select the alarm type to be displayed.
The selected item will be displayed in blue.
The displayed events for each alarm type are as follows.



Alarm Type	Events
[Numeric Data]	Numeric Data Alarm
[Arrhy.]	Arrhythmia Alarm
[Equip. Status]	Equipment Status, Low Battery, Chk TLM Receive
[Admit/Disch.]	Discharge, Bed Transfer/Exchange, Monitor Suspend
[Other]	Change of Alarm Setting, Alarm Silence, Alarm Suspend, Alarm Sound Suspend, Alarm Volume, Alarm Level, Change of Alarm Silence Duration, Change of Alarm Suspend Duration, Change of Link Alarm Sound Suspend Setting

3 Printing the Alarm History

- ▶ The currently displayed alarm history will be printed.
- ▶ It can be output on the Recorder Unit (HR-800) or the laser printer.
(☞ "Output Printer Setup for Review Data Printing" P11-9)

4 Displaying other review screens at the same time
(☞ "Common Operation" P9-1)

Chapter 8 Parameter Setup

To Display Each Parameter Setup Screen	8-1
ECG	8-2
Arrhythmia Relearn.....	8-2
ST Setup.....	8-3
Size / Lead.....	8-5
Detail Setup	8-7
RESP	8-11
Waveform Size	8-11
Common Setup / Impedance Setup	8-12
NIBP	8-13
NIBP Periodic Measurement	8-13
Detail Setup	8-14
BP	8-15
Scale.....	8-15
Label.....	8-16
Detail Setup	8-17
SpO2	8-18
Waveform Size	8-18
Label.....	8-18
Detail Setup	8-19
TEMP	8-19
CO2	8-20
Measurement Unit and Scale	8-20
GAS, SPIRO	8-21
Scale.....	8-21
Detail Setup	8-22
Ventilator Data.....	8-23
Scale.....	8-23
SvO2/CCO Monitor Data	8-24
BIS Monitor Data	8-24
INVOS Monitor Data.....	8-24
Parameter ON/OFF	8-24

Chapter 8 Parameter Setup

This chapter explains the procedure for measurement condition setup of each parameter received from the telemetry transmitter or bedside monitor.

To Display Each Parameter Setup Screen

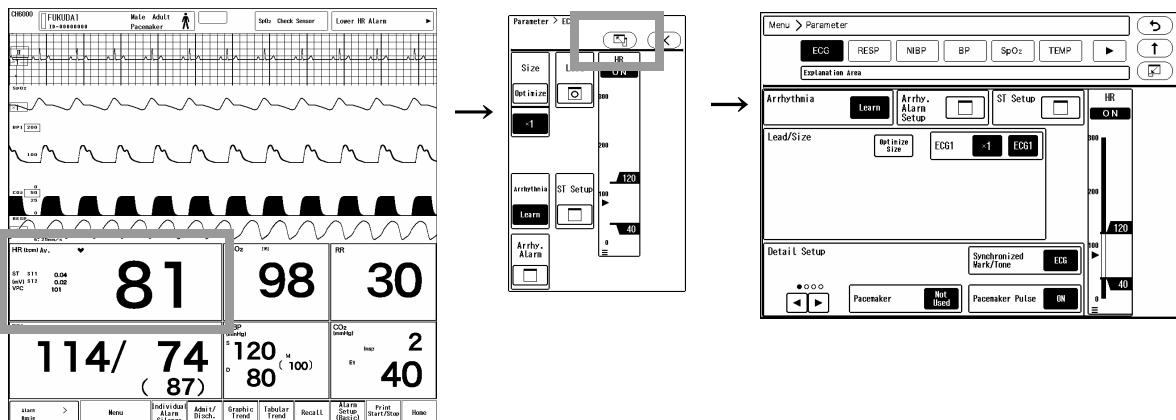
There are following 2 procedures to display the parameter setup screen.

- ♦ 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.

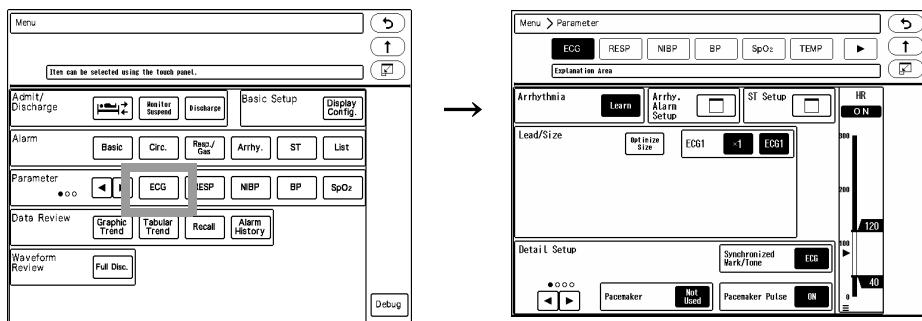
- 1 Select the patient to perform the parameter setup by pressing the bed selection area.
▶ The individual bed display for the selected patient will be displayed.
- 2 For example, press the ECG parameter key (area where HR data is displayed).
▶ The ECG floating window will be displayed.
- 3 Press the Detail () Key.
▶ The "ECG" screen will be displayed.



To Display from the Menu Display

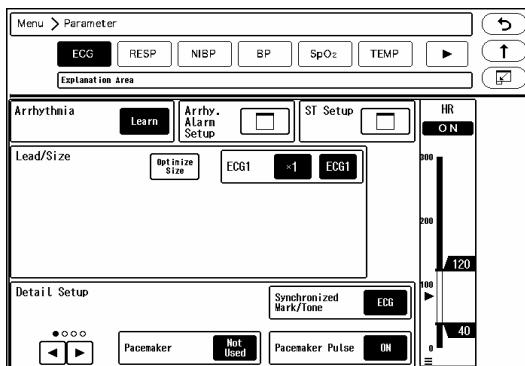
- 1 Press the [Menu] key on the individual bed display.
▶ The "Menu" screen will be displayed.
- 2 Select the parameter to perform the setup.

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



ECG

This section explains the procedure for ECG measurement condition setup.



Arrhythmia Learn	When arrhythmia or QRS is misjudged, performing arrhythmia learning will recover the original accuracy.
Arrhythmia Alarm	ON/OFF of each arrhythmia alarm, alarm limit (Asystole, Run, Pause, Frequent)
ST Setup	ST reference waveform, ON/OFF of ST level alarm, alarm limit
HR Alarm	ON/OFF of HR alarm, alarm limit
Size / Lead	Size and lead of ECG waveform
Detail Setup	Filter, Synchronized Mark/Tone, Pacemaker, Pacemaker Pulse, Pace Pulse Mask Time, ECG Drift Filter, AC Filter, Auto Lead, ST/VPC/Arrhy. Alarm Display

For procedure to set the HR alarm and arrhythmia alarm, refer to "Chapter 7 Alarm Function".

Arrhythmia Relearn

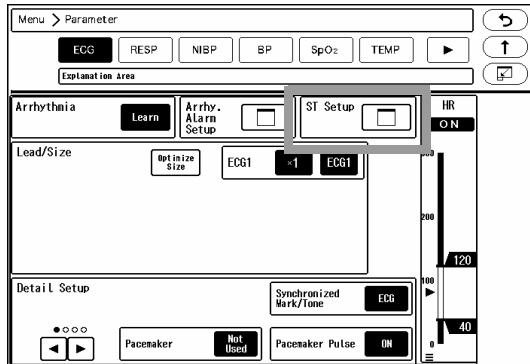
Learning the normal ECG largely affects the accuracy of arrhythmia analysis.

When arrhythmia or QRS is misjudged, performing arrhythmia learning will recover the original accuracy.

(☞ "To Perform Arrhythmia Learning" P7-8)

ST Setup

On the ST Setup screen, the reference point and measurement point to measure the ST level and ST level alarm can be set.

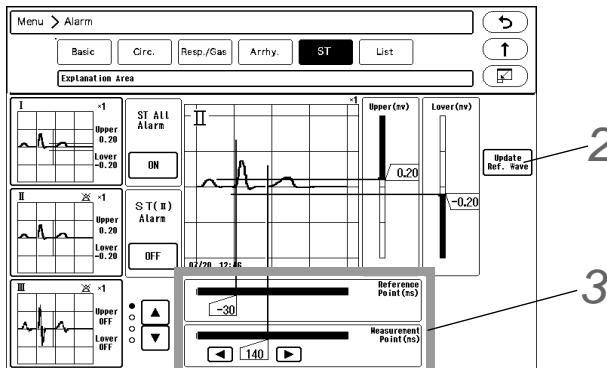


Setup for Reference Point / Measurement Point

Set the reference point and measurement point for the reference waveform.

- 1 Press the key for "ST Setup" on the ECG Setup screen.

► The ST alarm setup screen will be displayed.



- 2 Update the ST reference waveform.

CAUTION

- If the lead is off, the reference waveform cannot be set. Check if the electrode is properly attached, and perform the setup again.

- 1 Press the [Update Ref. Wave] key.

► 16 beats average of the ECG judged as normal QRS by arrhythmia analysis will be set as the reference waveform.
 ► While updating the reference waveform, the [Update Ref. Wave] key will be displayed in blue.
 ► The updated time of the reference waveform will be displayed.

NOTE

- While learning arrhythmia, or if VPC is present, it will take more than 16 beats to set the reference waveform.

3 Set the reference point / measurement point.

- 1 Slide the  for reference point to right and left.
- 2 Slide the  for measurement point to right and left.

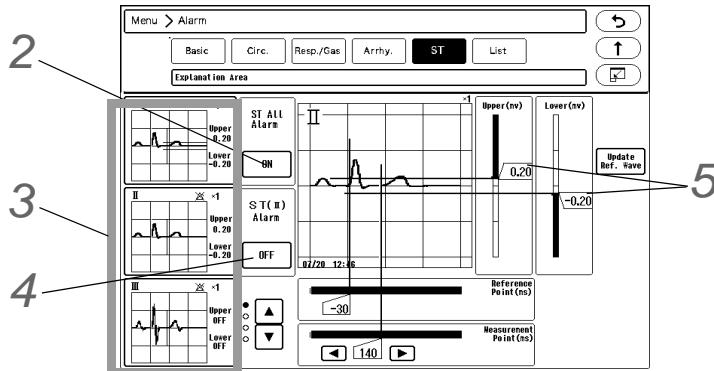
NOTE

- Set the reference point in the range of -240 to 0ms in increments of 10ms from the peak of QRS to the P wave direction.
- Set the measurement point in the range of 0 to 560ms in increments of 10ms from the peak of QRS to the T wave direction.

□ ST Level Alarm Setup

The ST upper value and lower value compared with the reference waveform will be set.

1 Select the ST Setup screen.



2 Select [ON]/[OFF] for "ST All Alarm".

3 Select the lead to set the alarm limit.

- ▶ The selected lead will be displayed large at the right.
- ▶ For the lead not selected on the screen, switch the page using /.

4 Select [ON]/[OFF] of alarm for the selected lead.

- ▶ This setup is not available for LW bed.

5 Slide on the right of the bar to set the upper/lower limit.

The upper and lower limit can be set in 1mm / 0.1mV increment.

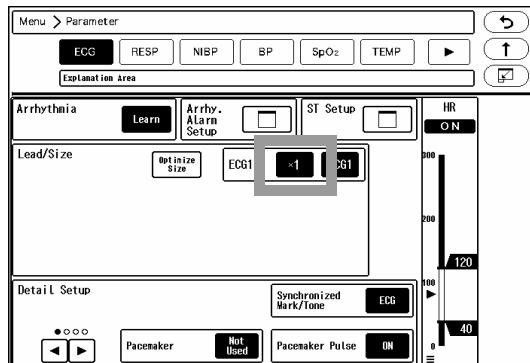
NOTE

- Set the upper limit in the range from -18mm to +20mm/-1.8mV to +2.0mV. If a value above +20mm/+2.0mV is set, the upper alarm will turn OFF.
- Set the lower limit in the range from -20mm to +18mm/ - 2.0mV to +1.8mV. If a value below -20mm/-2.0mV is set, the lower alarm will turn OFF.

Size / Lead

□ Adjustment of Waveform Size and Baseline Position

Adjust the waveform size and baseline position.

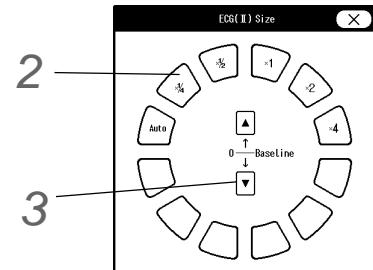


CAUTION

- Automatic size of the ECG is effective only at the time the [Auto] key is pressed. This does not continually adjust the size.
- The waveform size cannot be set if the waveform is not displayed. Change the display configuration as necessary.
(☞ "Numeric Data/Waveform" P12-4)

1 Press the key for "ECG1" to "ECG12".

- The "Size" screen will be displayed.
- When the display layout is "12-Lead", the waveform size can be set differently for limb leads and chest leads.



2 Select the waveform size for displaying and printing.

- [Auto]: ECG amplitude will be automatically adjusted to 10mm. The automatic adjustment is effective only when the [Auto] key is pressed.

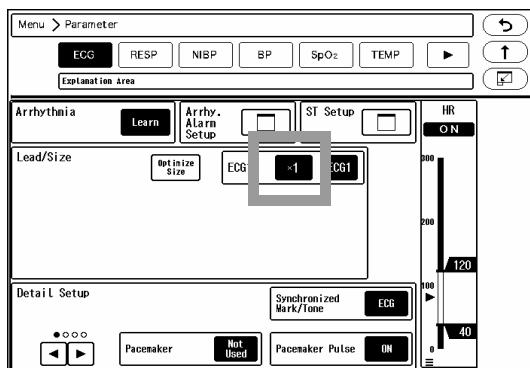
Waveform Size	x1/4	x1/2	x1	x2	x4
Voltage (10mm)	4mV	2mV	1mV	500μV	250μV

3 Use the **▲/▼** keys to adjust the baseline position.

If the waveform is difficult to see due to ECG amplitude, set the baseline position to 0mV. The baseline position for the waveform display and printing will be adjusted. When the display layout is set to "12-Lead", the baseline position cannot be changed.

□ Lead Selection

Set the monitoring lead.

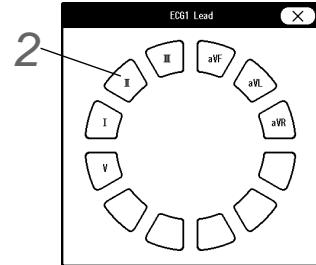


⚠ CAUTION

- ECG1 and ECG2 are leads for arrhythmia detection and printing. Set the most appropriate leads with high QRS for ECG1 and ECG2, especially for arrhythmia detection.
- The lead/size selected for ECG1 or ECG2 links with the bedside monitor.

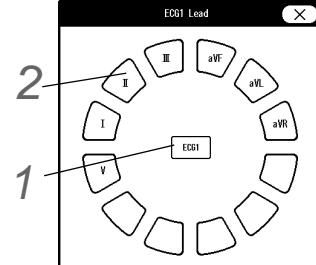
1 Press the key for "ECG1" to "ECG12".

- ▶ The "Lead" selection window will be displayed.

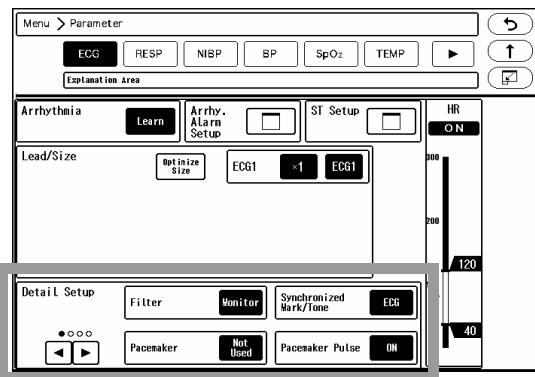


- ▶ When the display layout is set to "12-Lead", press the **[Lead Sel.]** key of "Arrhythmia" to switch [ECG1] and [ECG2].

2 Select the ECG monitoring lead.



Detail Setup



The following items can be set on the "ECG Detail Setup" screen.

First Page	Filter, Synchronized Mark/Tone, Pacemaker, Pacemaker Pulse
Second Page	Pace Pulse Mask Time, ECG Drift Filter, AC Filter
Third Page	Auto Lead, ST/VPC/Arrhy. Alarm Display

1 Filter

For the bedside monitor, the waveform frequency characteristic can be selected from Monitor Mode, ESIS Mode, or Diagnosis Mode according to the monitoring purpose. The settings will be transmitted to the central monitor.



CAUTION

- The ESIS mode can largely reduce the artifact such as electrosurgery noise and EMG, but it may also reduce the QRS amplitude. Using the ESIS mode may erroneously detect the pacemaker spike.
- The ESIS mode should be selected only when a high frequency noise largely affects the HR measurement.

2 Synchronized Mark/Tone

- ▶ [OFF]: Synchronized mark will not be displayed.
- ▶ [ECG]: HR synchronized mark will be displayed. The synchronized tone will be set to ON.
- ▶ [SpO₂-1]/[SpO₂-2]: SpO₂ synchronized mark will be displayed. The synchronized tone will be set to ON.
- ▶ [BP]: BP synchronized mark will be displayed. The synchronized tone will be set to ON.



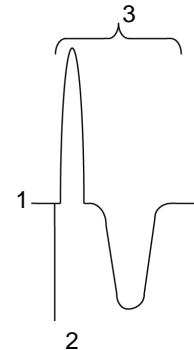
3 Pacemaker

- ▶ [Used]: Pacemaker pulse will be detected and pace pulse mask function will be performed for set duration.
- ▶ [Not Used]: Pacemaker pulse will not be detected.

4 Pacemaker Pulse

Pacemaker Pulse Detection Algorithm is as follows.

- 1 ECG Signal Input
ECG signal will be input.
- 2 Pacemaker Pulse Detection and Suspension of QRS Detection
Detects the high frequency and large amplitude signal as pacemaker pulse.
When pacemaker pulse is detected, QRS detection will be suspended for fixed amount of time to avoid erroneous detection of pacemaker pulse as QRS.
- 3 Cancelling of Arrhythmia Detection
Arrhythmia detection of the waveform following the pacemaker pulse will be cancelled.



⚠ CAUTION

- ◆ Precautions about Pacemaker Pulse Detection
 - ◆ 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.
 - ◆ When a spontaneous QRS and pacemaker pulse overlap (ex. fusion beat, etc.), QRS detection cannot be performed properly. In this case, the heart rate is degraded.
 - ◆ If a pacemaker pulse is continuously detected due to AC frequency interference, QRS detection will be suspended and the heart rate will be reduced. Arrhythmia will not be detected either.

- ▶ [ON]/[Distinct Color]: Displays the artificial pace pulse in yellow.
- ▶ [OFF]: The pacemaker artificial pulse will not be displayed.
- ▶ "Pacemaker Pulse" will be automatically set to [ON] when [Used] is selected for "Pacemaker" on the "Admit/Discharge" screen.

5 Pace Pulse Mask Time

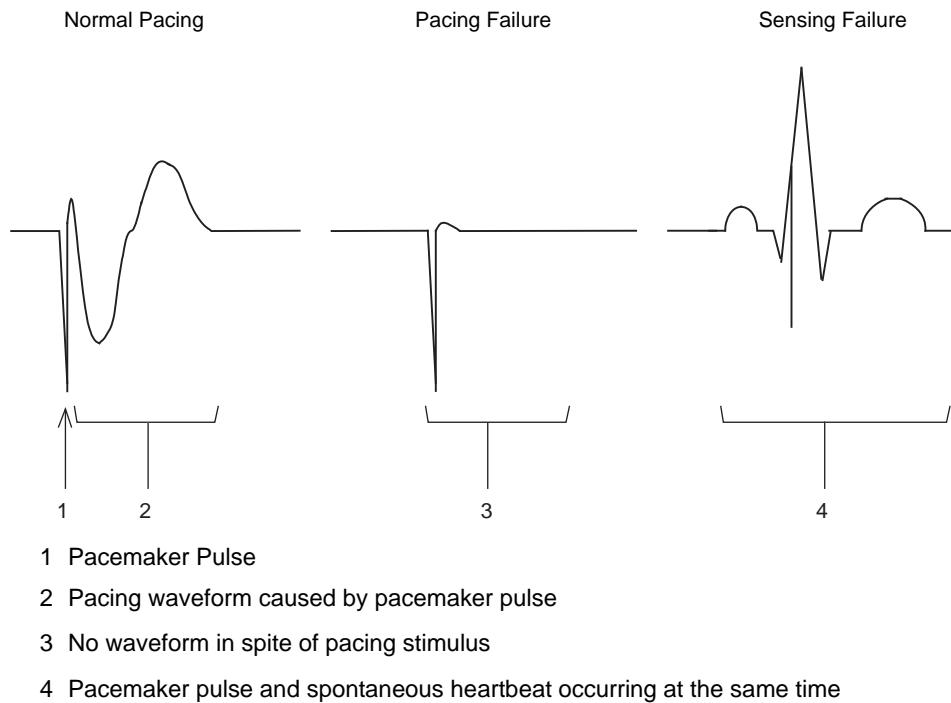
⚠ WARNING

- ◆ If the QRS pace mask function is set to [OFF]/ [10ms]/ [20ms]/ [40ms], the pace pulse may be erroneously be detected as a QRS complex and HR, asystole alarms may not generate due to incorrect HR (counting pace pulse as QRS complex). Select [OFF]/ [10ms]/ [20ms]/ [40ms] only if you are sure that pacing failure will not occur, or when the patient can be constantly monitored.

REFERENCE

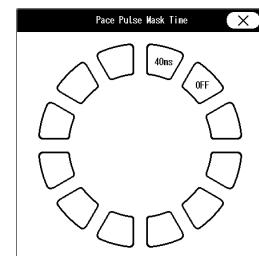
- ◆ For the patients using pacemakers, there are cases when the pacing waveform may not occur in spite of the pacing stimulus. This condition is called "pacing failure". To avoid detecting pacemaker pulses as a QRS complex, this monitor has a function to suspend QRS detection for a fixed amount of time starting from the detection of the pacing stimulus. This function is called "pace pulse 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 pulse mask function can be set to [OFF]/ [10ms]/ [20ms] for

correct measurement of the heart rate.



- 1 Pacemaker Pulse
- 2 Pacing waveform caused by pacemaker pulse
- 3 No waveform in spite of pacing stimulus
- 4 Pacemaker pulse and spontaneous heartbeat occurring at the same time

- 1 Press the key for "Pace Pulse Mask Time".
▶ The "Pace Pulse Mask Time" selection window will be displayed.
- 2 Select the mask time depending on the pace spike amplitude or presence of fusion beat.
▶ [40ms]: Pace pulse mask time will be set to 40ms.
▶ [OFF]: Pace pulse mask time will be set to 0ms.

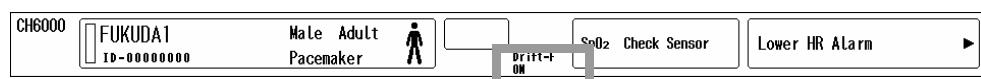


NOTE

- For DS-LAN bed, the data set on the bedside monitor is displayed. The settings cannot be changed on the central monitor.

6 ECG Drift Filter

- ▶ [ON]: Only the amplitude with frequency component under 1Hz will be attenuated to prevent the ECG baseline drift.
The patient signal display will delay about 0.5 seconds.
On the information area of the Individual Bed Display, "Drift-F ON" will be displayed.



- ▶ [OFF]: ECG drift filter will not be set.

NOTE

- To set ON/OFF of drift filer, [Each Bed] should be selected for "Drift Filter" (Initial Settings > Measurement > Other).
- ON/OFF of drift filter can be set only for LX bed. For DS-LAN bed, the data set on the bedside monitor will be displayed.
HLX bed will not be displayed.

7 AC Filter

- ▶ [ON]: AC filter will be set. If the ECG waveform is interfered with AC noise, the AC filter cuts off the frequency component (50Hz/60Hz).
- ▶ [OFF]: AC filter will not be set.

NOTE

- ◆ The "AC Filter" can be set only for the telemetry beds (LX patient on LW bed).
- ◆ The AC filter frequency can be set by pressing the [Menu], [Initial Settings], Enter Password, [Other] ("System") keys.

8 Auto Lead

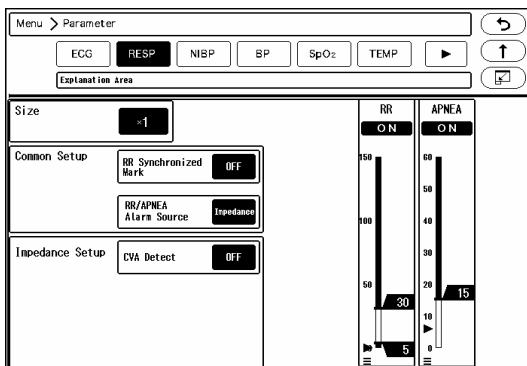
ON/OFF of auto lead can be selected on the bedside monitor. The setting will be displayed on the central monitor.

9 ST/VPC/Arrhy. Alarm Display

- ▶ [ON]: If 2 or more boxes are used for ECG numeric data display, ST level, VPC, arrhythmia alarm factor will be displayed inside the ECG numeric data box.
- ▶ [OFF]: ST level, VPC, arrhythmia alarm factor will not be displayed inside the ECG numeric data box.

RESP

This section explains the procedure for respiration measurement condition setup.

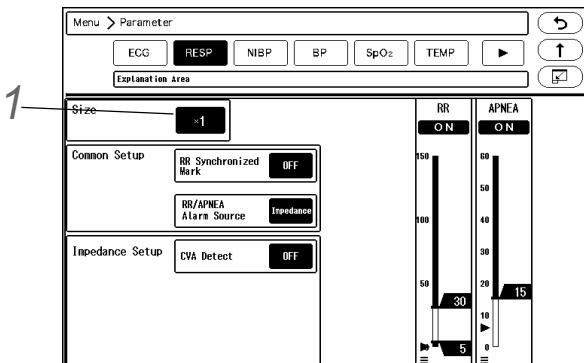


Waveform Size	Respiration waveform size
RESP Alarm	ON/OFF of RR alarm, alarm limit
APNEA Alarm	ON/OFF of APNEA alarm, alarm limit
Common Setup	RR Synchronized Mark, RR/APNEA Alarm Source
Impedance Setup	CVA Detect

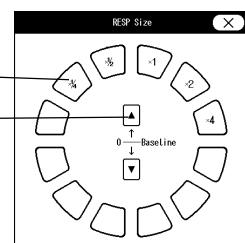
For procedure to set the RR Alarm and APNEA Alarm, refer to "Chapter 7 Alarm Function".

Waveform Size

Set the RESP waveform size.



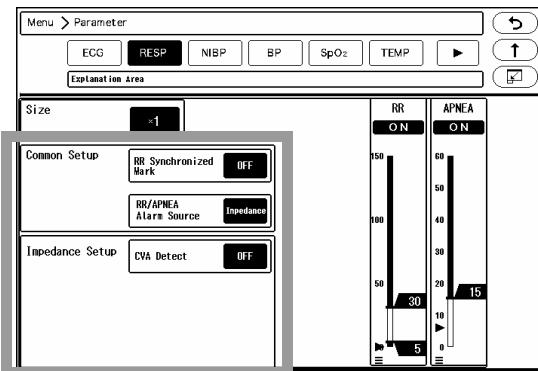
- 1 Press the key for "Size".
► The "RESP Size" window will be displayed. (shown on right)
- 2 Select from [1/4]/ [x1/2]/ [x1]/ [x2]/ [x4].
- 3 Use the ▲/▼ keys to adjust the baseline position.



REFERENCE

- If the waveform is difficult to see due to impedance waveform amplitude, set the baseline position to 0Ω. The baseline position for printing will not change.

Common Setup / Impedance Setup



RR can be measured from the following 3 sources.

- ♦ Impedance RR
- ♦ RR measured on the multigas unit
- ♦ RR measured on the ventilator

There are setup items common to all sources and setup items specific to each source.

Common Setup

1 RR Synchronized Mark

- ▶ [ON]: The RR mark synchronized to impedance (or CO₂, ventilator) respiration will be displayed.
- ▶ [OFF]: Synchronized mark will not be displayed.



2 RR/APNEA Alarm Source

RR/APNEA Alarm Source can be set only on the bedside monitor. The setting will be displayed on the central monitor.

- ▶ [Impedance]: RR alarm will be generated based on the impedance respiration curve. The RR synchronized mark based on impedance respiration will be displayed.
- ▶ [CO₂/GAS]: RR alarm will be generated based on the RR measured by the CO₂ module or multigas unit. Also, the RR mark synchronized to CO₂ waveform will be displayed.
- ▶ [Vent.]: RR alarm will be generated based on the RR measured by the ventilator. The RR synchronized mark based on ventilator measurement will be displayed.

Impedance Setup

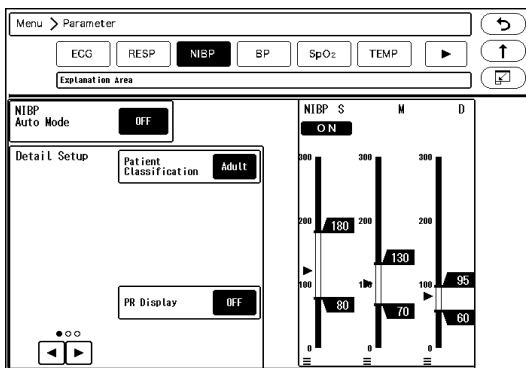
1 CVA Detect

- ▶ [ON]: When CVA is detected, alarm will generate and message will be displayed.
- ▶ [OFF]: CVA detection will not be performed.
- ♦ 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.
- ♦ This function will be effective only when [Impedance] is set as the "RR/APNEA Alarm Source".
- ♦ If the ECG waveform is superimposed on to the respiration waveform with HR (RR) of 30Bpm or above for more than 20 seconds (10 seconds for neonates) and if the "CVA Detect" is set to [ON], the <CVA detected>

message will be displayed, and an alarm sound will be generated.

NIBP

This section explains the procedure for NIBP measurement condition setup.



Auto Mode	NIBP measurement interval (only for DS-LAN bed, TCON bed)
NIBP Alarm	ON/OFF of NIBP alarm, alarm limit for systolic (S), diastolic (D), mean (M) blood pressure.
NIBP Detail Setup	Patient Classification, PR Display, MAP, Time Display

For procedure to set the NIBP alarm, refer to "Chapter 7 Alarm Function".

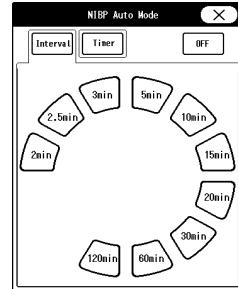
NIBP Periodic Measurement

NIBP 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.

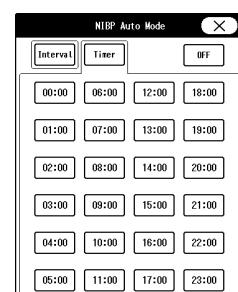
1 Press the key for "NIBP Auto Mode". ([Interval]/[Timer]/[OFF])

2 When [Interval] is selected, select the interval from [2min.] to [120min.].

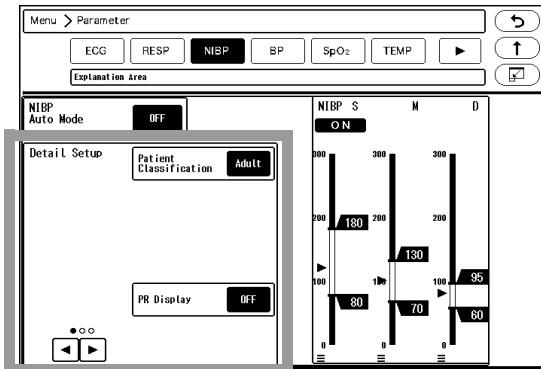
- ▶ The measurement time will be integral multiple of the selected interval time starting from 0 minute.
Ex.) If the current time is 13:14, the measurement time will be as follows for each interval time.
2 min: 13:16, 13:18, 13:20, ...
2.5 min: 13:15, 13:17:30, 13:20, ...
3 min: 13:15, 13:18, 13:21,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



3 When [Timer] is selected, select the measurement starting time. (More than one selection is possible.)



Detail Setup



The following items can be set on the "NIBP Detail Setup" screen.

First Page	Patient Classification, PR Display
Second Page	MAP
Third Page	Time Display

1 Patient Classification

The patient classification setting is linked with that on the "Admit/Discharge" screen. The inflation value and measurement duration will differ according to the patient classification setting.

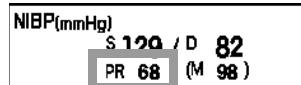
(☞ "Entering the Patient Information" P6-2)

WARNING

- The patient classification selection influences the precision of the QRS detection and NIBP measurement. Make sure the correct selection is made.
- To perform correct NIBP measurement, appropriate NIBP air hose corresponded to the set patient classification must be used. (However, if the patient classification is child, NIBP air hose for adult can be used.)

2 PR Display

[ON]: PR will be displayed.

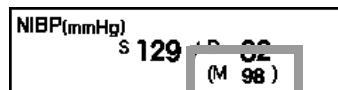


NOTE

- When the DS-8500 system bedside monitor is used, PR will be displayed only. It will not generate alarm, or be displayed for the tabular trend function.

3 Mean BP (MAP) Display

ON/OFF of the MAP display can be set only on the bedside monitor. The setting will be displayed on the central monitor.



CAUTION

- If the mean BP (MAP) value is not displayed, the mean BP (MAP) alarm will not be

generated.

4 Time Display

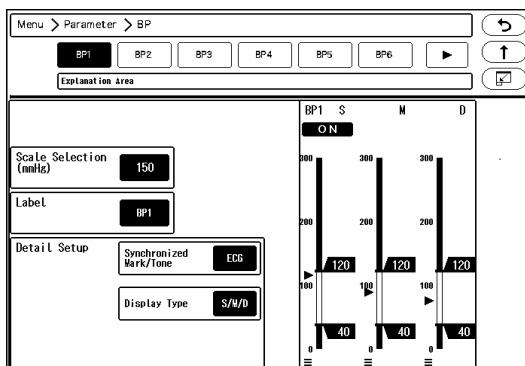
The time for the NIBP measurement will be displayed.

► [Elapsed]: The elapsed time from the previous NIBP measurement will be displayed.

► [Meas.]: The NIBP measured time will be displayed.

BP

This section explains the procedure for BP measurement condition setup.



Scale	BP waveform scale
Label	BP Label
BP Alarm	ON/OFF of BP alarm Alarm limit for systolic (S), diastolic (D), mean (M) blood pressure
BP Detail Setup	Synchronized Mark/Tone, Display Type

For procedure to set the BP alarm, refer to "Chapter 7 Alarm Function".

Scale

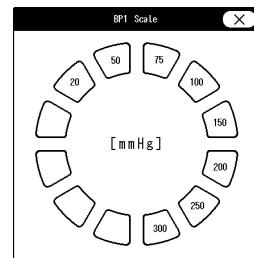
Select the full scale for displaying and printing. The scale selection will differ depending on the label as shown below.

BP Label	Scale														
	5	10	15	20	30	40	50	75	100	150	200	250	300	mmHg	
	1	2	3	4	5	6	8	12	16	20	24	32	40	kPa	
BP1 to BP8, RAP, RVP, UAP, LAP, User Label				Yes			Yes								
ART, IAP, LVP							Yes								
PAP				Yes		Yes									
CVP		Yes		Yes											
ICP	Yes	Yes	Yes	Yes			Yes								

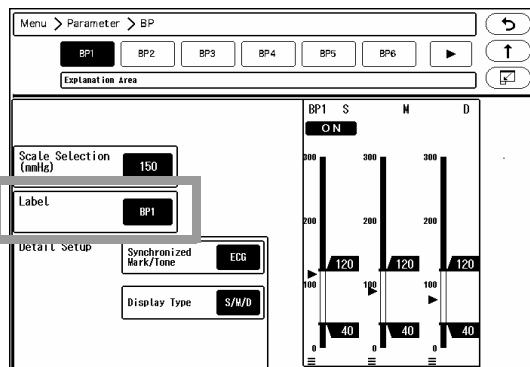
1 Press the key for "Scale Selection".

- The scale selection window will be displayed.

2 Select the scale from the displayed selection.



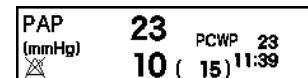
Label



BP label cannot be changed on this equipment. The label set on the bedside monitor will be displayed on the key for "Label".

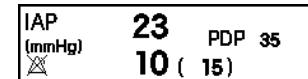
When the BP Label is PAP

PCWP (Pulmonary Capillary Wedge Pressure) and measurement time will be displayed.



When the BP Label is IAP

PDP (Peak Diastolic Pressure) of IABP can be displayed in addition to systolic, diastolic, and mean pressure. Note that Systolic Pressure (SYS) = Peak Systolic Pressure (PSP).



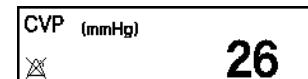
CAUTION

- Note that Systolic Pressure (SYS) = Peak Systolic Pressure (PSP) when reviewing graphic trend, data base, or when setting the alarm.
- When ECG is not measured, PDP cannot be calculated.

When the BP Label is CVP

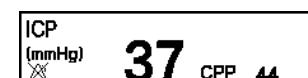
The measurement unit can be selected from "mmHg", "kPa", "cmH₂O". (Initial Settings > Measurement > Unit) The selected measurement unit will be displayed on the BP numeric data box.

(☞ Maintenance Manual "Unit" P6-7)

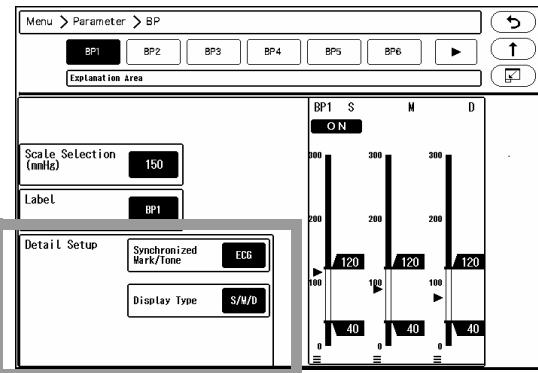


When the BP Label is ICP

CPP (Cerebral Perfusion Pressure) can be measured. (CPP = Mean Arterial Pressure -Mean Intracranial Pressure) If the CPP value is negative, the data will not be displayed. Also, alarm cannot be set for CPP.



Detail Setup



The following items can be set on the "BP Detail Setup" screen.

First Page	Synchronized Mark/Tone, Display Type
------------	--------------------------------------

1 Synchronized Mark/Tone (BP1/ART)

The parameter to display the HR synchronized mark can be selected from ECG, SpO₂, and BP (BP1 or ART). If BP1 and ART are measured simultaneously, ART will be prioritized.

- ▶ [ECG]: HR synchronized mark will be displayed.
- ▶ [SpO₂-1]/[SpO₂-2]: SpO₂ synchronized mark will be displayed.
- ▶ [BP]: BP synchronized mark will be displayed.
- ▶ [OFF]: Synchronized mark will not be displayed.

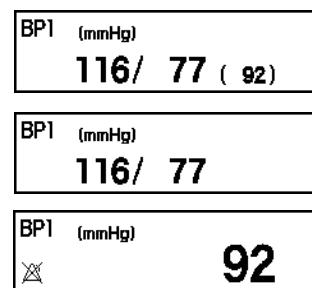
NOTE

- ♦ If the corresponding BP (BP1/ART) is not measured, PR (BP) will be displayed as "---".

2 Display Type

The display type of BP numeric data ([S/M/D]/[S/D]/[M]) can be set only on the bedside monitor. The setting will be displayed on the central monitor.

- ▶ [S/M/D]: The systolic/mean/diastolic BP value will be displayed.
- ▶ [S/D]: The systolic/diastolic BP value will be displayed.
- ▶ [M]: The mean BP value will be displayed.

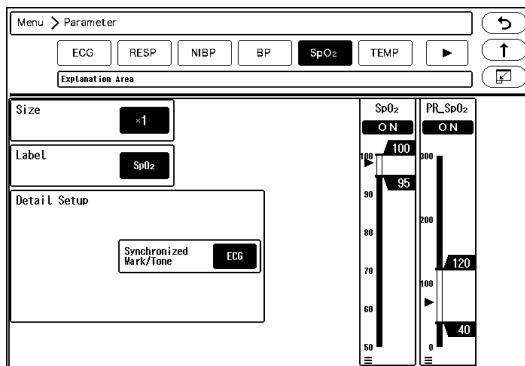


CAUTION

- ♦ The BP data which is not displayed in the numeric data box will not generate a BP alarm.

SpO₂

This section explains the procedure for SpO₂ measurement condition setup.



Waveform Size	SpO ₂ waveform size
Label	SpO ₂ Label
SpO ₂ Alarm	ON/OFF of SpO ₂ alarm, PR alarm, SpCO alarm, SpMet alarm, SpHb alarm, alarm limit
SpO ₂ Detail Setup	Synchronized Mark/Tone

For procedure to set the SpO₂ alarm, refer to "Chapter 7 Alarm Function".

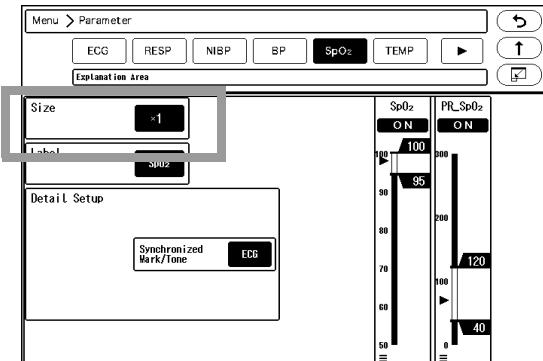
Waveform Size

Pulse waveform size can be set.

1 Press the key for "Size".

► The "RESP Size" screen will be displayed.

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

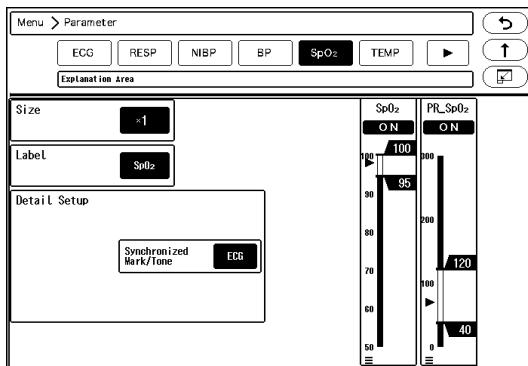


Label

SpO₂ label cannot be changed on this equipment. The label set on the bedside monitor will be displayed on the key for "Label".

Detail Setup

SpO_2 detail setup is explained below.

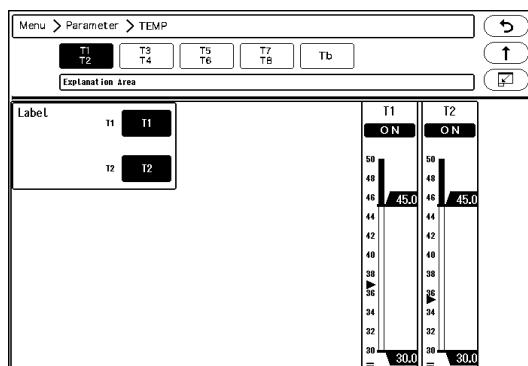


1 Synchronized Mark/Tone

(ECG ↴ "Detail Setup" P8-7)

TEMP

This section explains the procedure for TEMP measurement condition setup.



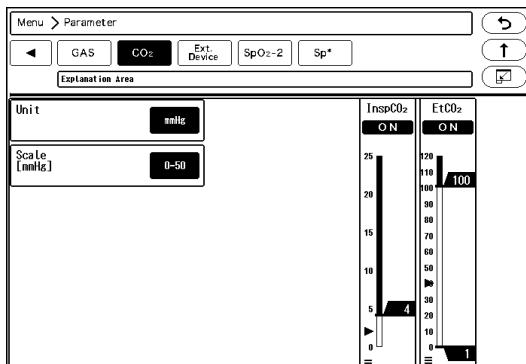
Label	TEMP Label
Alarm	ON/OFF of TEMP alarm, Tb alarm, alarm limit

For procedure to set the TEMP alarm, refer to "Chapter 7 Alarm Function".

TEMP label cannot be changed on this equipment. The label set on the bedside monitor will be displayed on the key for "Label".

CO₂

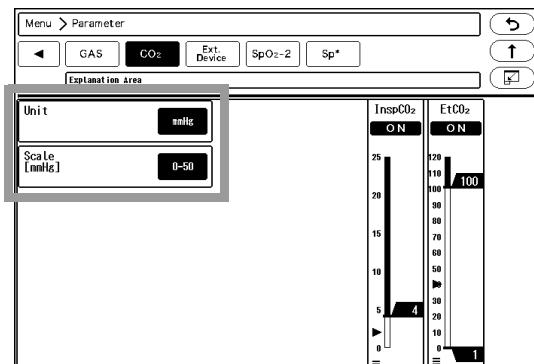
This section explains the procedure for EtCO₂ and InspCO₂ measurement condition setup.



Unit	CO ₂ measurement unit
Scale	CO ₂ waveform scale
Alarm	ON/OFF of EtCO ₂ alarm, InspCO ₂ alarm, alarm limit

For procedure to set the CO₂ alarm, refer to "Chapter 7 Alarm Function".

Measurement Unit and Scale



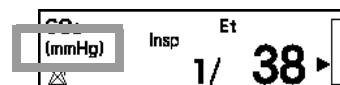
NOTE

- When a measurement unit is changed, make sure to set the alarm limit with the set unit. Set the alarm for each measurement unit.

1

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

- The data of currently set measurement unit will be displayed on the graphic/ tabular trend.

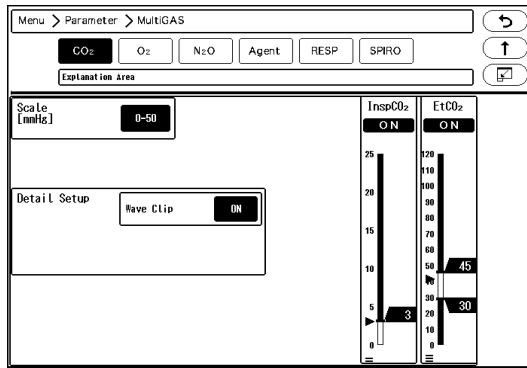


2

Select the scale from [0-50]/[0-100] if the measurement unit is mmHg, and from [0-4]/[0-8]/[0-10] if the unit is kPa or %.

GAS, SPIRO

This section explains the procedure for multigas and SPIRO measurement condition setup.



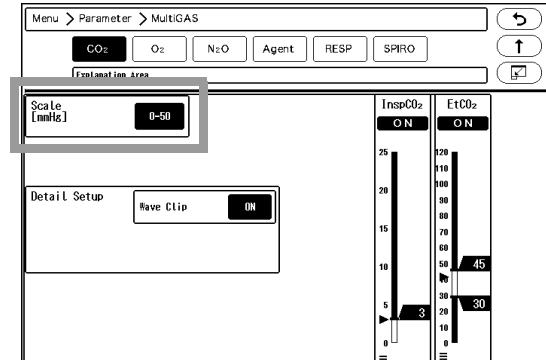
CO ₂	Scale, EtCO ₂ / InspCO ₂ Alarm, Detail Setup (Wave Clip)
O ₂	Scale, InspO ₂ / ExpO ₂ Alarm, Detail Setup (Wave Clip)
N ₂ O	InspN ₂ O / ExpN ₂ O Alarm, Detail Setup (Wave Clip)
Agent	Agent Selection, InspAgent / ExpAgent Alarm (ISO/HAL/ENF/DES/SEV), Scale, Wave Clip
RESP	RR Alarm, APNEA Alarm, Common Setup (RR Synchronized Mark, RR/APNEA Alarm Source)
SPIRO	AWP Scale, AWF Scale, AWV Scale, ExpMV Alarm, PEAK Alarm, PEEP Alarm

For procedure to set the alarm, refer to "Chapter 7 Alarm Function".

Scale

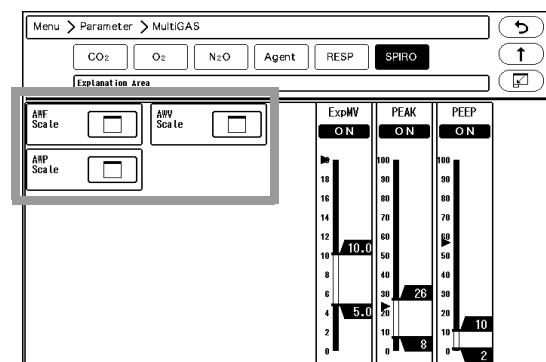
The waveform scale for CO₂, O₂, Agent can be set.

- ♦ CO₂: Select from [0-50]/ [0-100] (mmHg) or [0-4]/ [0-8]/ [0-10] (kPa, %) .
- ♦ O₂: Select from [18-30]/ [18-60]/ [18-100]/ [0-30]/ [0-60]/ [0-100] (%) .
- ♦ Agent: Select from [0-4]/ [0-8]/ [0-16] (%) .



For SPIRO, the following scale can be set.

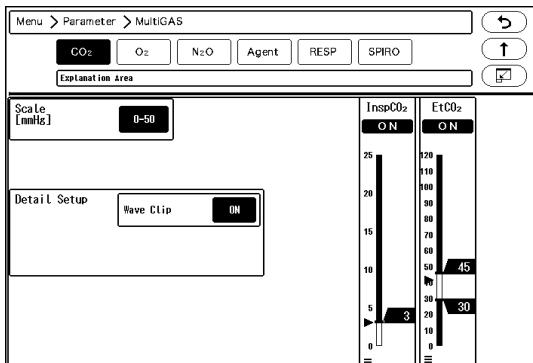
- ♦ AWF Scale: Select from [±5]/ [±10]/ [±20]/ [±50]/ [±180] (L/min).
- ♦ AWP Scale: Select from [10]/ [20]/ [30]/ [50]/ [120] (cmH₂O) .
- ♦ AWV Scale: Select from [50]/ [250]/ [500]/ [1000]/ [3000] (mL) .



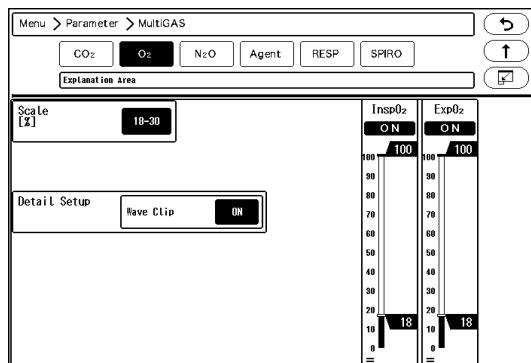
Detail Setup

"Wave Clip" can be set.

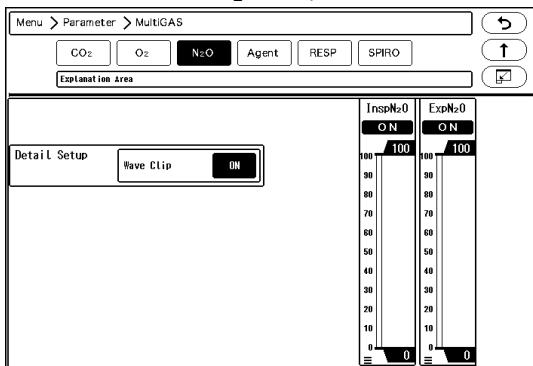
CO₂ Setup



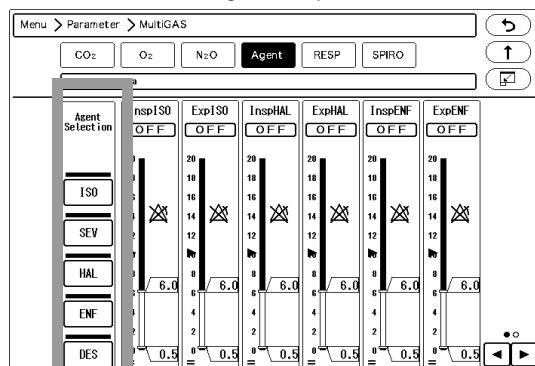
O₂ Setup



N₂O Setup



Agent Setup



1 Waveform Clip (CO₂, O₂, N₂O, Agent)

If the gas waveform amplitude exceeds the waveform display area, whether or not to clip the exceeded part can be selected.

- ▶ [ON]: The exceeded part of the waveform will be displayed in straight line at the upper or lower scale limit.
- ▶ [OFF]: The whole part of the waveform will be displayed even if it exceeds the scale. However, the exceeded part may be displayed in straight line at the upper or lower scale limit depending on the sweep speed of the waveform displayed above or below the gas waveform.

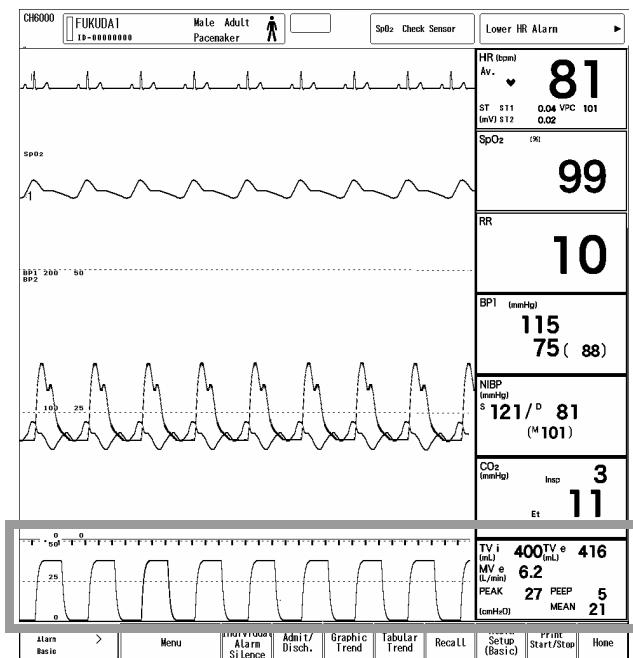
2 Agent Selection

Agent gas label cannot be selected on this equipment. The label set on the bedside monitor will be displayed.

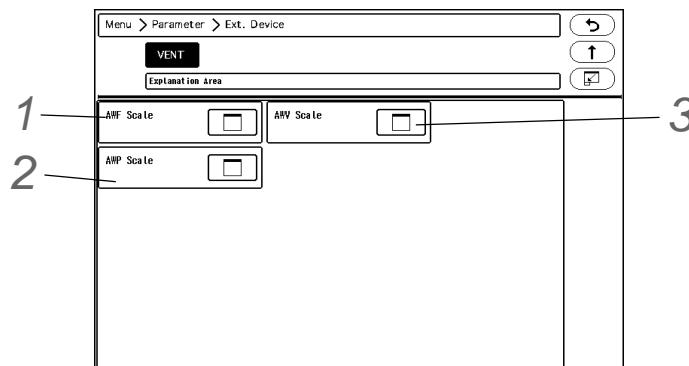
Ventilator Data

Numeric data and waveform measured by the ventilator connected to the bedside monitor can be displayed on the DS-8900 system.

This section explains the setup procedure of AWP/AWF/AWV scale.

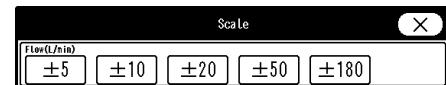


Scale



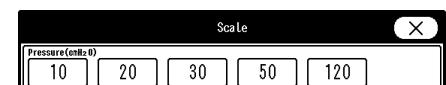
1 AWF Scale

- ▶ Select the AWF (Airway Flow) scale from [±5]/[±10]/[±20]/[±50]/[±180] (L/min).



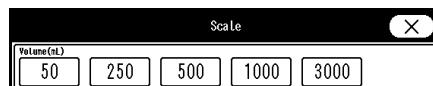
2 AWP Scale

- ▶ Select the AWP (Airway Pressure) scale from [10]/[20]/[30]/[50]/[120] (cmH₂O).



3 AWV Scale

- ▶ Select the AWV (Airway Volume) scale from [50]/ [250]/ [500]/ [1000]/ [3000] (mL) .



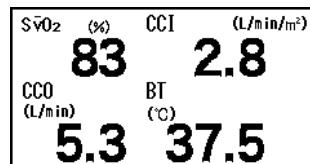
SvO₂/CCO Monitor Data

The DS-8900 system can display the measurement data (SvO₂, CCO, CCI, BT) of SvO₂/CCO monitor (Vigilance, VigilanceCEDV, Vigilance II, Vigileo) connected to the bedside monitor.

(Display Configuration on the Individual Bed Display: "Numeric Data/Waveform" P12-4)

(Display Configuration on the Home Display: "Numeric Data/Waveform" P12-25)

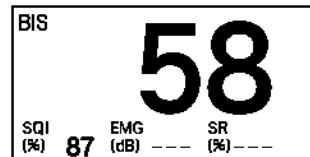
There are no setup items for SvO₂/CCO monitoring.



BIS Monitor Data

The DS-8900 system can display the BIS monitor measurement data (BIS, SQI, EMG, SR).

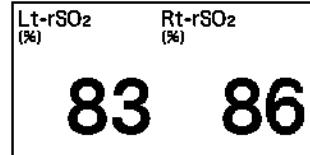
There are no setup items for BIS monitoring.



INVOS Monitor Data

The DS-8900 system can display the regional cerebral oxygen saturation (rSO₂) data measured by INVOS 5100C Non-Invasive Cerebral Oximeter connected to the bedside monitor.

There are no setup items for INVOS data monitoring.



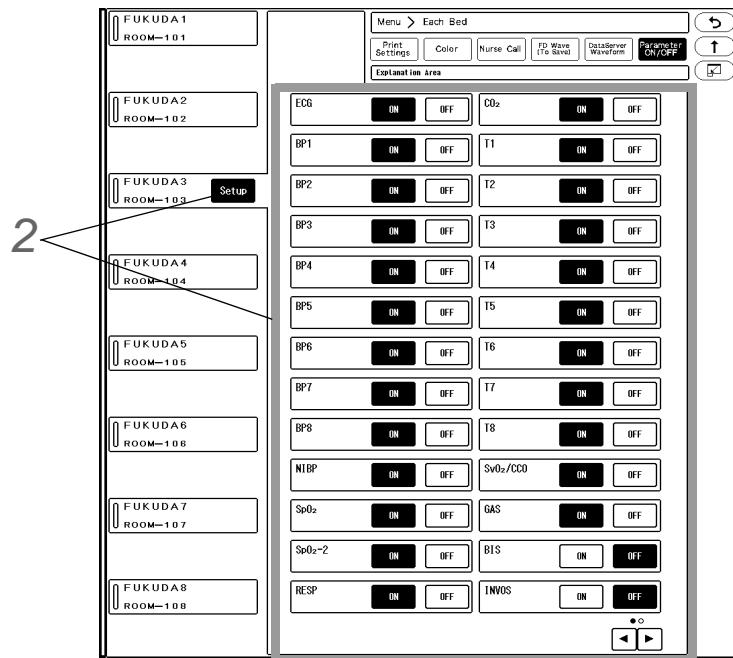
Parameter ON/OFF

ON/OFF of monitoring can be set for each parameter.

- 1 Press the [Menu], [Parameter ON/OFF] ("Each Bed") keys.

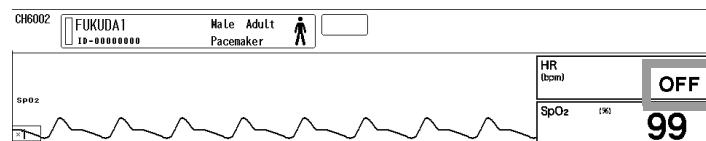
- ▶ The "Parameter ON/OFF" screen will be displayed.

- ▶ [Parameter ON/OFF] key can be also assigned to the user key.



2 Press the [Setup] key for the bed to perform the setup, and select [ON]/[OFF] for each parameter.

- ▶ When [OFF] is selected, <OFF> will be displayed inside the numeric data box for corresponding parameter.
- ▶ Pressing the numeric data box where <OFF> is displayed will display the "Parameter ON/OFF" screen.



Chapter 9 Data Review

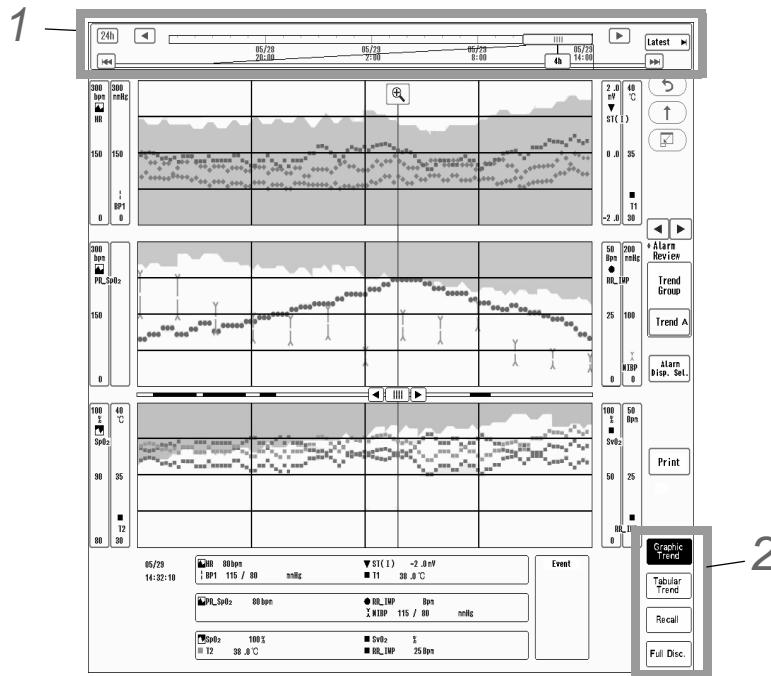
Common Operation	9-1
Graphic Trend.....	9-2
Displayed Items	9-2
Graphic Trend Setup and Printing	9-4
Description for Each Parameter	9-5
Tabular Trend	9-7
Displayed Items	9-7
Tabular Trend Setup and Printing	9-8
Parameter Selection for Tabular Trend	9-9
Recall.....	9-11
Displayed Items	9-11
Recall Condition Setup	9-12
Recall Setup and Printing	9-13
Divider Function.....	9-15
Review Data Display for Discharged Patient.....	9-16
Alarm History	9-17

Chapter 9 Data Review

The patient review data function such as graphic trend, tabular trend, recall will be displayed.

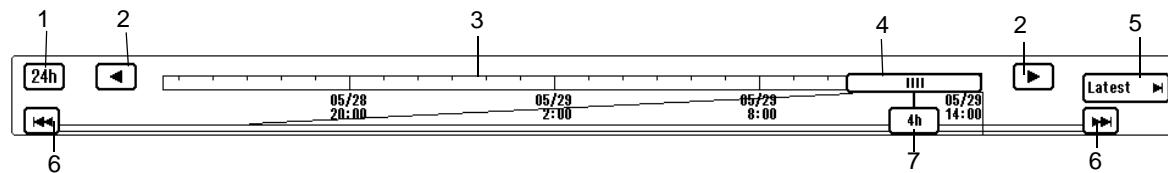
Common Operation

The common operations for all the review screens are explained below.



1 Time Bar

- ▶ Changing the displayed time, scrolling the time, updating the data can be performed.
- ▶ The upper row shows the time zone for the whole review data.
The lower row shows the time zone for the displayed review data.



- 1 The time zone scale can be selected from [4h]/[8h]/[12h]/[16h]/[20h]/[24h]/[36h]/[48h].
- 2 The time zone range can be changed.
- 3 The time zone for the whole data is shown. ◆ indicates the alarm occurrence point.
Pressing the time bar will display the data at pressed time.
- 4 Indicates the displayed time range with the bar length
Dragging the slider to the right will display newer data, and dragging it to the left will display older data.
- 5 The latest data will be displayed.
- 6 The display will switch by page.
- 7 The display time interval can be selected. The selections will differ depending on the review data type.
For example, for the graphic trend, the time interval can be selected from 20min, 1h, 2h, 4h, 8h, 12h, 16h,

24h.

2 Displaying other review screens at the same time

- Other review screens of the same date/time can be displayed.

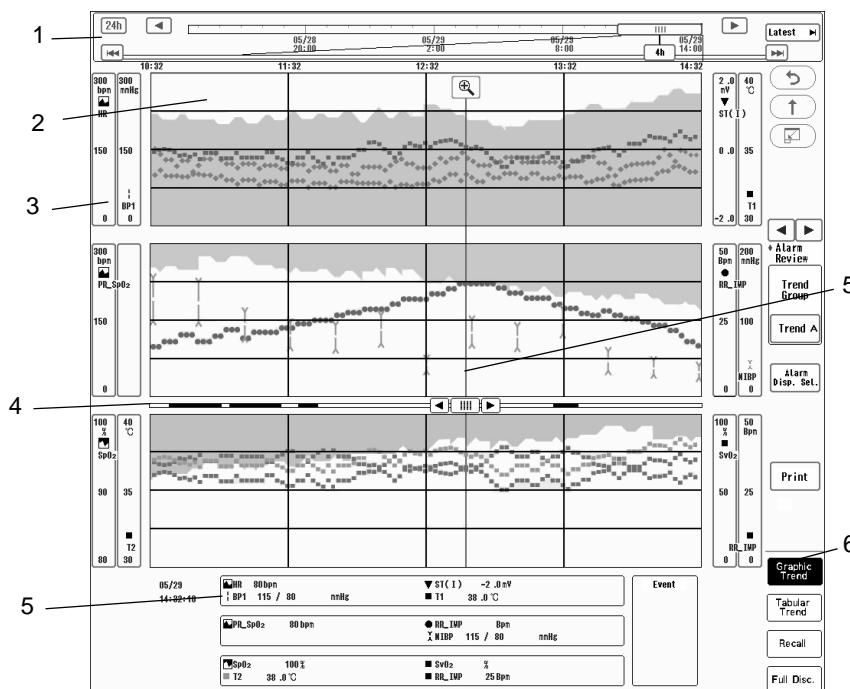
Graphic Trend

This section explains the graphic trend function and printing procedure.

The 120 hours of data will be automatically stored and displayed as trend data.

Displayed Items

Press the [Menu], [Graphic Trend] ("Data Review") on the individual bed display.



NOTE

- The apnea duration of 5 seconds or more will be stored. If less than 5 seconds, it will be stored as "0 (zero)".

CAUTION

- When "Check extended memory" is displayed for the system status message, internal

memory error can be considered. In such case, trend data cannot be properly stored or displayed. Refer to the "Troubleshooting" section.

- The trend data is periodically stored to the internal memory, but if the power has been turned OFF for 5 minutes or more, maximum of 5 seconds of data may be lost. In such case, the lost data will be displayed as not measured data.

REFERENCE

- The displayed data is compressed as follows depending on the display interval.
 VPC: Maximum value within the display interval
 APNEA: Maximum value within the display interval
 Other than above: Latest value within the display interval
 For example, if the 24-hour trend for the parameter with minimum resolution of 30 seconds is displayed, one mark will be displayed for the 12-minute (720-second) data.
- If the display resolution is higher than the minimum resolution of the data, the same data is repeated to match the display resolution.
 Refer to the following table for resolution. The resolution will differ depending on the parameter.

Display Resolution

Time Span	Minimum Resolution			
	Line Display		Mark Display	
	10 sec. Sample	30 sec. Sample	10 sec. Sample	30 sec. Sample
20 min	10 sec.	30 sec.	10 sec.	30 sec.
1 hours	10 sec.	30 sec.	30 sec.	30 sec.
2 hours	10 sec.	30 sec.	60 sec.	60 sec.
4 hours	20 sec.	60 sec.	120 sec.	120 sec.
8 hours	40 sec.	120 sec.	240 sec.	240 sec.
12 hours	60 sec.	120 sec.	360 sec.	360 sec.
16 hours	80 sec.	240 sec.	480 sec.	480 sec.
24 hours	120 sec.	240 sec.	720 sec.	720 sec.

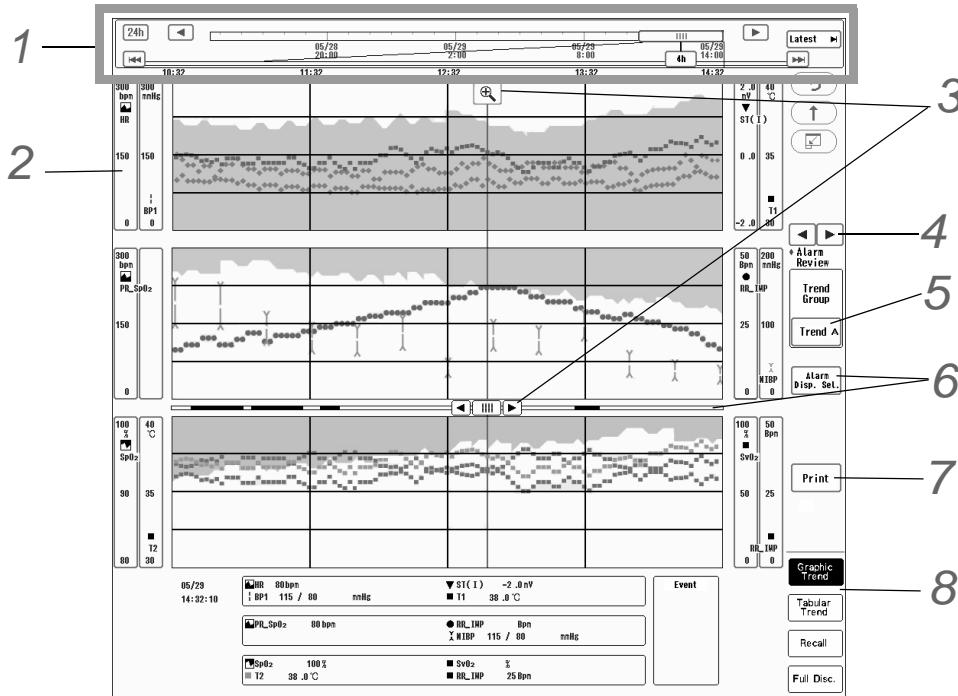
Data Resolution

Minimum Resolution	Parameter
10 sec.	HR, ST, SpO ₂ , SpO ₂ -2, PR_SpO ₂ , PR_SpO ₂ -2, BP1, BP2
30 sec.	Other than above (Excluding NIBP*)

* Actual measured data will be displayed for NIBP.

Graphic Trend Setup and Printing

The procedure for the graphic trend setup and printing is explained below.



1 Changing the displayed time, scrolling the time, updating the data
(☞ "Common Operation" P9-1)

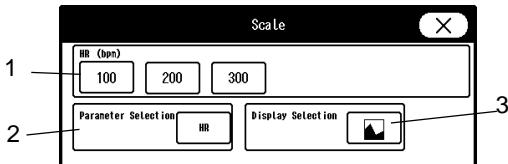
2 Selection of parameter, display type, scale.

- ▶ Pressing the scale display section of each parameter will display the "Scale" window.

1 Select the scale.

2 Select the parameter to be displayed. Changing the parameter will also change the parameter in the trend group.

3 Select the display format.



3 Moving the Cursor

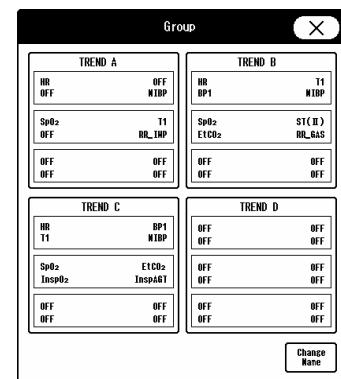
- ▶ The cursor position can be adjusted by using the / keys. The measurement data at the cursor point will be always displayed below.
- ▶ will display the 10-minute trend data before and after the cursor position.
- ▶ will return the display to the previous time range.

4 Alarm Review

- ▶ Pressing the / key for "Alarm Review" will move the cursor to the alarm generated time.

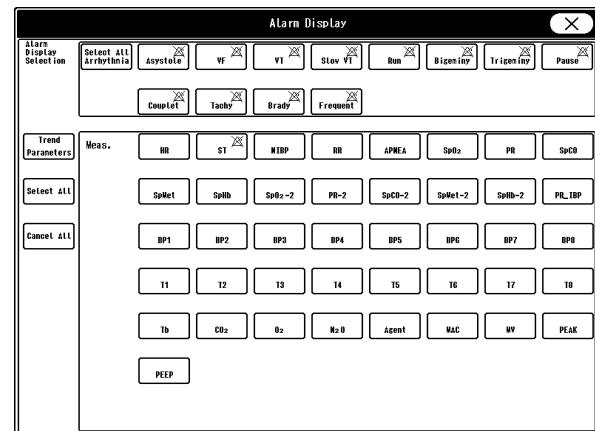
5 Trend Group Selection

- ▶ Maximum of 4 trend groups with 12 parameters each can be registered.
- The trend group can be selected according to the monitoring purpose.
- ▶ Pressing the [Change Name] key will allow to change the trend group name.



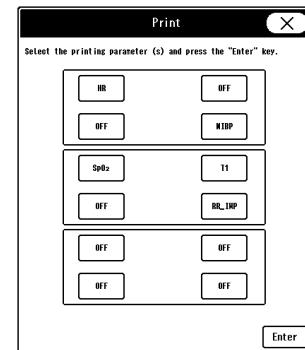
6 Alarm Display Selection

- ▶ If the alarm for the selected arrhythmia, parameter is generated during the displayed time range, it will be indicated in red on the alarm bar.
- ▶ [Trend Parameters]: The displayed trend parameters will be selected.
- ▶ [Select All]: All parameters including arrhythmia will be selected.
- ▶ [Cancel All]: All selections will be cancelled.
- ▶ [Select All Arrhythmia]: All arrhythmia will be selected.
- ▶ Each parameter key: Each time the key is pressed, selected/unselected status will change.



7 Graphic Trend Printing

- ▶ To print the trend data, press the [Print] key, select the parameter, and press the [Enter] key.
- ▶ It can be output on the Recorder Unit (HR-800) or the laser printer.
(☞ "Output Printer Setup for Review Data Printing" P11-9)



Description for Each Parameter

The parameters and scales for the graphic trend are as follows.

Parameter	Details	Scale	Unit
HR	HR	100, 200, 300	bpm
VPC	VPC Counts	20, 50, 100	-
ST (ST1, ST2, I, II, III, aVR, aVL, aVF, V1 to V6)	ST Level	±0.2, ±0.5, ±1.0, ±2.0 ±2, ±5, ±10, ±20	mV mm
SpO ₂ -1, SpO ₂ -2	SpO ₂ Value	0 to 100, 50 to 100, 80 to 100	%
PR_SpO ₂ -1, PR_SpO ₂ -2	SpO ₂ Pulse Rate	100, 200, 300	bpm

Parameter	Details	Scale	Unit
NIBP	NIBP (SYS / Mean / DIA)	100, 150, 200, 300	mmHg
		16, 20, 24, 40	kPa
BP1 to 8	Blood Pressure (Systolic / Mean / Diastolic)	20, 50, 100, 150, 200, 300	mmHg
		4, 8, 16, 20, 24, 40	kPa
CVP	Central Venous Pressure	20, 50, 100, 150, 200, 300	mmHg
		4, 8, 16, 20, 24, 40	kPa
		20, 40	cmH ₂ O
PDP, CPP	Peak Diastolic Pressure of IABP, Cerebral Perfusion Pressure	20, 50, 100, 150, 200, 300	mmHg
		4, 8, 16, 20, 24, 40	kPa
PR_IBP	BP Pulse Rate (BP1/ART)	100, 200, 300	bpm
T1 to 8	TEMP	20 to 45, 30 to 40	°C
		68.0 to 113.0, 86.0 to 104.0	°F
Tb	Blood Temperature (Cardiac Output Measurement)	20 to 45, 30 to 40	°C
		68.0 to 113.0, 86.0 to 104.0	°F
RR_IMP	Impedance Respiration Rate	50, 100, 150	Bpm
RR_GAS	Gas Unit Respiration Rate	50, 100, 150	Bpm
RR_VENT	Ventilator Respiration Rate	50, 100, 150	Bpm
APNEA	Apnea (Impedance, CO ₂ , Ventilator)	15, 30	s (second)
EtCO ₂ , InspCO ₂	Gas Unit CO ₂ Concentration	50, 100	mmHg
		4, 8, 10	kPa, %
ExpO ₂ , InspO ₂	Gas Unit O ₂ Concentration	50, 100	%
ExpN ₂ O, InspN ₂ O	Gas Unit N ₂ O Concentration	50, 100	%
ExpAGT, InspAGT	Gas Unit Agent Concentration	4, 8, 10	%
MAC	Minimal Alveolar Concentration	5, 10	-
BIS	BIS Monitor Data	25, 50, 75, 100	-
SvO ₂	Mixed Venous Oxygen Saturation	0 to 100, 50 to 100, 80 to 100	%
ScvO ₂	Central Venous Oxygen Saturation	0 to 100, 50 to 100, 80 to 100	%
CCO	Continuous Cardiac Output	6, 12, 20	L/min
CCI	Continuous Cardiac Index	6, 12, 20	L/min/m ²
BT	Blood Temperature (Vigilance)	20 to 45, 30 to 40	°C
		68.0 to 113.0, 86.0 to 104.0	°F
SpCO (1, 2)	Carboxyhemoglobin Concentration	20, 40, 100	%
SpMet (1, 2)	Methemoglobin Concentration	10, 15, 100	%
SpHb (1, 2)	Total Hemoglobin Concentration	10 to 20, 0 to 25	g/dL
PI(1,2)	Perfusion Index	10, 20	%
PI(1,2)	Pleth Variability Index	30, 60, 100	%
ExpMV	Expiratory Minute Ventilation Volume	6.0, 12.0, 20.0	L/min
PEAK	Peak Airway Pressure	10, 20, 50, 100	cmH ₂ O
PEEP	Peak End Expiratory Pressure	10, 20, 50, 100	cmH ₂ O

Parameter	Details	Scale	Unit
Lt-rSO ₂	Regional Cerebral Oxygen Saturation	20 to 100	%
Rt-rSO ₂			
S1-rSO ₂			
S2-rSO ₂			

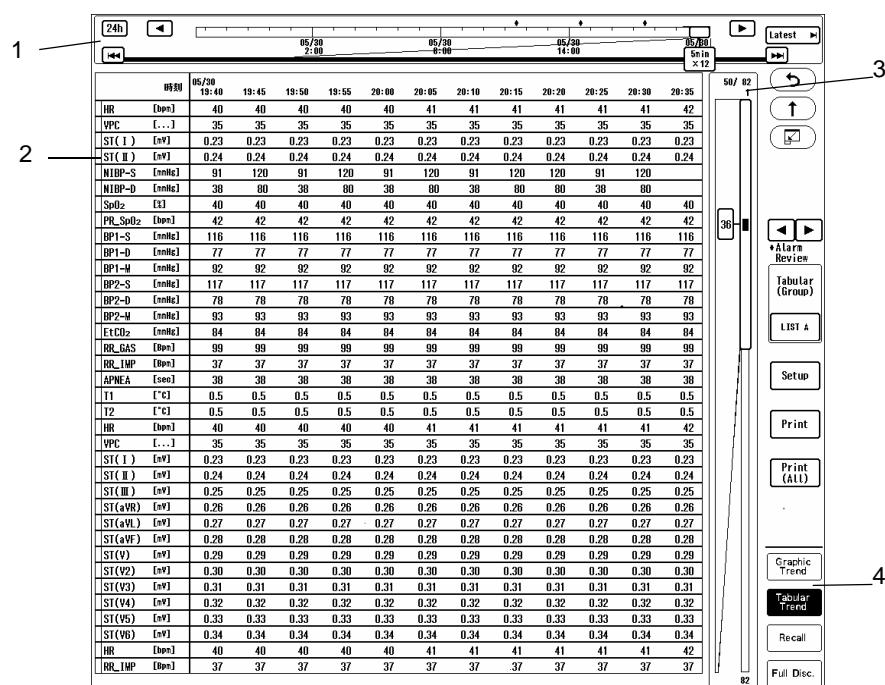
Tabular Trend

This section explains the tabular trend function and printing procedure.

The 120 hours of data in 10 sec. / 30 sec. interval will be automatically stored and displayed as tabular trend data.

Displayed Items

Press the [Menu], [Tabular Trend] ("Data Review") on the individual bed display.



1	Time Bar	(☞ "Common Operation" P9-1)
2	Numeric Data List	The numeric data will be displayed. The alarm generated data will be displayed with red background. On the left side of the parameter, the color assigned for the corresponding parameter will be displayed.
3	Scroll Parameter	If all the parameters are not displayed, the display can be scrolled.
4	Other Review Data Display	(☞ "Common Operation" P9-1)

NOTE

- The red background will be displayed for the alarm generated parameter.
- The alarm display for the expiratory and inspiratory parameter such as EtCO₂ and InspCO₂ will be the same.
- For example, if the alarm is generated for BP-S, the background color of BP1-S, BP1-M, BP1-D will be displayed in red.
- If the display resolution is higher than the minimum resolution of the data, the same data is

repeated to match the display resolution.

- The data resolution differs according to the parameter as shown below.

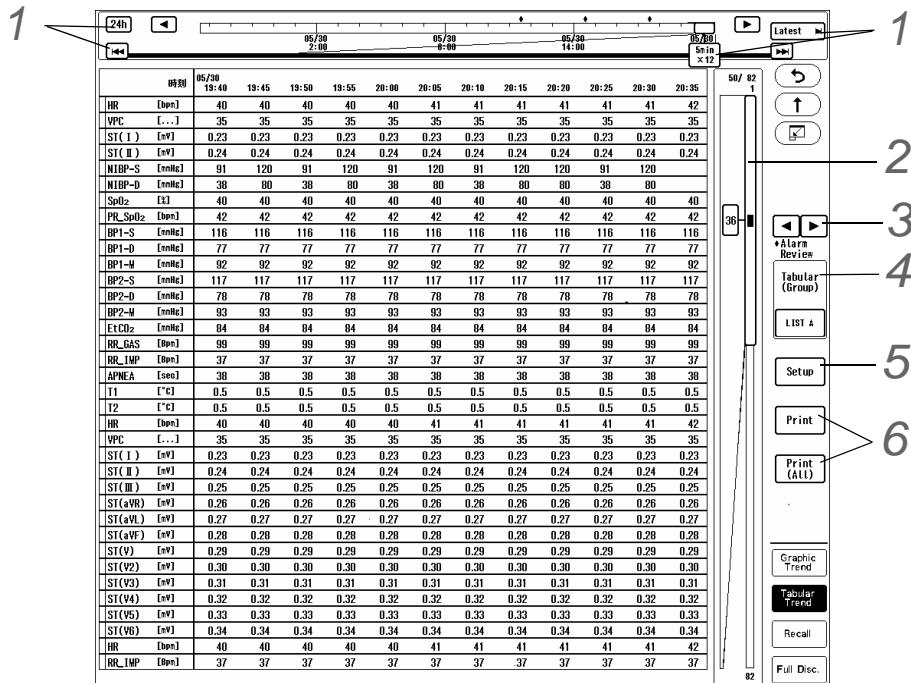
Data Resolution

Minimum Resolution	Parameter
10 sec.	HR, ST, SpO ₂ , SpO ₂ -2, PR_SpO ₂ , PR_SpO ₂ -2, BP1, BP2
30 sec.	Other than above



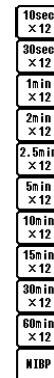
- When "Check extended memory" is displayed for the system status message, internal memory error can be considered. In such case, tabular trend data cannot be properly stored or displayed. Refer to the "Troubleshooting" section.
- The tabular trend data is periodically stored to the internal memory, but if the power has been turned OFF for 5 minutes or more, maximum of 5 seconds of data may be lost. In such case, the lost data will be displayed as not measured data.

Tabular Trend Setup and Printing



1 Time Bar Duration, Scroll Interval, Update Display (☞ "Common Operation" P9-1)

- ▶ The displaying time span can be selected by pressing one of the keys such as [10sec x12]. (shown on right)
- ▶ [NIBP]: The tabular trend display interval will be according to the NIBP measurement time.



2 Switching the Displaying Items

- ▶ By dragging the scroll bar slider up and down and releasing it, / will be displayed for a fixed amount of time.
- ▶ Pressing the / will switch the display by page.

3 Alarm Review

- ▶ Pressing the / key for "Alarm Review" will move the cursor to the alarm generated time.

4 Tabular Trend Group Selection

- ▶ Maximum of 6 groups of parameters can be registered for tabular trend.
- The trend group to be displayed can be selected according to the monitoring purpose.
- ▶ Pressing the [Change Name] key will allow to change the trend group name.

Group					
LIST A	LIST B	LIST C	LIST D	LIST E	LIST F
HR	HR	HR	SvO ₂	BIS	HR
VPC	VPC	RR_IMP	CCU	SvI	SpO ₂
ST(I)	ST(I)	RR_GAS	EDV	EMG	NIBP_S
ST(II)	ST(II)	RR_VENT	B-Temp	SR	NIBP_D
NIBP_S	ST(III)	SpO ₂	RVEF		NIBP_M
NIBP_D	ST(aVR)	P-PEAK	SV		BP1_S
Spo ₂	ST(aVL)	P-PAUSE	CCI		BP1_D
PR_Spo ₂	ST(aVF)	P-MEAN	EDW		BP1_W
BP1_S	ST(V)	PEEP	CSV		RR_GAS
BP1_D	ST(V2)	E-IV	SVR		EtCO ₂
BP1_W	ST(V3)	I-IV	SaO ₂		O ₂ -I
BP2_S	ST(V4)	WV	SVI		AGT-1

5 Displaying Parameter Selection

(☞ "Parameter Selection for Tabular Trend" P9-9)

6 [Print]/[Print (All)]

- ▶ [Print]: The currently displayed tabular trend will be printed.
- ▶ [Print (All)]: All data for 12 parameters (which fits in 1 page) will be printed.
- ▶ It can be output on the Recorder Unit (HR-800) or the laser printer.

(☞ "Output Printer Setup for Review Data Printing" P11-9)

Parameter Selection for Tabular Trend

- ### 1 Press the [Setup] key on the Tabular Trend screen.

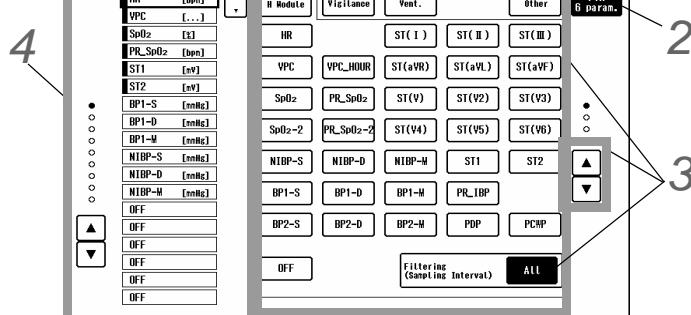
2 Quantity of Fixed Display Parameters

- 1 Press the [Fix x param.] key.

- ▶ The dropdown list will be displayed.

- 2 Select from [0 param.] to [6 param.].

- ▶ The selected quantity of parameters will be always displayed on the tabular trend, and these will be remained displayed even when scrolled.



3 Parameter Selection for Tabular Trend

- 1 The data can be filtered by pressing the key for "Filtering".
 - ▶ [10 sec.]: The displayed data will be filtered in 10 seconds sampling interval.
 - ▶ [All]: All data will be displayed.
- 2 Select the category and displaying page.
 - ▶ [H Module]/[Vigilance]/[Vent.]/[Other]: The parameters for the corresponding category will be displayed.
[H Module] is a generic term for the modules for DS-7000 series and DS-8000 series patient monitor (HS-700, HS-8000, HM-800, etc.)
 - ▶ /: The displaying page for the parameters can be selected.
- 3 Select the parameter to be displayed for the selected location on the left.
 - ▶ The blue frame will move to one row below.
 - ▶ [OFF]: The line where [OFF] is selected will not be displayed.

4 Parameter Display Location

- 1 The selected location will be displayed with blue frame and / will be displayed at the side.
- 2 To change the location, directly press the desired location or drag the / key up or down.
- 3 To change the displayed page, press the / keys on the left.

Parameters for each Category

H Module	HR, VPC,VPC-HOUR, ST, SpO ₂ -1, PR_SpO ₂ -1, SpO ₂ -2, PR_SpO ₂ -2, NIBP, BP1 to 8, PR-IBP, PDP, PCWP, CPP, T1 to 8, Tb, EtCO ₂ , InspCO ₂ , RR-GAS, RR-IMP, RR-VENT, APNEA, O ₂ , N ₂ O, Agent, E-TV, I-TV, E-MV, P-PEAK, PEEP, P-MEAN, PI, PVI, SpCO, SpMet, SpHb
Vigilance	SvO ₂ , ScvO ₂ , B-Temp, CCO, CCI
Ventilator	E-TV, I-TV, MV, P-PEAK, PEEP, P-MEAN
Other	BIS, SQI, EMG, SR, Lt-rSO ₂ , Rt-rSO ₂ , S1-rSO ₂ , S2-rSO ₂

NOTE

- The apnea duration of 5 seconds or more will be stored. If less than 5 seconds, it will be stored as "0 (zero)".

Recall

This section explains about the recall function and the setup procedure.

CAUTION

- When "Check extended memory" is displayed for the system status message, internal memory error can be considered.
In such case, full disclosure waveform cannot be properly stored or displayed.
Refer to the "Troubleshooting" section.
 - The recall data is periodically stored to the internal memory, but if the power has been turned OFF for 5 minutes or more, maximum of 1 minute of data may be lost. In such case, the lost data will be displayed as not measured data.
-

Displayed Items

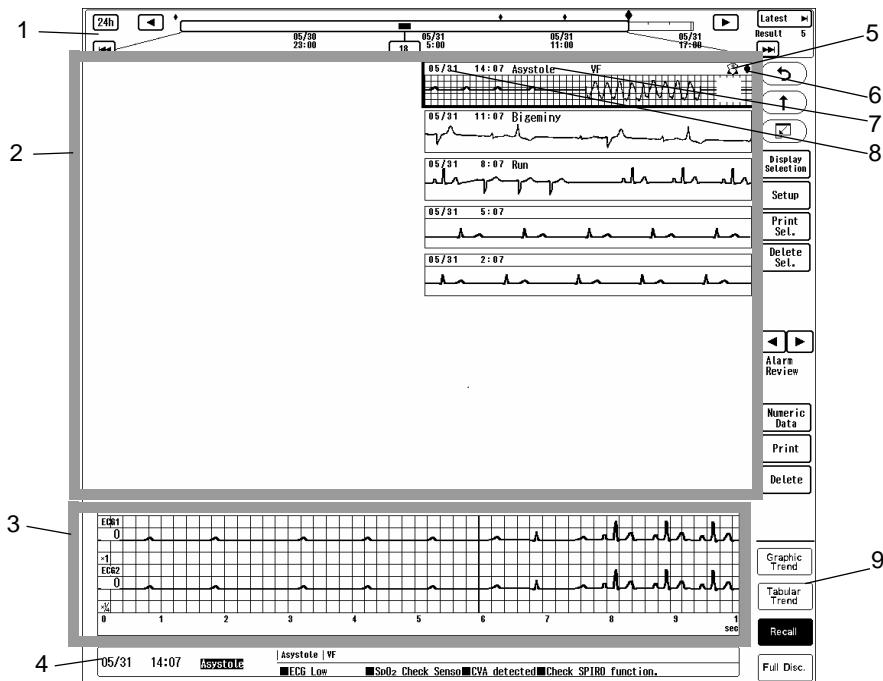
Press the [Menu], [Recall] ("Data Review") keys.

When the alarm for the specified recall factor occurs, the specified waveform (12 seconds) and numeric data for each recall factor will be stored up to 1000 data when 1 recall waveform and up to 500 data when 2 recall waveforms. The recall data to be displayed can be selected. Maximum of 18 compressed recall waveforms will be displayed.

Pressing the waveform area will display the enlarged waveform.

The recall waveform will be acquired from the point prior to alarm occurrence so that alarm-generated point will be displayed at 7 to 8 seconds point on the 12-seconds recall waveform.

If the recall data exceeds the maximum quantity (1000/500), the data will be erased from the oldest one.



1	Time Bar	(☞ "Common Operation" P9-1)
2	List Display Area	18 data will be displayed.
3	Enlarged Display Area	Maximum of 2 waveforms (12 seconds each) can be displayed. The waveform can be dragged to left and right. When a mouse is used, divider function can be used.
4	Date/Time at Alarm Occurrence, Recall Factor, Numeric Data	
5	Nurse Call Mark	Indicates that the recall factor was notified to the nurse call system.
6	Latest Recall Factor	A diamond shape mark will be displayed for the waveform of latest recall factor.
7	Major Recall Factor	Indicates the major recall factor.
8	Date/Time at Alarm Occurrence	Indicates the date/time at alarm occurrence.
9	Other Review Data Display	(☞ "Common Operation" P9-1)

Recall Condition Setup

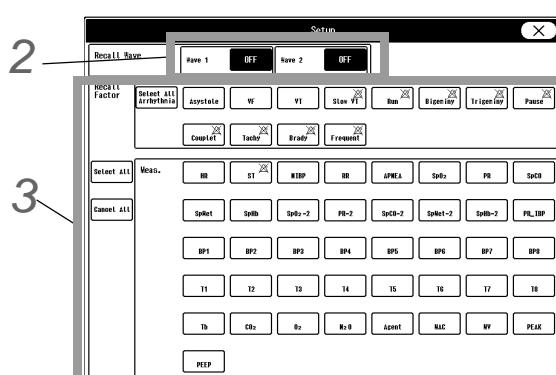
The storing condition at alarm occurrence can be set for the recall function. The recall waveform and recall factor (numeric data, arrhythmia) can be selected.

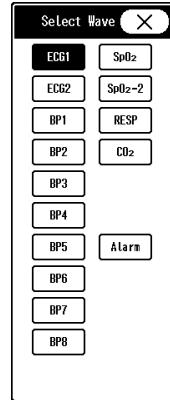
- 1 Press the [Setup] key on the recall screen.
▶ The "Setup" window will be displayed.

2 Recall Waveform Selection

Up to 2 waveforms can be selected for recall waveform.

- ▶ Select the parameter for "Wave 1" and "Wave 2".





3 Recall Factor Selection

- ▶ Select the alarm factor to be stored as recall waveform.

NOTE

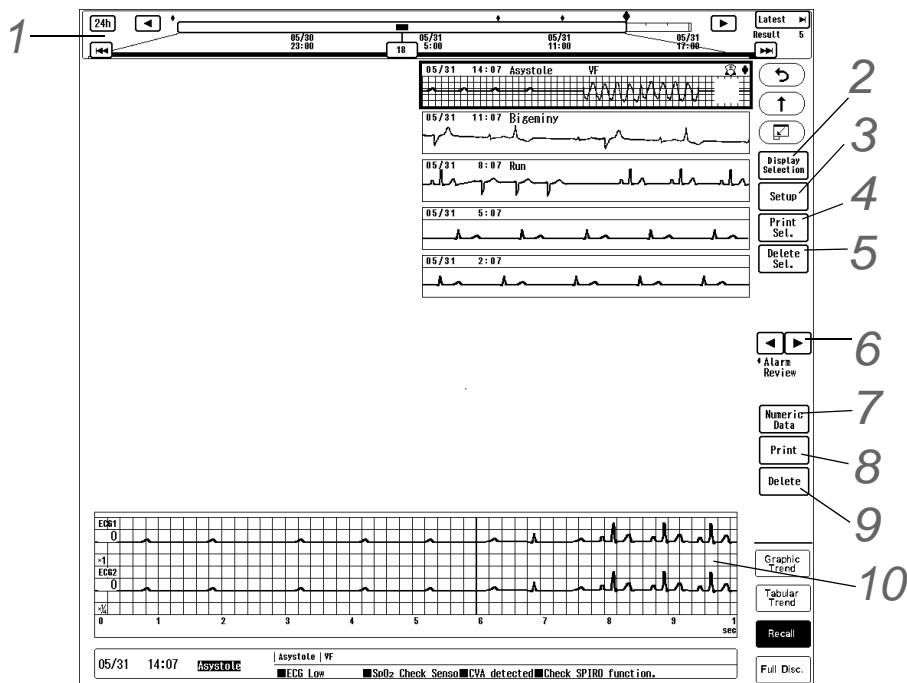
- The recall waveform will start with the following delay time tracing back from the alarm occurrence.

	Adult	Child	Neonate	
			Numeric Data Alarm	Arrhythmia Alarm
Delay Time	12 sec.	12 sec.	8 sec.	12 sec.

- For the parameters measured on the multigas unit, the delay time is 8 seconds.

Recall Setup and Printing

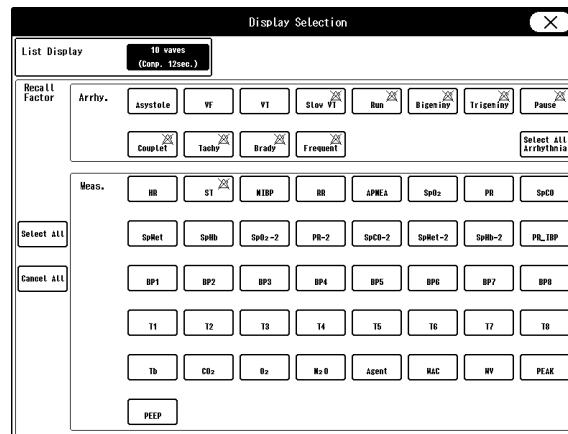
The procedures to select the displaying recall factor, to delete the recall waveform, to print the recall waveform, etc. are explained below.



1 Time Bar Duration, Scroll Interval, Update Display (☞ "Common Operation" P9-1)

2 Recall Display Selection

- The key will turn in blue when pressed which indicates that the alarm for that parameter will be the recall factor to be displayed.
- [Select All]: All parameters including arrhythmia will be selected.
- [Select All Arrhythmia]: All arrhythmia will be selected.
- [Cancel All]: All selections will be cancelled.



3 Recall Factor Selection

(☞ "Recall Condition Setup" P9-12)

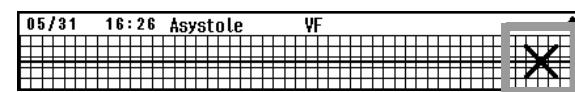
4 Recall List Printing

- This key will be displayed only when a laser printer is used.
- Pressing the [Print Sel.] key will allow to print the recall list.
 - Select the waveforms to be printed on the laser printer. For the selected waveform, "█" will be displayed. (shown on right)
To select all displayed waveforms, press the [Select All] key.
"To cancel the selection, select again the waveform with "█" mark. "█" mark will be cleared indicating that it has been removed from the printing parameter selection.
 - Pressing the [Print] key will display the [Print OK]/[Cancel] keys.
 - Press the [Print OK] key to print the waveforms with "█" mark on the laser printer.



5 Deleting All Recall Waveform

- Press the [Delete Sel.] key.
- Select the parameter to delete. For the selected parameter, "x" will be displayed. (shown on right)
To select all displayed waveforms, press the [Select All] key.
To cancel the selection, select again the waveform with "x" mark. "x" mark will be cleared indicating that it has been removed from the deleting parameter selection.
- Pressing the [Delete] key will display the [Delete OK]/[Cancel] keys.
- Press the [Delete OK] key to delete the parameters with "x" mark.



6 Alarm Review

- Pressing the [◀]/[▶] key for "Alarm Review" will move the selection on the recall list and displays the enlarged waveform for the selected recall factor.

7 Displaying the Numeric Data for the Recall Factor

- The numeric data for the displayed enlarged waveform will be displayed on another window.

8 Printing the Recall Waveform

- The displayed enlarged waveform and numeric data will be printed. The output printer can be selected on

the "Print Settings".

(☞ "Output Printer Setup for Review Data Printing" P11-9)

9 Deleting the Displayed Recall Enlarged Waveform

- ▶ Pressing the [Delete] key will display the [Delete OK]/[Cancel] keys.
- ▶ Press the [Delete OK] key to delete the displayed enlarged waveform.



10 Divider Function

(☞ "Divider Function" P9-15)

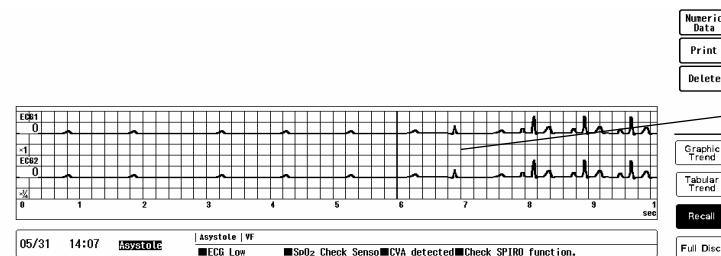
Divider Function

By using the divider function, PR, RR, PP interval of ECG can be measured.

NOTE

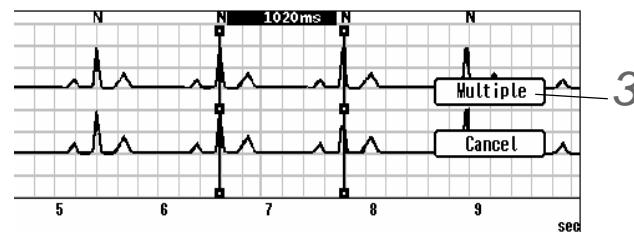
- ♦ The divider function can be used only when a mouse is connected.

1 The divider mode will be activated by dragging the mouse to the right on the enlarged waveform.



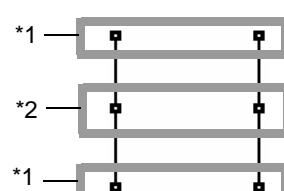
2 Divider Mode Operation

- 1 The divider start line will be displayed on the dragging start point.
- 2 While dragging the mouse to the right, the divider end line will be displayed along with the mouse pointer.
- 3 When the drag operation is released, the finalized divider end line will be displayed.



- 4 To adjust the divider lines after they are finalized, use the square marks on the divider lines.

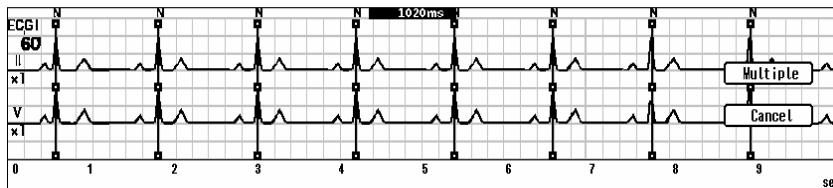
- ▶ By using the square marks on the upper/lower end (*1 shown on right), the divider line can be dragged.
- ▶ By using the square marks on the center (*2 shown on right), the start line and end line can be dragged at the same time without changing the divider interval.



- ▶ By releasing the drag operation, a divider interval, [Multiple], [Cancel] keys will be displayed again.

3 [Multiple] Key Operation

- 1 Clicking the [Multiple] key will continuously display the dividers in equal intervals before and after the current divider.



- ▶ The divider interval (ms) will be displayed at the center of QRS judgment display area.
 - ▶ If the divider interval is less than 200ms, the [Multiple] key will not function.
- 2 To adjust the divider lines after they are finalized, use the square marks on the divider lines.
- ▶ By dragging the square marks on the upper/lower end of the divider line, the divider interval from the previous divider line can be decreased/increased.
 - ▶ By using the square marks on the center, the start line and end line can be dragged at the same time without changing the divider interval.
 - ▶ By releasing the drag operation, a divider interval, [Multiple], [Cancel] keys will be displayed again.

4 When the enlarged waveform is printed during the divider mode, the divider lines will be also printed.

5 The divider mode will be cancelled for the following cases.

- ▶ When the display is switched to other display
- ▶ When the display is switched to other patient
- ▶ When the [Cancel] key is clicked

NOTE

- ◆ The data resolution of the divider is 12ms. Adjustment of less than 12ms is not possible.

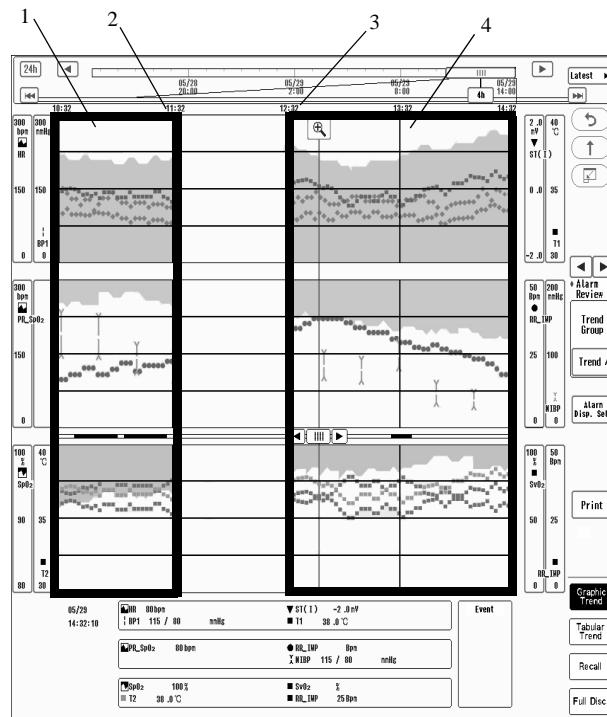
Review Data Display for Discharged Patient

The review data of the discharged patient can be displayed for the past 120 hours. (☞ "Discharged List" P12-13)
The review data that can be displayed after the patient is discharged are as follows.

- ◆ Graphic Trend
- ◆ Tabular Trend
- ◆ Recall (List Display, Enlarged Display)
- ◆ Full Disclosure Waveform (Compressed Display, Enlarged Display)

1 On the review display for the Bed ID which the discharged patient was previously registered, scrolling back the time will display the review data for the discharged patient.

- ▶ The data for the discharged patient will be displayed with lower brightness.
- ▶ The review data can be printed along with patient information.



Example on "Graphic Trend" Display

- 1 Trend data of previous patient
- 2 Discharged date/time of previous patient
- 3 Admit date/time of current patient
- 4 Trend data of current patient

Alarm History

REFERENCE

- ♦ For details of the alarm history display, refer to the following chapter.
(☞ "Alarm History" P7-19)

Chapter 10 Waveform Review

Full Disclosure Waveform.....	10-1
To Select the Waveform to Store	10-1
Displayed Items	10-3
Full Disclosure Waveform Setup	10-4
To Print the Full Disclosure Waveform	10-6
To Search by Time	10-7

Chapter 10 Waveform Review

Full Disclosure Waveform

Total of 64 waveforms, 120 hours of waveform data can be stored.

The waveforms that can be stored as full disclosure waveforms are as follows.

ECG1, ECG2, ECG(I) to ECG(V6), BP1 to 8, SpO₂-1, SpO₂-2, RESP, AWP, AWF, AWV, CO₂, O₂, AGENT

The alarm event and time will be also stored which allows to search the waveform by each factor.

CAUTION

- When "Check extended memory" is displayed for the system status message, internal memory error can be considered.
In such case, full disclosure waveform cannot be properly stored or displayed.
Refer to the "Troubleshooting" section. (☞ "Troubleshooting" P13-12)
- The full disclosure waveform data is periodically stored to the internal memory, but if the power has been turned OFF for 5 minutes or more, maximum of 20 seconds of data may be lost. In such case, the lost data will be displayed as not measured data.

NOTE

- When the full disclosure waveform data exceeds the maximum capacity, the data will be deleted from the old one. To delete the full disclosure waveform data, perform the discharge procedure.
(☞ "Discharge" P6-12)

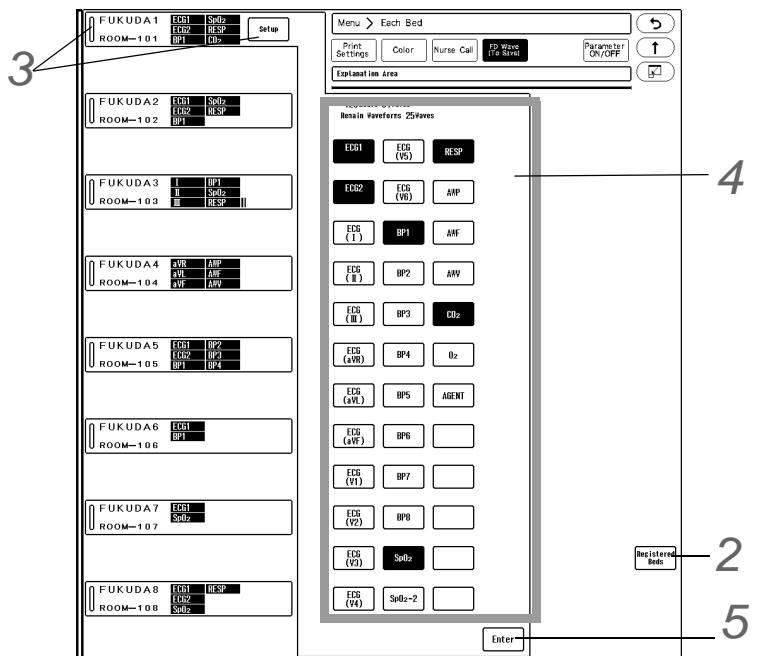
To Select the Waveform to Store

The beds and waveforms to store for full disclosure waveform data can be selected in the following 2 ways.

- Displayed Beds: Maximum of 32 beds which are displayed on the home display.
- Registered Beds: Maximum of 32 beds which are previously registered.

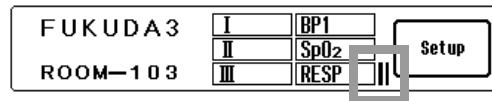
1 Press the [Menu], [FD Wave (To Save)] ("Each Bed") keys.

- The full disclosure waveform selection window will be displayed.



2 Select from [Displayed Beds] or [Registered Beds].

3 Press the [Setup] key for the bed to perform the setup. On the bed selection area, maximum of 6 selected parameters will be displayed. If there are more than 6 parameters, bar mark will be displayed. (shown on right)



4 Select the waveform to store. The key for the selected waveform will be displayed in blue.

The remaining quantity of waveforms that can be stored will be displayed at the upper part of the display. Use this quantity as an indication, and select the waveforms for each bed. To cancel the selection, press the key for the corresponding waveform.

5 Press the [Enter] key.

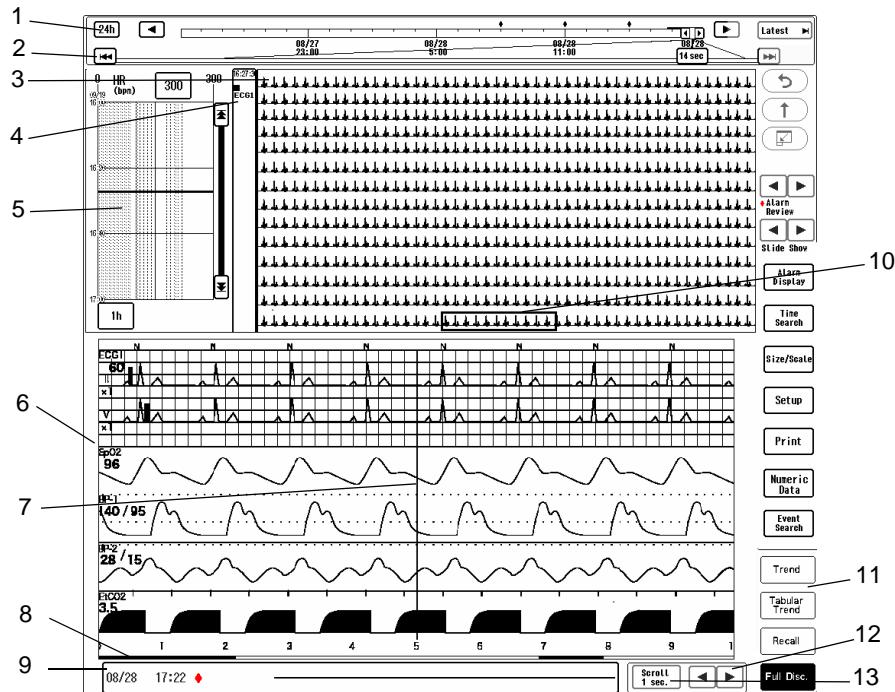
- The settings will be finalized.

NOTE

- When the waveform selection is cancelled, the previously stored waveforms will be also deleted.

Displayed Items

Select a bed, and press the [Menu], [Full Disc. Wave] ("Waveform Review") on the individual bed display. This section explains about the items displayed on the full disclosure waveform display.



1 Time Bar

The stored duration for the full disclosure waveform data will be displayed. A diamond shape mark indicates the alarm occurrence point.

2 Time Duration of Compressed Waveform

Indicates the time duration of the displayed compressed waveform.

3 Full Disclosure Compressed Waveform Display Area

Maximum of 6 waveforms can be displayed. The displayed duration for one line can be selected from 10 sec. / 30 sec. / 1 min.

Pressing the waveform area will display the enlarged full disclosure waveform at the lower part of the display.

4 Displayed Waveform and Color

5 Instant HR Trend Display Area

Instant HR trend will be displayed. The trend display duration can be changed.

Pressing any area will display the compressed and enlarged waveform at that point.

Whether to display or not display the instant HR trend can be selected.

6 Full Disclosure Enlarged Waveform Display Area

Maximum of 6 waveforms can be displayed. The displayed duration for one line is 10 seconds.

When a mouse is used, divider function can be used. (☞"Divider Function" P9-15)

7 Cursor

8 Alarm Bar

Indicates the alarm occurrence point.

9 Date/Time at Cursor Point and Alarm Event

10 Displayed Range of Enlarged Waveform

11 Other Review Data Display

Other review data at the same date/time of cursor point will be displayed.

12 Scroll Key

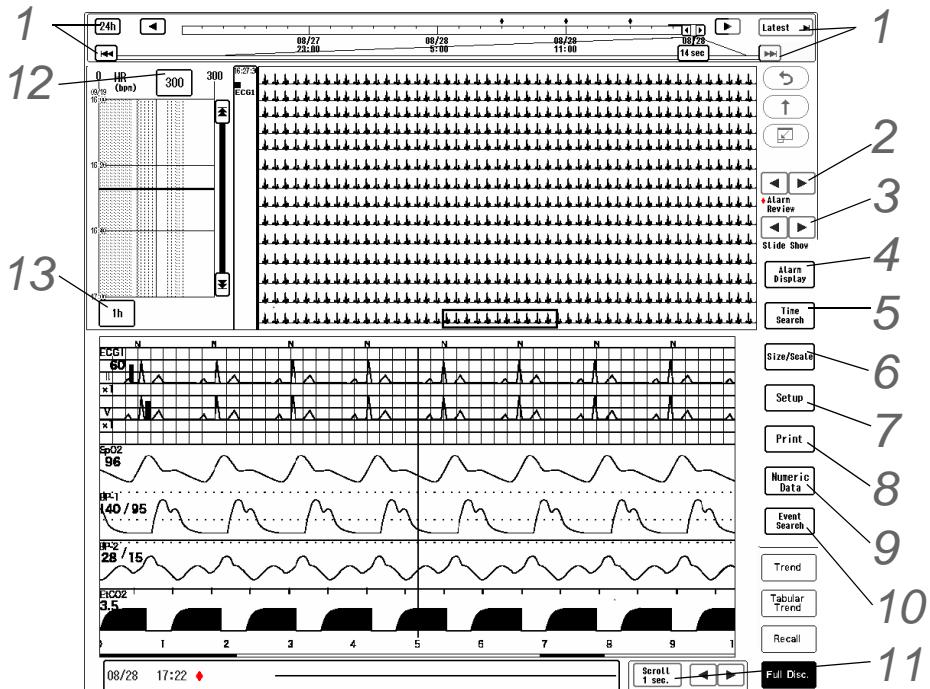
The enlarged waveform will shift with the set interval for the "Scroll Interval".

13 Scroll Interval

The scroll interval can be selected from 1 sec. / 5 sec. / 10 sec.

Full Disclosure Waveform Setup

This section describes the setup and operation procedure of full disclosure waveform.

**1 Time Bar Duration, Scroll Interval, Update Display**

(☞ "Common Operation" P9-1)

2 Alarm Review

▶ Pressing the / key will shift the waveform to the alarm review point.

3 Slide Show (Update of Display)

▶ By pressing the / key, compressed waveform will be updated with the set interval.

The updating interval will be according to the set interval for "Slide Show Interval" under "Setup".

During the slide show mode, the key will turn to . Pressing the key again will cease the slide show.

4 Alarm Display

▶ When turned ON (when the key is blue), alarm occurrence point on the compressed waveform area will be highlighted.

5 Time Search

(☞ "To Search by Time" P10-7)

6 Waveform Size/Scale

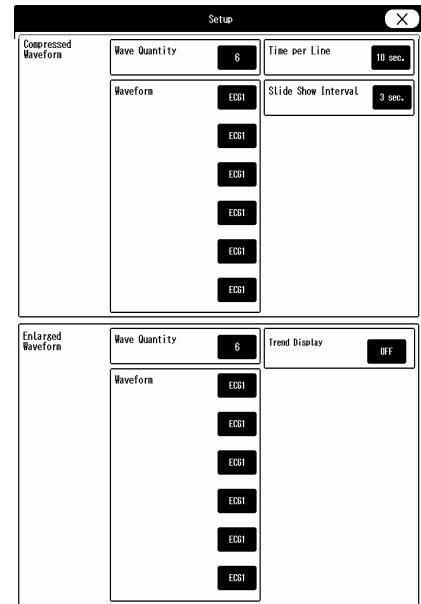
▶ Select from [Compress] / [Enlarge] to set the size/scale.

- ▶ The "Size/Scale" window will be displayed and key for the displayed waveform will be displayed. Pressing each key will display the size or scale selection window.

7

Displaying Waveform Setup (Quantity, Type, Duration, etc.)

- ▶ Wave Quantity for Compressed Waveform: Select from 1/2/3/4/5/6.
- ▶ Compressed Waveform: Select from the displayed parameters.
- ▶ Compressed Waveform Display Duration per Line: Select from 10 sec. / 30 sec. / 1 min.
- ▶ Slide Show Interval: Select from 3 sec. / 5 sec. / 10 sec. / 20 sec. / 30 sec.
- ▶ Wave Quantity for Enlarged Waveform: Select from 1/2/3/4/5/6.
- ▶ Enlarged Waveform: Select from the displayed parameters.
- ▶ Trend Display: Select ON (display) / OFF (not display) for instant HR trend display.

**8**

Print Waveform

(☞ "To Print the Full Disclosure Waveform" P10-6)

9

Numeric Data Display at Cursor Point

- ▶ The numeric data at the cursor position (blue line) on the enlarged waveform area will be displayed in another window.

10

Transmit Event

The [Transmit Event] key will be displayed when a data server is used.

The data server setup can be performed by pressing the [Menu] > [Initial Settings] > [Network] ("External Device") > [Data Server] keys.

(☞ Maintenance Manual "Data Server" P2-14)

- ▶ 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.

11

Scroll Interval

- ▶ The interval to scroll the enlarged waveform when [◀] / [▶] is pressed can be selected from [1sec.] / [5sec.] / [10sec.].

12

Instant HR Trend Scale

- ▶ Select from [100]/[200]/[300].

13

Instant HR Trend Display Duration

- ▶ Select from [24h]/[12h]/[6h]/[1h]/[30m].

To Print the Full Disclosure Waveform

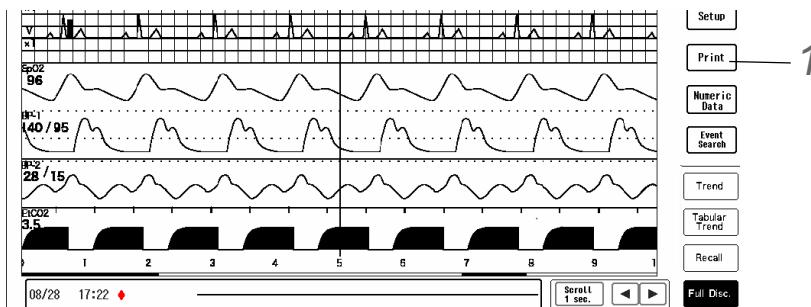
This section describes the printing procedure of full disclosure waveform.

Compressed waveform, enlarged waveform, or 12-lead waveform can be printed. The printing range can be specified.

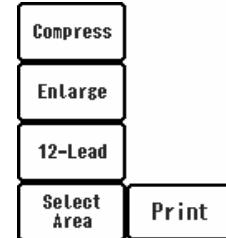
The output printer can be selected on the "Print" menu. (☞ "Output Printer Setup for Review Data Printing" P11-9)

NOTE

- For the telemetry beds, 12-lead waveform cannot be printed.
- To print the 12-lead waveform, [ECG (I)] to [ECG (V6)] need to be set under the full disclosure waveform setup menu. (☞ "To Select the Waveform to Store" P10-1)



1 Pressing the [Print] key will display the dropdown list of [Compress] / [Enlarge] / [12-Lead] / [Select Area]. (shown on right)



2 Compressed Waveform Printing

- ▶ The currently displayed compressed waveform will be printed.

3 Enlarged Waveform Printing

- ▶ The currently displayed enlarged waveform will be printed.

4 12-lead Waveform Printing

- ▶ When the HR-800 Recorder Unit is used, the 12-lead waveform for the enlarged display time range will be printed.
- ▶ When the laser printer is used, the 12-lead waveform for the enlarged display time range will be printed in a report format with the pre-set printing format. (Menu > Each Bed Setup > Print > 12-Lead) (☞ "12-Lead Printing Setup" P11-7)

5 Specifying the Printing Range

1 Selecting [Select Area] from the dropdown list will change the display to "Select Area" mode.

- ▶ During the "Select Area" mode, the [Print] key will change to [Select Area] key, and the key will be displayed in blue.

2 Specify the print range.

On the compressed waveform display area, the print range starts from the point where it is first pressed and ends at the point where it is pressed next.

- ▶ The print range will be displayed in light blue.

- ▶ When the end point of the print range is finalized, [Enlarge]/[12-Lead]/[Cancel] keys will be displayed beside the end point.

- ▶ If the compressed waveform display area is pressed, the end point will be reset to the pressed point.

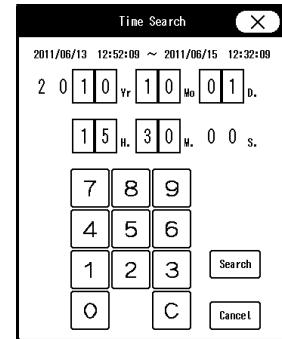
3 Start the printing.

- ▶ Pressing the [Enlarge] key will print the enlarged waveform of the selected print range.
 - ▶ Pressing the [12-Lead] key will print the 12-lead waveform of the selected print range.
The printing format will be according to the pre-set format. (Menu > Each Bed Setup > Print > 12-Lead)
 - ▶ Pressing the [Cancel] key will cancel the selected print range.
- 4** The "Select Area" mode will be cancelled for the following cases.
- * When the [Select Area] key is pressed again
 - * When the display is switched to other display
 - * When the display is switched to other patient
 - ▶ When the "Select Area" mode is cancelled, the [Select Area] key will change to [Print] key.

To Search by Time

The full disclosure waveform of the specified time can be displayed.

- 1 Press the [Time Search] key on the full disclosure waveform display.
 - ▶ The "Time Search" window will be displayed.
- 2 Enter the searching date/time using the numeric keys and press the [Search] key.
 - ▶ The time search will start.
 - ▶ The searched waveform will be displayed on the full disclosure waveform display.



Chapter 11 Printing

Types of Printing and Output Printer	11-1
Printing Condition/Output Destination Setup	11-2
Manual Printing Setup	11-2
Alarm Printing Setup.....	11-3
Periodic Printing Setup	11-5
12-Lead Printing Setup.....	11-7
Output Printer Setup for Review Data Printing	11-9
To Start/Stop the Printing	11-10
Manual Printing.....	11-10
Alarm Printing, Periodic Printing.....	11-12
Remote Printing.....	11-12
Review Data Printing	11-14
Measurement Status	11-15
Operation Procedure for HR-800.....	11-16
Paper Feed, Stop Printing	11-16
Status Message.....	11-16
Laser Printer Operation	11-17
Status Message.....	11-17
Stacked Data	11-17
To Delete the Stacked Data	11-17

Chapter 11 Printing

Types of Printing and Output Printer

This section explains the procedure to output the monitoring data to the HR-800 Recorder Unit or to the laser printer (A4/letter size) connected to the TCP/IP network.

There are following types of printing.

Printing Types	Output Printer	
	Recorder Unit HR-800	Laser Printer (A4/Letter)
Waveform Printing		
Manual Printing	Yes	No
Alarm Printing	Yes	No
Periodic Printing	Yes	No
Telemetry Remote Printing	Yes	No
Review Data Printing		
Graphic Trend Printing	Yes	Yes
Tabular Trend Printing	Yes	Yes
Recall List Printing	No	Yes
Recall, Zoom Wave Printing	Yes	Yes
12-lead Waveform Printing	Yes	Yes
Full Disc. Wave, Compressed Wave Printing	Yes	Yes
Full Disc. Wave, Zoom Wave Printing	Yes	Yes

Yes: Printing can be performed. No: Printing cannot be performed.

NOTE

- The laser printer setup should be performed by Fukuda Denshi service representative or system administrator of your institution.
( Maintenance Manual "Laser Printer" P2-13)
- The data of the DS-8500 system bedside monitor (from version 6) 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 your nearest service representative.
- When printing operation is performed from the DS-8500 system (from version 6), the printing will be output on the central monitor with the smallest central ID. For example, if the bedside monitor "BED-001" is monitored on 3 central monitors, "CNT-002", "CNT-004", "CNT-006", the printing operation from "BED-001" will output the printing on the "CNT-002" central monitor.

Printing Condition/Output Destination Setup

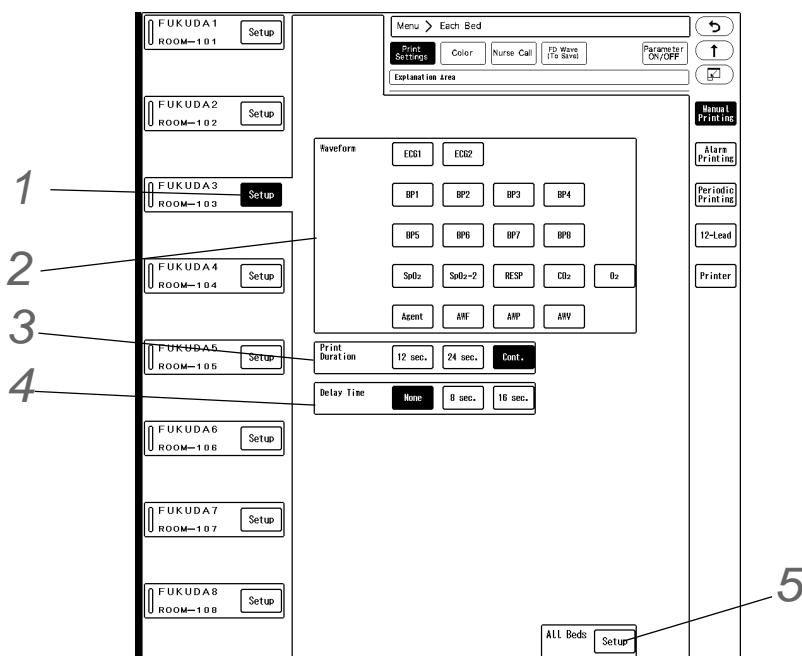
Manual Printing Setup

The manual printing can be set to start from the time the key is pressed, or 8 sec./16 sec. prior to the time the key is pressed.

Also, the printing can be set to automatically stop after 12 or 24 seconds, or continue to print until the "Print Start/Stop" key is pressed again.

- 1** Press the [Menu], [Print Settings] ("Each Bed") keys, and press the [Setup] key for the patient to perform the setup.

► The manual printing setup window for the selected patient will be displayed.



2 Output Waveform Selection

► Maximum of 3 waveforms can be selected for printing. When selected, the key will be displayed in blue.

3 Print Duration

► [12sec.]/[24sec.]: Printing will automatically stop after 12 seconds or 24 seconds.
► [Cont.]: Printing will continue until the [Print Start/Stop] key is pressed again or until paper runs out.

4 Delay Time

► [None]: Printing will start from the point the [Print Start/Stop] key is pressed.
► [8 sec.] / [16 sec.]: Printing will start 8 sec. or 16 sec. prior from the point the [Print Start/Stop] key is pressed.

NOTE

- If [None] is selected for the manual printing delay time, QRS classification symbol will not be printed. To print the QRS symbol, set the delay time to [8 sec.] or [16 sec.].

5 All Beds

- ▶ Applies the same setting for manual printing to all beds.

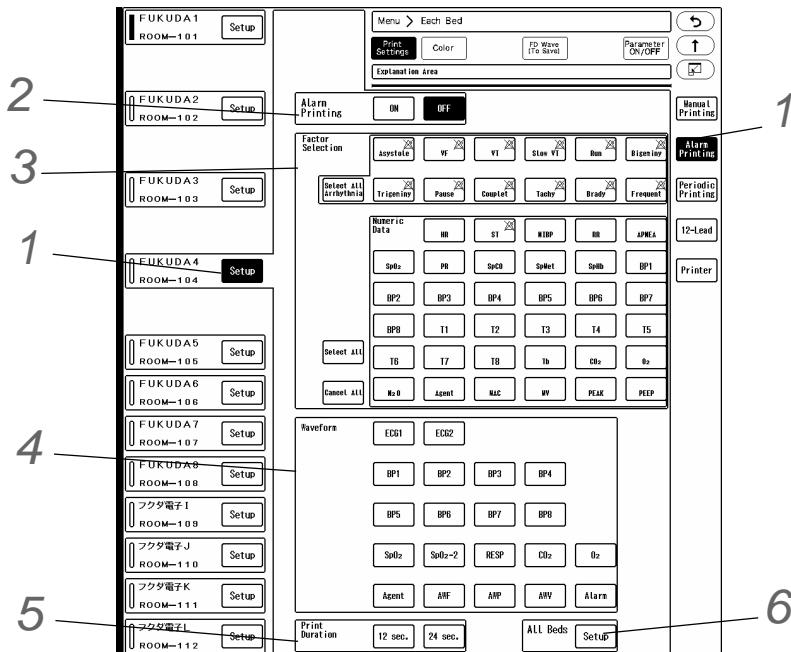
Alarm Printing Setup

When numeric data alarm or arrhythmia alarm occurs, printing will automatically start.

NOTE

- Alarm printing will be cancelled at condition such as <Printer Busy>, <Paper Out>, or <Check Cassette>. The data will be stored as recall data instead.
- If alarm generates simultaneously at more than one bed, the data for the bed that could not be printed will be also stored as recall data.
- The priority of alarm printing factor will be according to the alarm priority.
If the alarms of same priority generates, the priority will be in the following order.
ASYSTOLE > VF > VT > SLOW VT > RUN > COUPLET > PAUSE > BIGEMINY >
TRIGEMINY > FREQUENT > TACHY > BRADY > HR > ST1 > ST2 > SpO₂ > PR >
APNEA > EtCO₂ > InspCO₂ > T1 > T2 > MVe > PEAK > PEEP > SpO₂-2 > PR-2 > SpMet
> NIBP > BP1 > ... > BP6 > SpMet-2 > SpCO > SpCO-2 > ST(I) > ... >
ST(V6) > BP7 > BP8 > Tb > T3 > T4 > T5 > T6 > T7 > T8 > O₂-I > O₂-E >
N₂O-I > N₂O-E > AGENT1-I > AGENT1-E > AGENT2-I > AGENT2-E >
MAC > SpHb > SpHb-2 > PR_IBP > RR_IMP > RR_GAS > RR_VENT

- 1** On the "Print Settings" menu, press the [Setup], [Alarm Printing] key for the patient to perform the setup.



- 2** Alarm Printing

- ▶ [ON]: Printing will automatically start at alarm occurrence.
- ▶ [OFF]: Printing will not start at alarm occurrence.

- 3** Alarm Factor Selection

- ▶ Select the alarm factor for alarm printing. When selected, the key will be displayed in blue.
- ▶ The alarm OFF mark will be displayed inside the key for the parameter in alarm OFF condition.
- ▶ [Select All Arrhythmia]: All arrhythmia factors will be selected.

- ▶ [All ON]: All alarm factors will be selected.
- ▶ [All OFF]: All selections for the alarm factor will be cancelled.

4 Output Waveform Selection

- ▶ Maximum of 3 waveforms can be selected for printing.
- ▶ [Alarm]: Prints the waveform of the alarm factor.
( "Alarm Factor and Printed Waveform" P11-5)

5 Print Duration

- ▶ [12sec.]/[24sec.]: Printing will automatically stop after 12 seconds or 24 seconds.
- ▶ The delay time differs depending on the print duration.

Print Duration	Delay Time				
	Adult	Child	Neonate		Arrhythmia Alarm
			Numeric Data Alarm		
12 sec.	12 sec.	12 sec.	8 sec.	12 sec.	
	8 sec. for the multigas unit alarm				
24 sec.	16 sec.	16 sec.	16 sec.	16 sec.	

6 All Beds

- ▶ Applies the same setting for alarm printing to all beds.

Alarm Factor and Printed Waveform

Alarm Factor	Printed Waveform
Numeric Data	
HR	ECG1, ECG2
ST1, ST2	ECG1, ECG2
ST(I) to ST(V6)	ECG1, ECG2
BP1 to 8, CVP	BP1 to 8
NIBP	-
SpO ₂	SpO ₂
SpO ₂ -2	SpO ₂ -2
PR	SpO ₂
PR-2	SpO ₂ -2
RR	RESP (Other than CO ₂ source)
	CO ₂ (CO ₂ Source)
APNEA	RESP (Other than CO ₂ source)
	CO ₂ (CO ₂ Source)
EtCO ₂ , InspCO ₂	CO ₂
T1 to T8	-
MV	AWF
PEAK	AWF
PEEP	AWF
SpCO	SpO ₂
SpCO-2	SpO ₂ -2
SpMet	SpO ₂
SpMet-2	SpO ₂ -2

Alarm Factor	Printed Waveform
Numeric Data	
SpHb	SpO ₂
SpHb-2	SpO ₂ -2
InspO ₂ , ExpO ₂	O ₂
InspN ₂ O, ExpN ₂ O	CO ₂
InspAGT, ExpAGT	AGENT
InspAGT2, ExpAGT2	AGENT
MAC	AGENT
Arrhythmia	
Asystole	ECG1, ECG2
VF	ECG1, ECG2
VT	ECG1, ECG2
Slow VT	ECG1, ECG2
Run	ECG1, ECG2
Couplet	ECG1, ECG2
Pause	ECG1, ECG2
Bigeminy	ECG1, ECG2
Trigeminy	ECG1, ECG2
Frequent	ECG1, ECG2
Tachy	ECG1, ECG2
Brady	ECG1, ECG2

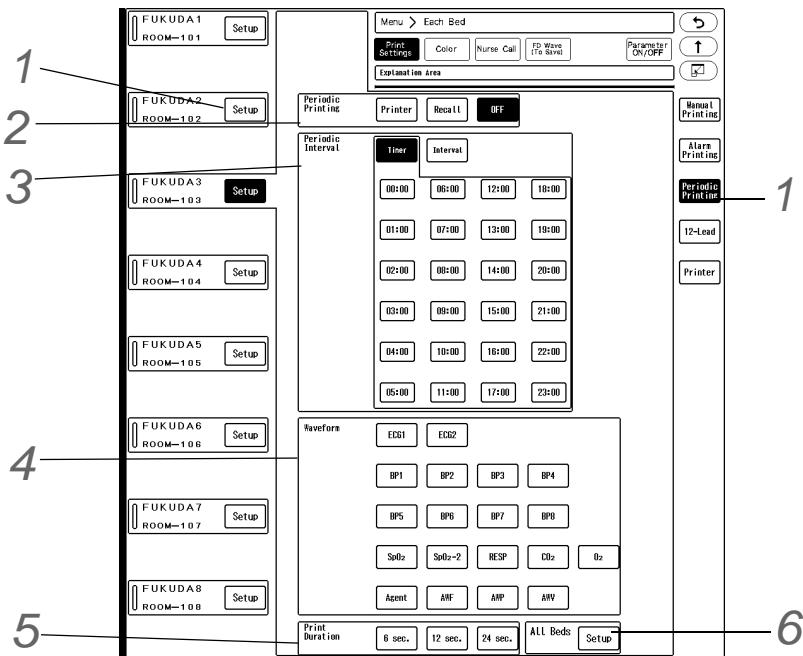
Periodic Printing Setup

The printing will automatically start with the selected interval.

NOTE

- When other data is in process of printing or if the printer is in paper out condition, one data per bed will be stacked for printing.

- 1** On the "Print Settings" menu, press the [Setup], [Periodic Printing] key for the patient to perform the setup.



2 Periodic Printing Setup

- ▶ [Printer]: Prints the data.
- ▶ [Recall]: Stores the data as recall waveform.
- ▶ [OFF]: Turns OFF the periodic printing function.

3 Periodic Interval

- ▶ [Timer]: Printing will automatically start at selected time.
- ▶ [Interval]: Printing will automatically start at selected interval. (shown on right)
For example, if [5 min] is selected for [Interval], printing will start at 10:00, 10:05, ...10:25. If [60 min] is selected, printing will start at 10:00, 11:00, 12:00,

Interval	
1min	15min
2min	20min
3min	30min
5min	60min
10min	120min

4 Waveform

- ▶ Maximum of 3 waveforms can be selected for printing. When selected, the key will be displayed in blue.

5 Print Duration

- ▶ The printing will automatically stop after the selected duration.

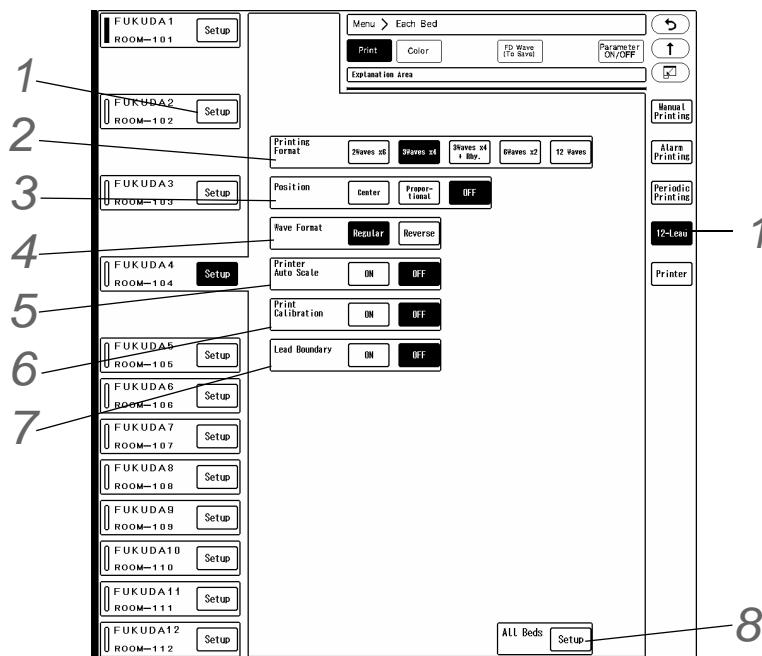
6 All Beds

- ▶ Applies the same setting for periodic printing to all beds.

12-Lead Printing Setup

The 12-lead waveform can be printed.

- 1** On the "Print Settings" menu, press the [Setup], [12-Lead] key for the patient to perform the setup.



2 Printing Format

- ♦ When [Recorder Unit] is selected:
 - ▶ [2 Waves x6] : Prints 2 waveforms in 6 columns.
 - ▶ [3 Waves x4] : Prints 3 waveforms in 4 columns.
- ♦ When [Laser Printer] is selected:
 - ▶ [3 Waves x4] : Prints 3 waveforms in 4 columns.
 - ▶ [3 Wavesx4+Rhy.] : Prints 3 waveforms in 4 columns along with 10 seconds of rhythm waveform (ECG1 lead on the home display).
 - ▶ [6 Waves x2] : Prints 6 waveforms in 2 columns.
 - ▶ [12 Waves] : Prints 12 waveforms in 1 column.

	Printing Format	Printing Duration	Delay Time
When [Recorder Unit] is selected:	2Wavesx6	6 sec.	6 sec.
	3 Waves x 4	6 sec.	
When [Laser Printer] is selected:	3 Waves x 4	2.5 sec.	10 sec.
	3Wavesx4+Rhythm	2.5 sec.	
	6Wavesx2	5 sec.	
	12 waves	10 sec.	

3 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 printing.

4 Wave Format

- ▶ [Regular]: Printing will start from the limb leads. (In the order of I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6)
- ▶ [Reverse]: Printing will start from the chest leads. (In the order of V1, V2, V3, V4, V5, V6, I, II, III, aVR, aVL, aVF)

5 Printer Auto Scale

- ▶ When [OFF] is set for "Position", select whether or not to automatically adjust the scale.
- ▶ The scale will be adjusted in the range of x1, x1/2, x1/4. It will not be adjusted to x2, x4 even if the amplitude is small.
- ▶ [ON]: Printing scale will be automatically adjusted.
- ▶ [OFF]: Printing will be performed with the displayed scale.

6 Print Calibration

- ▶ [ON]: Calibration waveform will be printed.
- ▶ [OFF]: Calibration waveform will not be printed.

7 Lead Boundary

- ▶ [ON]: Lead boundary between the leads will be printed.
- ▶ [OFF]: Lead boundary will not be printed.

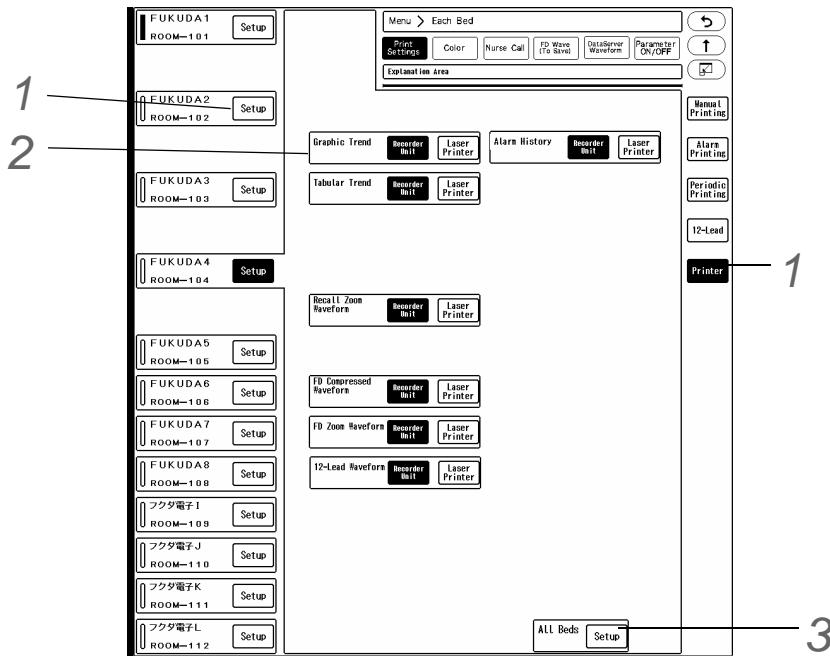
8 Common Setting for All Beds

- ▶ Applies the same setting for 12-lead printing to all beds.

Output Printer Setup for Review Data Printing

Graphic printing is a printing performed from the data review screen such as graphic trend and tabular trend. Select the output printer for each review data.

- 1** On the "Print Settings" menu, press the [Setup], [Printer] key for the patient to perform the setup.



- 2** Output Printer Selection

- ▶ [Recorder Unit]: Data will be printed on the HR-800 Recorder Unit.
- ▶ [Laser Printer]: Data will be printed on the laser printer.

REFERENCE

- ♦ If selecting laser printer for the output printer, it is necessary to perform network setting in advance.
(Maintenance Manual "Laser Printer" P2-13)

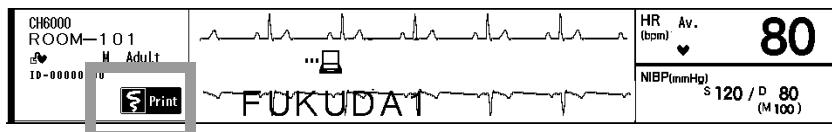
- 3** All Beds

- ▶ Applies the same setting for output printer to all beds.

To Start/Stop the Printing

Manual Printing

□ Operation from the Home Display



- 1** Press the **[Print]** (Print) key. To stop the printing, press the **[Print]** (Print) key again for the same bed.

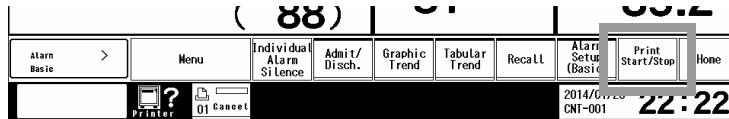
REFERENCE

- Pressing the **[Print]** (Print) keys for more than one bed will sequentially start the printing for the pressed beds. However, [12 sec.] or [24 sec.] should be selected for "Print Duration" under [Manual Printing].

□ Operation from the User Key for Individual Bed

- 1** Assign [Print Start/Stop] key to the user key for the individual bed.

(Maintenance Manual "User Key" P6-15)



- 2** Press the [Print Start/Stop] key.

▶ Printing will start.

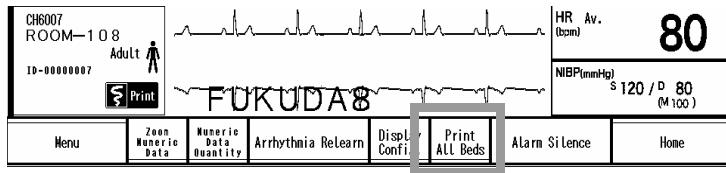
□ Operation from the User Key for All Beds

NOTE

- Using this procedure will start the printing for all beds displayed on the home display.
- The printing duration is 12 seconds and the delay time is 8 seconds for all beds.

- 1** Assign [Print All Beds] to the user key for all beds.

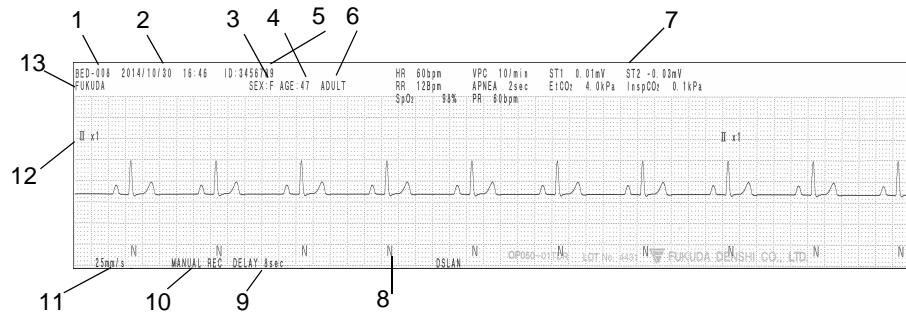
(Maintenance Manual "User Key" P6-15)



- 2** Press the [Print All Beds] key.

▶ Printing will start.

□ Example of Manual Printing



1 Bed ID/Channel ID

2 Printed Time

3 Sex

4 Age

5 Patient ID

6 Patient Classification

7 Numeric Data

The measurement value at the beginning of the waveform (at the bed ID, channel ID display area) will be printed.

8 QRS Classification

Selecting [ON] for "QRS Classification"(Menu > Initial Settings > User I/F > Display/Print) will print the following symbols.

(Refer to Maintenance Manual "Display/Print" P6-9)

9 Delay Time

If [None] is selected for "Delay Time" on "Manual Printing" setup window, <MANUAL REC. DIRECT> will be printed.

10 Printing Mode

11 Printing Speed

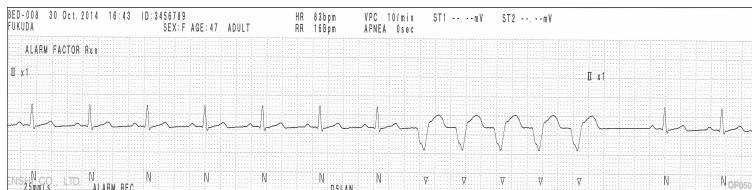
12 Waveform Type, Lead, Size

13 Patient Name

Alarm Printing, Periodic Printing

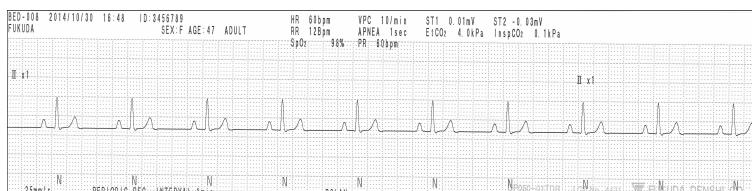
When the set condition is met, alarm/periodic printing will automatically start/stop.

The measurement value at alarm occurrence (at about 7 seconds point) will be printed for alarm printing.



Example of Alarm Printing

The measurement value at the beginning of the waveform (at the bed ID, channel ID display area) will be printed for periodic printing.



Example of Periodic Printing

Remote Printing

When the [Print] key of the bedside monitor or [EVENT] key of the telemetry transmitter is pressed, remote printing can be performed on the recorder unit (HR-800) connected to this equipment.

Waveform Remote Printing from the Wired Bedside Monitor

1

Press the [Print Start/Stop] key on the bedside monitor.

- ▶ Printing will be performed on the recorder unit of this equipment.
- ▶ If more than one central monitors are connected to the network, printing will be performed on the central monitor with the smallest central ID.
- ▶ The printing will be performed according to the printing setting on the bedside monitor. The printing setting on the central monitor will not be effective.
- ▶ For the patient ID, maximum of 10 digits will be printed.

NOTE

- ♦ [Central] should be selected as output printer for waveform printing on the bedside monitor.

Graphic Remote Printing from the Wired Bedside Monitor

1

Press the [Print] key on the review data screen (ex. graphic trend).

- ▶ Graphic printing will be performed on the recorder unit of this equipment.
- ▶ The printing will be performed according to the printing setting on the bedside monitor.

NOTE

- [Central] should be selected as output printer for graphic printing on the bedside monitor.

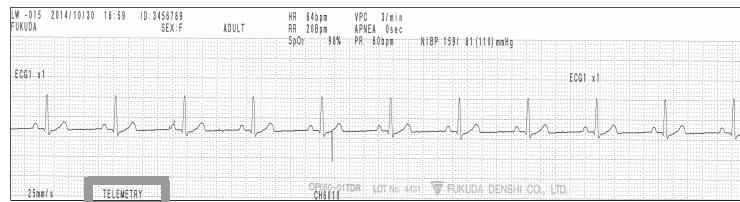
□ Remote Printing from the Telemetry Transmitter (LX-5120, LX-5230, LX-7120, LX-7230)**1**

Press the event key for more than 3 seconds on the LX-5120, LX-5230, and for more than 2 seconds for the LX-7120, LX-7230.

- ▶ Printing will be performed on the recorder unit of the central monitor.
- ▶ The print duration and delay time is fixed as 24 seconds and 12 seconds respectively.
- ▶ The waveform selection will be according to the manual printing setup on the central monitor (this unit).

NOTE

- Select [ON] for "LX Remote Printing" (Menu > Initial Settings > User I/F > Display/Print).
( Maintenance Manual "Display/Print" P6-9)



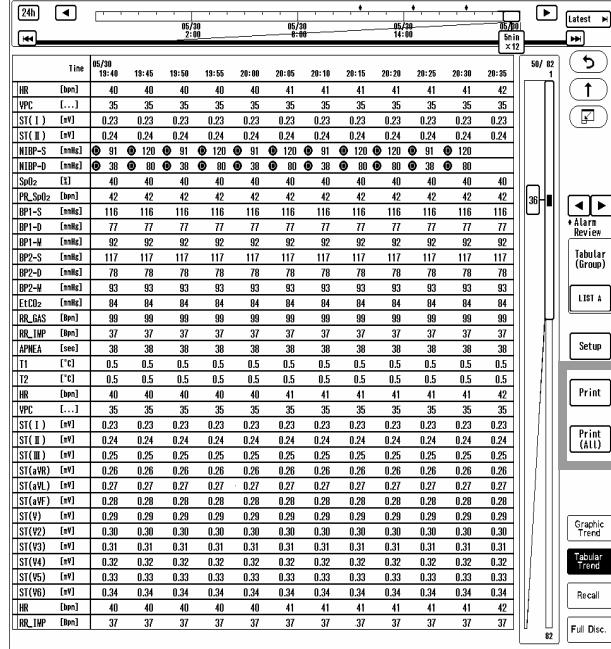
Example of Telemetry Remote Printing

The measurement value at the beginning of the waveform (at the bed ID, channel ID display area) will be printed.

Review Data Printing

The review data such as graphic trend, tabular trend, NIBP list, recall waveform, ST waveform can be printed.

The review data can be printed by pressing the [Print] key displayed on each review data screen.

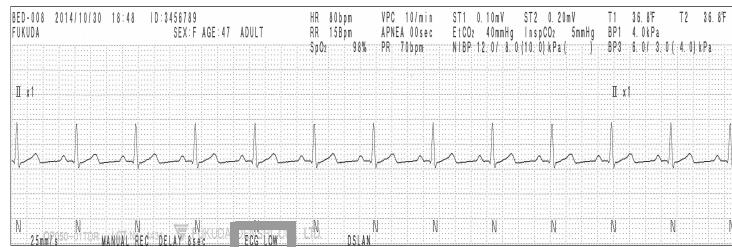


NOTE

- When using a laser printer, printing cannot be performed if the stacked data reaches the maximum quantity.
- When using a laser printer, pressing the [Print] key during printing will not stop the printing. It will stack a new data instead.

Measurement Status

Measurement status such as vital signal condition and equipment status will be printed after the printing type.



The following measurement status will be printed.

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 too 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-LANIII. DS-LANIII connection is cut off. Cannot receive data via DS-LANIII.
TCON OFF	TCON signal cannot be received. Data cannot be received by TCON.
TCON ERROR	Communication error with TCON.
CHECK SPIRO	SPIRO unit is malfunctioning.

Operation Procedure for HR-800

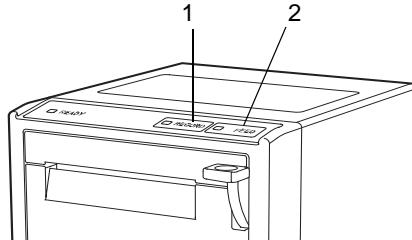
Paper Feed, Stop Printing

1 Print Key

Starts/stops the printing.

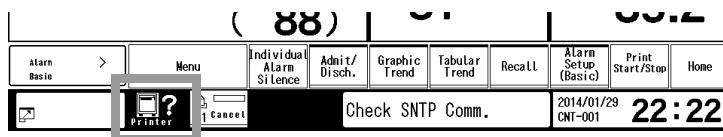
2 Paper Feed Key

While not printing, press to feed the paper.



Status Message

The recorder unit status will be indicated with the following message.

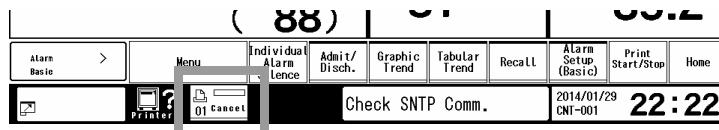


Displayed Message	Details
Check Printer	Thermal head error
Check Cassette	The paper cassette is open. Set the cassette properly.
Paper Out	There is no paper. The printing will automatically stop when the paper is out. Set a new pad of paper. (☞ "Installing the Recording Paper (Optional)" P5-3) The message will continue to be displayed until the paper is set.
Printer Busy	Printing is in operation.

Laser Printer Operation

Status Message

The laser printer status will be indicated with the following messages.

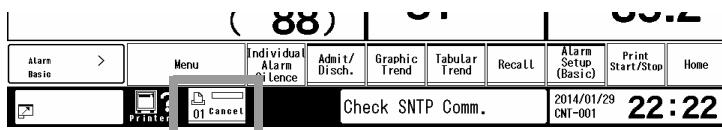


Displayed Message	Details
(Numeric Value)	Quantity of stacked data is displayed. Maximum of 64 data can be stacked.
(Printing Status Icon)	Printing status is displayed. The status bar indicates 0%, 25%, 50%, 75%, 100%.
LP Com Error	Indicates communication error with the laser printer.
LP Waiting	Indicates that the printer is waiting for printing.
Cancel Printing	Pressing this key will delete all stacked data.

Stacked Data

Maximum of 64 data can be stacked for printing.

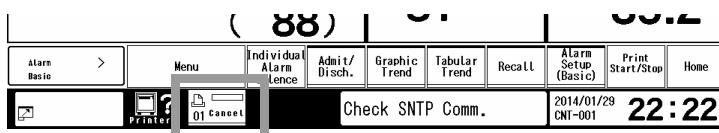
On the laser printer status message display area, total number of stacked data for all beds will be displayed. When the total stacked data for all beds reaches 64, printing will be disabled for additional data.



To Delete the Stacked Data

- 1 Press the [Cancel Printing] key while printing.

▶ All stacked data will be deleted.



NOTE

- Pressing the [Print] key on each review data screen will not stop the printing. It will stack a new data instead.

Chapter 12 Menu Items

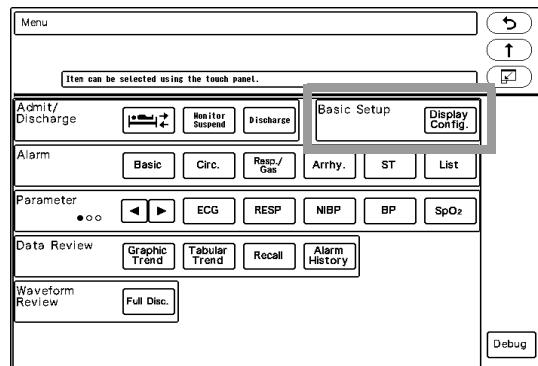
Display Configuration for Individual Bed.....	12-2
Layout.....	12-3
Numeric Data/Waveform	12-4
User Key Display on the Numeric Data Box.....	12-6
Detail Setup	12-6
To Set the Same Setting for All Beds.....	12-9
Bed Transfer/Bed Exchange	12-9
Night Mode	12-12
Discharged List.....	12-13
Nurse Call Daily Check.....	12-15
Printing Setup	12-15
Color	12-15
Nurse Call Setup	12-17
Full Disclosure Waveform Setup	12-19
Data Server Output Waveform Setup.....	12-19
Parameter ON/OFF	12-20
Display Configuration of the Home Display	12-20
Setting/Registering the Layout	12-21
Selecting the Displaying Bed.....	12-23
Numeric Data Box Size	12-24
Numeric Data/Waveform	12-25
Detail Setup	12-27
Exiting the Display Configuration Setup	12-29
Tone/Volume	12-29
Brightness.....	12-30
Monitor Suspend Setup	12-31
Nurse Team Setup	12-32

Chapter 12 Menu Items

This section describes the setup procedure of individual bed menu and central monitor menu.

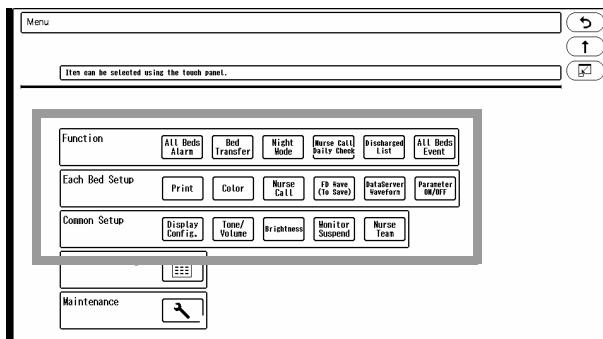
□ Individual Bed Menu

On the individual bed menu, display configuration of the individual bed display can be performed.



□ Central Monitor Menu

The following items can be set on the central monitor menu.

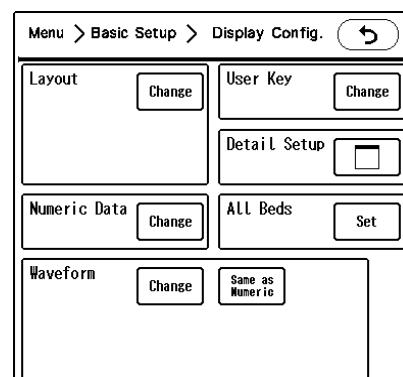


Function:	
Bed Transfer	The patient information and monitoring data can be transferred/exchanged between beds.
Night Mode	The night mode for the DS-LAN III network bed and TCON bed can be turned ON from this equipment.
Nurse Call Daily Check	Daily check of the nurse call system can be performed. The key for this function will be displayed only when [Nurse Call] is assigned to "Main Unit Port" for serial communication. (Initial Settings > External Devices > Serial Comm.) (☞ "Nurse Call Daily Check" P5-5)
Discharged List	The list of 160 discharged patients can be displayed. Whether or not to display the review data can be set.
Each Bed: Settings can be performed for each bed.	
Print	Settings for printing the data to the recorder unit or laser printer can be performed. (☞ "Printing Condition/Output Destination Setup" P11-2)
Color	The colors of waveforms and numeric data can be set.
Nurse Call	ON/OFF of nurse call system, nurse call factor, alarm duration before notification can be set. The key for this function will be displayed only when [Nurse Call] is assigned to "Main Unit Port" for serial communication. (Initial Settings > External Devices > Serial Comm.)
Full Disclosure Waveform	The parameters to save as full disclosure waveform can be set. (☞ "To Select the Waveform to Store" P10-1)
Data Server Output Waveform	The waveforms to output to the data server can be set. The key for this function will be displayed only when [ON] is set for "Data Server" on the network setup. (Initial Settings > External Devices > Network)
Parameter ON/OFF	Whether or not to monitor can be set for each parameter. (☞ "Parameter ON/OFF" P8-24)
Common Setup: Settings common to all beds can be performed.	
Display Configuration	The display configuration such as waveform sweep speed can be set.
Tone/Volume	The volume and tone of the alarm sound, HR synchronized sound, key sound, boot/shutdown sound can be set.
Brightness	The brightness of the display can be set.
Monitor Suspend	The messages and colors to be displayed when monitoring is suspended can be set.—
Nurse Team	The colors and name of the nurse team can be set to identify the nurse team for each patient.

Display Configuration for Individual Bed

The following settings can be performed for individual bed display configuration.

Layout	The layout of the individual bed display can be set.
Numeric Data	The parameters to be displayed and numeric data box size can be set.
Wave Select	The waveforms to be displayed can be set.
User Key	User keys can be assigned to numeric data box area of the individual bed display.
Detail Setup	Alarm limit display (graph/numeric/OFF), waveform thickness, etc. can be set.
All Beds	Applies the same setting for display configuration to all beds.

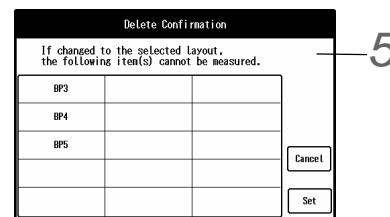
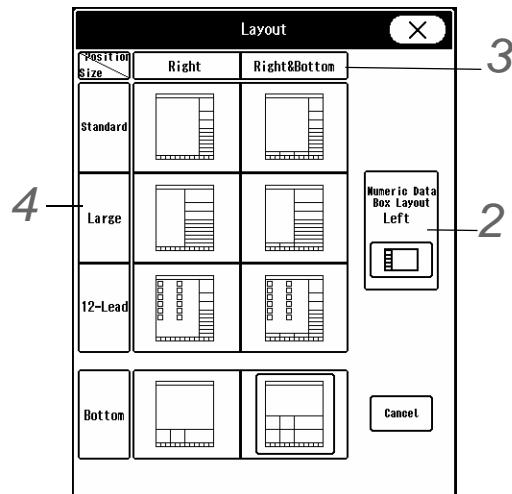


Press the [Menu], [Display Config.] ("Basic Setup") on the individual bed display.

Layout

There are 8 types of layout for the individual bed display.

- 1** Press the key for "Layout" on the display configuration menu. (Menu > Basic Setup > Display Config.)
- 2** The numeric data box can be displayed either on the right side or on the left side.
- 3** The numeric data box layout can be selected from "Right" / "Right&Bottom" / "Left" / "Left&Bottom".
- 4** The numeric data box size can be selected from [Standard] / [Large] / [12-Lead] / [Bottom].
When [Bottom] is selected, the numeric data box will be displayed large but user keys cannot be assigned to the numeric data box area
- 5** When changing the layout, some of the currently displayed parameters may not be able to be displayed and "Delete Confirmation" window will be displayed. To change the layout, press the [Set] key.



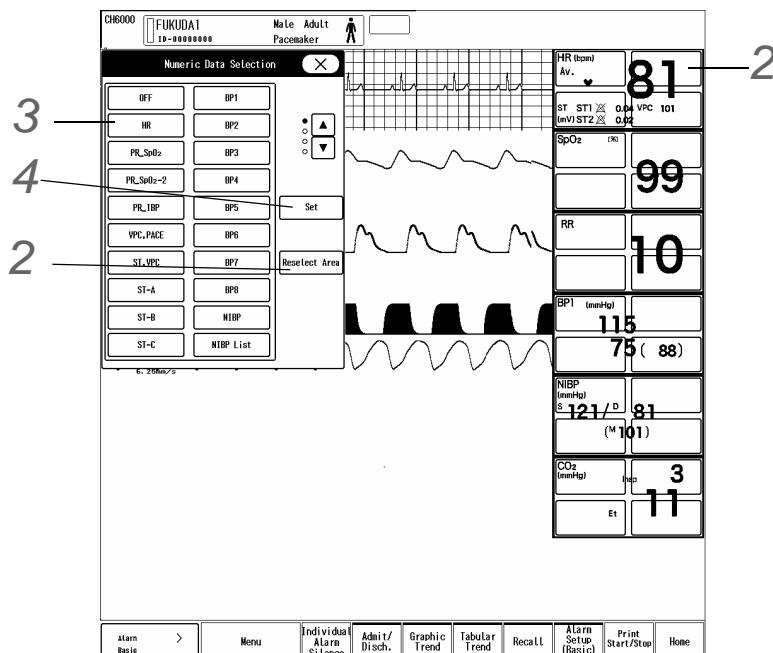
Numeric Data/Waveform

The numeric data and waveforms to be displayed for the individual bed can be selected. The numeric data box size can be also set.

Numeric Data Selection

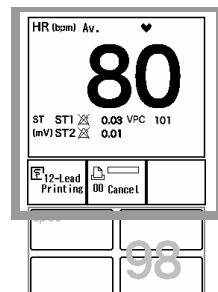
- 1** Press the [Change] key for "Numeric Data".

▶ The "Numeric Data Selection" window and numeric data box display area will be displayed.



- ## 2 Numeric Data Box Size

- ▶ The numeric data box can be assigned to the area outlined in blue. By selecting multiple areas, the numeric data box can be enlarged.
- ▶ By pressing the selected area again, the selection will be cancelled.
- ▶ To restart from the beginning, press the [Reselect Area] key.
- ▶ For the "12-Lead" layout, HR numeric data box and 12-lead user key will be automatically assigned to 6 boxes from the top and cannot be changed. (shown on right)
- ▶ The selectable box size differs depending on the parameter.
(☞ "Numeric Data Box Size Range" P16-8)



- 3 Parameter Selection

- ▶ Select the parameters to be displayed.

- ## 4 Finalizing the Setting

- ▶ Press the [Set] key to finalize the settings for numeric data box display configuration.

► To set other parameters, repeat the procedure from step 2 to 4.

NOTE

- The selected parameter may not be displayed depending on the numeric data box size. In

such case, <Size Error> will be displayed on numeric data area. Adjust the size.

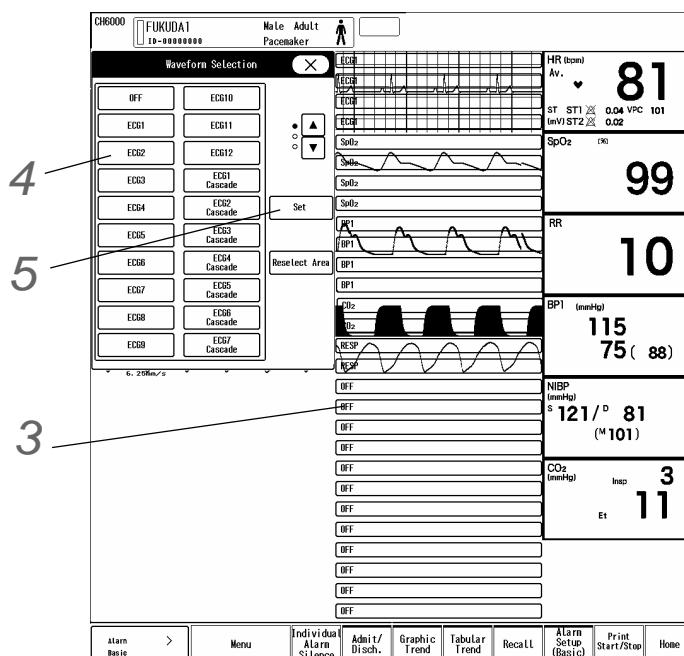
□ Waveform Selection

Select the waveforms to be displayed on the individual bed display using the same procedure as the numeric data.

1 The waveforms of the displayed numeric data can be automatically configured by pressing the [Same with Numeric] key for "Waveform". (Basic Setup > Display Config.)

2 To manually set the waveforms to be displayed, press the [Change] key for "Waveform".

- ▶ The "Waveform Selection" window and waveform display area will be displayed.



3 Waveform Display Area Size

- ▶ The waveform can be assigned to the area outlined in blue. By selecting multiple areas, the waveform display can be enlarged. For ECG1 to ECG12, minimum of 2 areas needs to be assigned.
- ▶ By pressing the selected area again, the selection will be cancelled.
- ▶ To restart from the beginning, press the [Reselect Area] key.

4 Waveform Selection

- ▶ Select the waveform to display.
- ▶ When [Block Cascade] is selected, the waveform block set for "Block Cascade" (Basic Setup > Display Config. > Detail Setup) will be assigned. 2 to 6 waveforms can be displayed in one block. By assigning the block cascades to multiple waveform areas, full disclosure waveform can be monitored.
(☞ "Detail Setup" P12-6)

NOTE

- ♦ To assign [Block Cascade], the area of waveform quantity x2 will be required. For example, if 3 parameters are set for block cascade waveforms, 6 or more areas will be required.

5 Finalizing the Setting

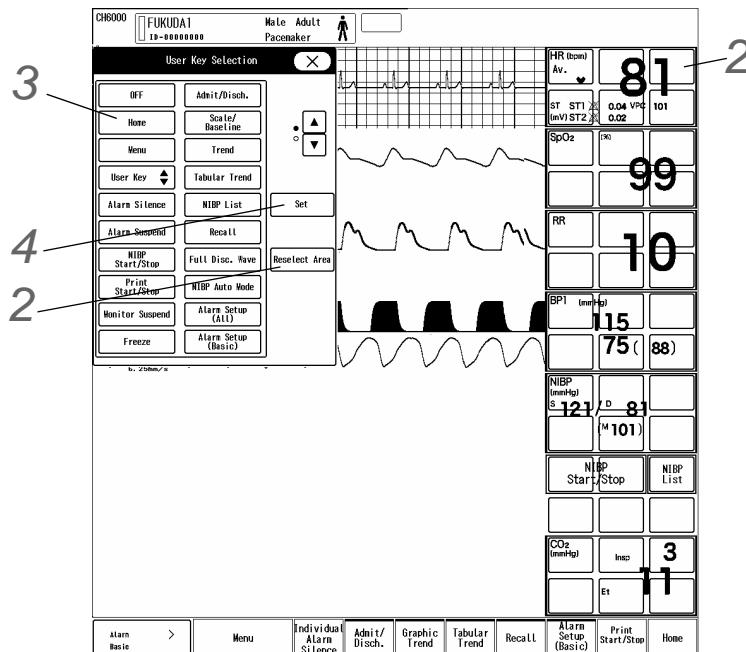
- ▶ Press the [Set] key to finalize the settings for waveform display configuration.
- ▶ To set the displaying parameters or other beds, repeat the procedure from step 3 to 5.

User Key Display on the Numeric Data Box

The user key can be assigned to the numeric data box on the individual bed display.

1 Press the [Change] key for "User Key".

- ▶ The "User Key Selection" window and user key display area will be displayed.



2 User Key Display Area Selection

- ▶ The selected area will be outlined in blue. By selecting multiple areas, the display area can be enlarged. By pressing the selected area again, the selection will be cancelled.
- ▶ To restart from the beginning, press the [Reselect Area] key.

3 User Key Selection

- ▶ Press the **▲** / **▼** keys to switch the user key selection.

4 Finalizing the Setting

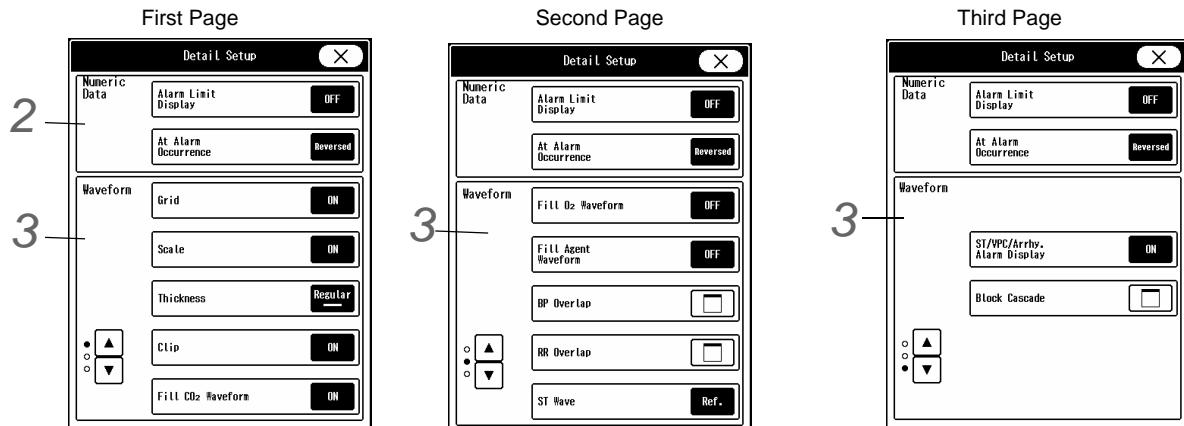
- ▶ Press the [Set] key to finalize the setting.

Detail Setup

The following items can be set for numeric data and waveform display configuration.

Numeric Data	Alarm Limit Display, At Alarm Occurrence	
Waveform	First Page	Grid, Scale, Thickness, Clip, Fill CO ₂ Waveform
	Second Page	Fill O ₂ Waveform, Fill Agent Waveform, BP Overlap, RR Overlap, ST Wave
	Third Page	ST/VPC/Arrhy. Alarm Display, Block Cascade

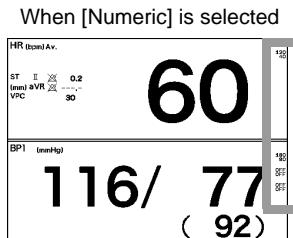
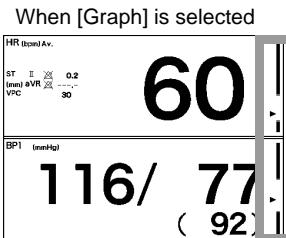
1 Press the  key for "Detail Setup". (Basic Setup > Display Config.)



2 Settings for Numeric Data Display

1 Alarm Limit Display

- ▶ How to display the alarm limit inside the numeric data box can be set.



- ▶ When [Graph] is selected, SYS alarm limit will be displayed for BP numeric data box.

- ▶ When [Numeric] is selected, the alarm limit for the parameter with the alarm turned OFF will not be displayed regardless of this setting.

2 At Alarm Occurrence

- ▶ How to display the numeric data box at alarm occurrence can be set.
- ▶ [Reversed]: The numeric data display will alternately change between standard display and reversed (highlighted) display.
- ▶ 3D]: The numeric data display will alternately change between standard display and 3D display.

3 Settings for Waveform Display

1 Grid

- ▶ [ON]: Grid will be displayed.
- ▶ [Bold]: Grid will be displayed in bold format.
- ▶ [OFF]: Grid will not be displayed.

2 Scale

- ▶ The scale can be selected from [ON]/[Bold1]/[Bold2].

3 Waveform Thickness

- ▶ The thickness of the displayed waveforms can be selected from [Thin] / [Regular] / [Thick].

4 Waveform Clip

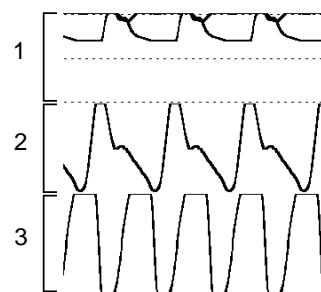
- ▶ Whether or not to clip the overlapped waveforms of the neighboring display area can be selected.

- ▶ [ON]: When the waveform amplitude exceeds the display area, the exceeded part of the waveform will be clipped.
- ▶ [OFF]: The whole waveform will be displayed even if the display area is exceeded. However, if the circulatory waveform exceeds to the respiratory waveform area, the exceeded part will be clipped, and vice versa.

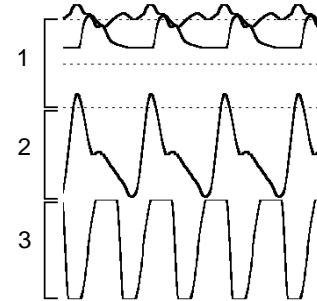
Example:

1. BP Waveform Display Area
2. Pulse Waveform Display Area
3. Respiration Waveform Display Area

When [ON] is selected



When [OFF] is selected



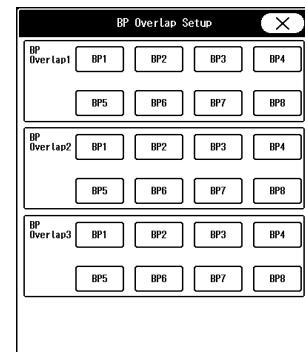
5 Fill CO₂, O₂, Agent Waveform

- ▶ [ON]: The waveform will be filled in with black color from the baseline.
- ▶ [OFF]: The waveform will not be filled in.



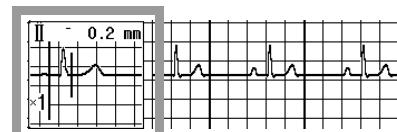
6 BP Overlap, RR Overlap

- ▶ The overlapping BP waveforms can be set for each overlap group 1 to 3.
- ▶ The overlapping RR waveforms can be set for each overlap group 1 to 3.



7 12-Lead ST Waveform

- ▶ The ST waveform to be displayed for the 12-Lead layout can be set.(shown on right)
- ▶ [OFF]: ST waveform will not be displayed.
- ▶ [Ref.]: The reference waveform of 12-lead ST waveform will be displayed.

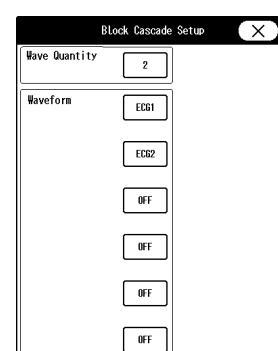


8 ST/VPC/Arrhy. Alarm Display

- ▶ Whether or not to display the ST value, VPC (integrated value of 1 minute), arrhythmia alarm message inside the HR numeric data box can be selected.

9 Block Cascade

- ▶ By registering 2 to 6 waveforms to one block and assigning [Block Cascade] to multiple display area, full disclosure waveform can be monitored.
- ▶ Select the waveform quantity from [2] to [6].
- ▶ Select the waveforms to be displayed as one block. To display this block, [Block Cascade] needs to be assigned to the waveform display area.
(☞ "Numeric Data/Waveform" P12-4)



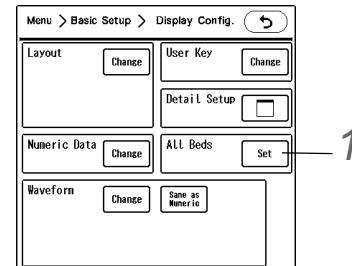
NOTE

- When the waveform quantity for block cascade is changed, [Block Cascade] assigned to the waveform area will be cancelled.

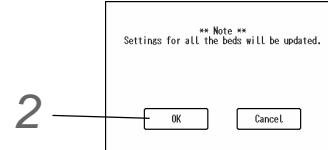
To Set the Same Setting for All Beds

The display configuration setting for the individual bed can be applied to all beds.

- Press the [Set] key for "All Beds" on the display configuration menu. (Menu > Basic Setup > Display Config.)



- A confirmation message will be displayed. To set the same setting, press the [OK] key.

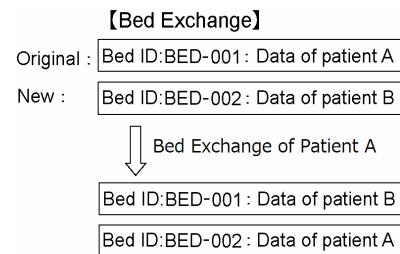
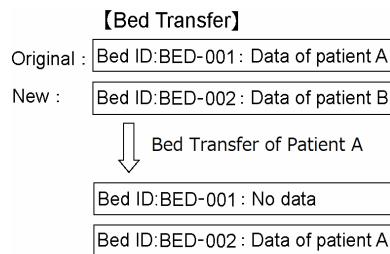
**Bed Transfer/Bed Exchange**

By using the bed transfer/exchange function, patient information and alarm settings can be transferred/exchanged between 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.

The procedure for bed transfer/exchange is explained below.



By performing central monitor communication setup, bed transfer/exchange among several central monitors can be performed 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
Print Settings	Print Settings	Discharge *3	Transfer	Transfer	Transfer
Review Data	Graphic Trend	Discharge *1	Delete or Transfer*4	Delete or Transfer*4	Delete or Transfer*4
	Tabular Trend				
	Full Disclosure Waveform				
	Recall				
Nurse Call Setup	Nurse Call Settings	Discharge *2	No Change*5	No Change*5	No Change*5
Initial Settings	When PHS nurse call system is used				
	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.

*5: The settings will not change and the same settings will be applied after bed transfer/exchange.

CAUTION

- When a bed transfer procedure is performed, all setup data for the new bed will be updated. The data for the DS-LAN bed, LW-T bed, and the same data monitored on other central monitor will be initialized.
- If the bed transfer/exchange is performed for the DS-LAN bed, 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/exchange can be performed when the EMR link is offline.

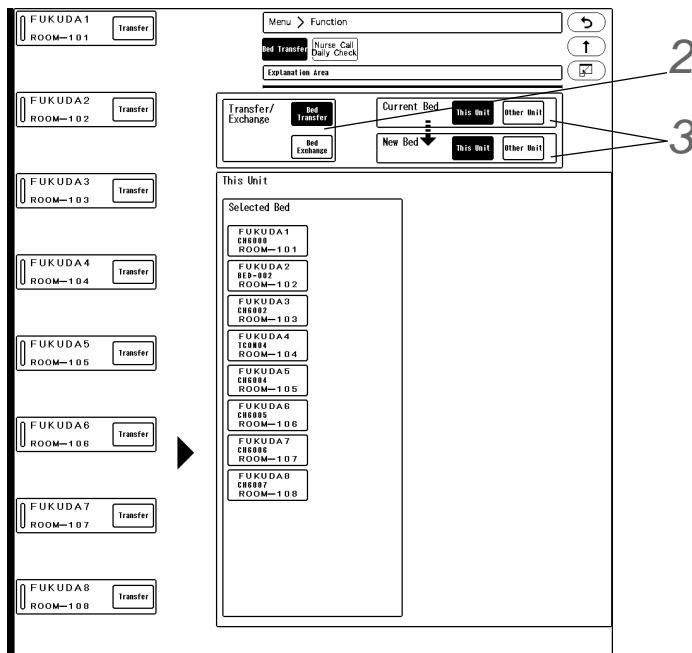
NOTE

- Perform settings for the "Central Monitor Comm." in advance. (Initial Settings > External Device > Network)
( Maintenance Manual "Central Monitor Communication" P2-15)

1 Press the [Menu], [Bed Transfer] ("Function") keys.

► The "Bed Transfer" screen will be displayed.

The currently monitored beds will be displayed at the left side.



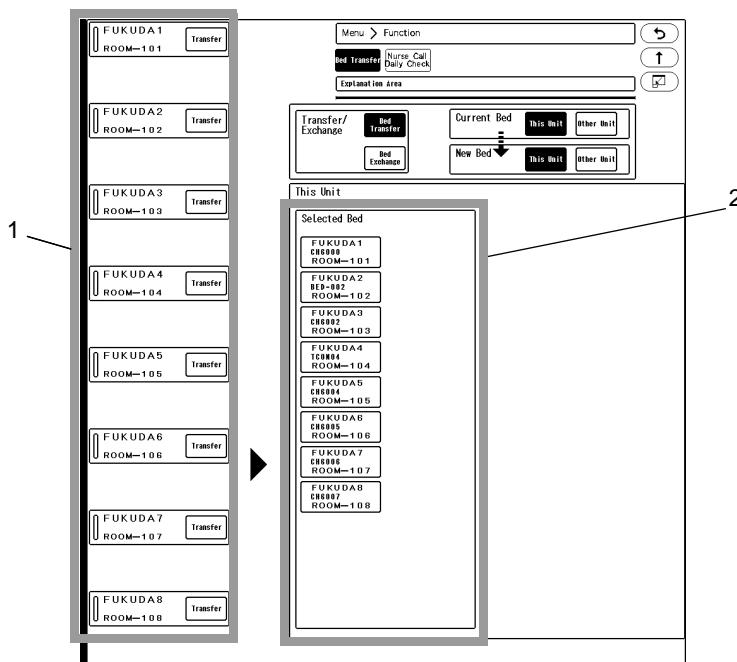
2 Select from [Bed Transfer] or [Bed Exchange].

3 Select [This Unit] or [Other Unit] for Bed 1 (Current Bed) and Bed 2 (New Bed).

NOTE

- If central communication setup (Initial Settings > External Device > Network) is not performed, [Other Unit] cannot be selected.
- [This Unit] must be set for either Bed 1 (Current Bed) or Bed 2 (New Bed). [Other Unit] cannot be set on both beds at the same time.

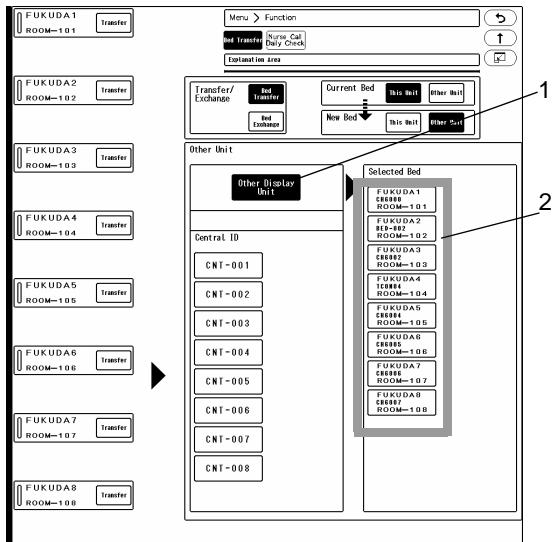
4 When performing bed transfer/exchange within this central monitor;



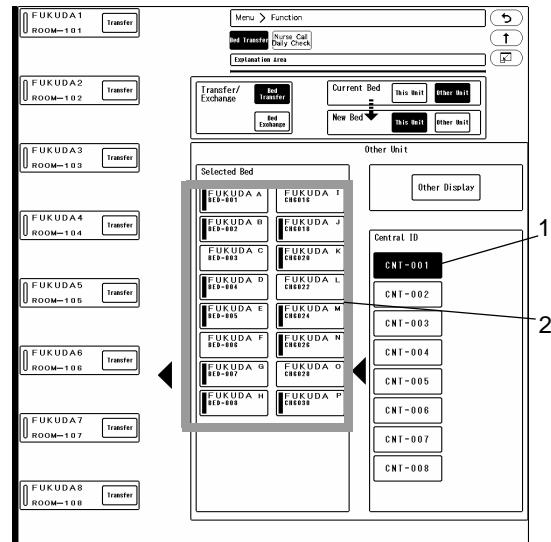
1 Press the [Transfer] or [Exchange] key for the original bed.

- 2** Select the new bed.
- 3** The confirmation window will be displayed. Proceed to step 6.
- 5** When performing bed transfer/exchange between this central monitor and other central monitor/extended display unit;

Display Example (This Unit -> Other Unit)



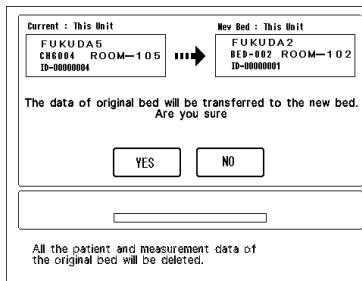
Display Example (Other Unit -> This Unit)



- 1** When [Other Unit] is selected, the list of central ID of the central monitors (max. 15) connected to the TCP/IP network will be displayed. Select [Other Display Unit] or central monitor on the list.
- 2** The list of beds monitored on the selected central monitor will be displayed. Select the bed from the list.
- 3** The confirmation window will be displayed. Proceed to step 6.

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

To perform bed transfer/exchange, press the [YES] key.



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.

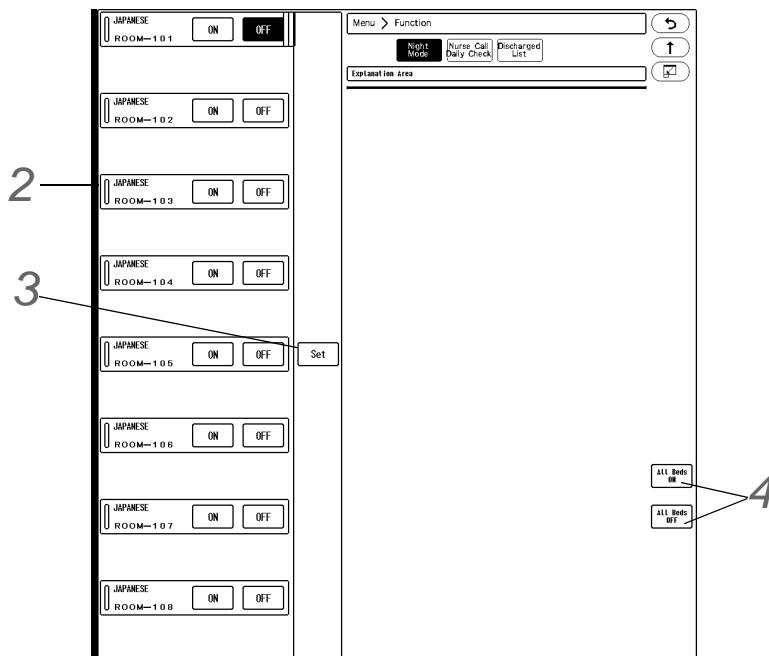
The brightness and alarm volume settings during night mode needs to be preprogrammed on the bedside monitor.

NOTE

- The night mode can be set only for the DS-LANIII network bed and the TCON bed.

1 Press the [Menu], [Night Mode] ("Function") keys.

- ▶ The "Night Mode" menu will be displayed.



- ▶ For the bed in night mode, [ON] key will be displayed in blue, and for the bed in normal monitoring mode, [OFF] key will be displayed in blue.

2 Press the [ON] or [OFF] key for the bed to change the mode.

3 Press the [Set] key.

- ▶ When changing to night mode, a confirmation window will be displayed.
Press the [OK] key to enter into night mode.
- ▶ When turning OFF the night mode (when [OFF] key is pressed), the night mode confirmation window will not be displayed.

If the Night Mode is set,
the alarm sound and alarm indicator may
not function on the bedside monitor.
(Depends on the bedside monitor setting.)

OK **Cancel**

4 The same setting can be applied to all beds.

- ▶ [All Beds ON]: The night mode will be set to all beds.
- ▶ [All Beds OFF]: The normal monitoring mode will be set to all beds.

Discharged List

The review data can be displayed/printed even after the patient is discharged.

120 hours of trend data can be stored for the discharged patient. (Ex. 64 waveforms / 120 hours)

In case of recall data, total of 1000 data can be stored.

In case of full disclosure waveform, only the waveforms which the storing waveform setup is not changed between the discharged patient and admitted patient will be displayed.

□ Selecting a Patient to Display the Data

1 Press the [Menu], [Discharged List] ("Function") keys.

- ▶ The discharged patients list will be displayed.

The list of discharged patients will be displayed.

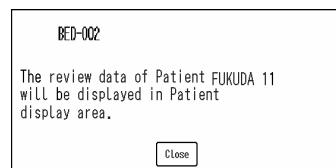
- ▶ The discharged patients list for all beds will be displayed in the order of discharged date/time from new to old.
 - ▶ For each discharged patient, bed ID, patient ID, patient name, data start/end time will be displayed.
 - ▶ The discharged patient key will be displayed in blue if the review data display is valid, and white if the review data display is invalid.
 - ▶ The review data display can be validated for only one patient. If it is validated on one patient, it will be invalidated for all the other patients.

REFERENCE

- The data start/end time will differ depending on whether EMR link function is used or not.
When EMR link function is used: The admitted time will be displayed for start time. The discharged time will be displayed for end time.
When EMR link function is not used: The discharged time of previous patient will be displayed for start time. The discharged time of current patient will be displayed for end time.

2 Pressing the key for the discharged patient will switch the valid/invalid status of review data display. When the status is changed from invalid to valid, a confirmation window will be displayed.

- ▶ The review data display for the selected patient will be validated.



CAUTION

- To avoid mixing up with the current patient data, invalidate the review data display after reviewing the data.

Viewing the Review Data for the Discharged Patient

The review data for the discharged patient can be viewed on the following display.

- ♦ Graphic Trend
 - ♦ Tabular Trend
 - ♦ Recall (List Display, Enlarged Display)
 - ♦ Full Disclosure Waveform
- (☞ "Review Data Display for Discharged Patient" P9-16)

Nurse Call Daily Check

REFERENCE

- ♦ The nurse call system should be checked daily. Refer to the following chapter.
(☞ "Nurse Call Daily Check" P5-5)
-

Printing Setup

REFERENCE

- ♦ For printing setup procedure, refer to the following chapter.
(☞ "Printing Condition/Output Destination Setup" P11-2)
-

Color

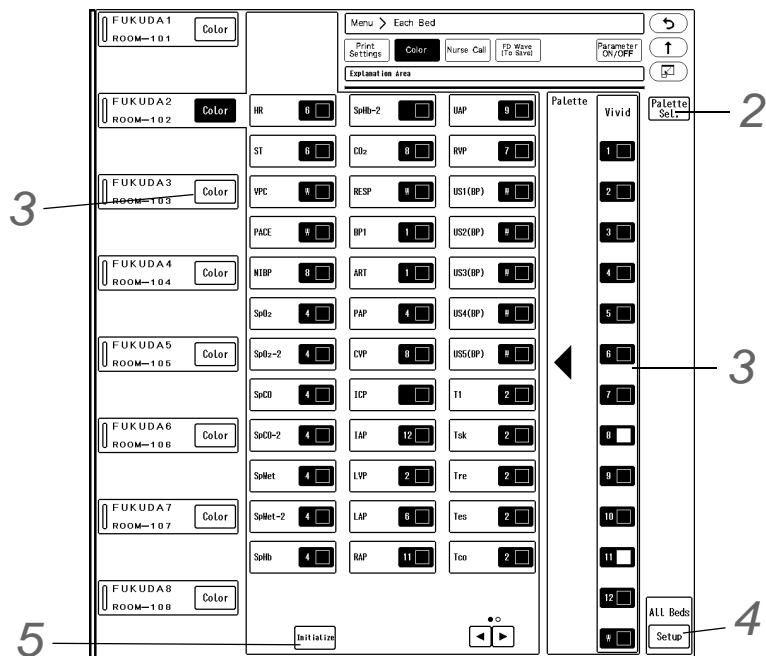
The color palette and color for the numeric data/waveform can be customized.

The colors can be customized according to the various monitoring scene such as recognizable colors from a far distance or colors which will not strain your eyes by the long time monitoring.

The color can be selected from 12 colors (+white) of the selected palette. The selected color for the parameter will be applied to the waveform, numeric data, graphic trend, and tabular trend.

1 Press the [Menu], [Color] ("Each Bed") keys.

- ▶ The "Color" selection window will be displayed.



2 Color Palette Selection

- ▶ Select the palette from [Light] / [Clear] / [Deep] / [Vivid].

3 Changing the Color

- 1 Press the [Color] key for the bed to change the color.
 - 2 Select the color from 13 selections on "Palette" window.
 - 3 Press the key for the parameter to change the color.
- ▶ The color of the numeric data and waveform will change to the selected color.

4 Common Setting for All Beds

- ▶ The same setting can be assigned to all beds.
- ▶ Pressing the [Setup] key will display confirmation window. Press the [OK] key to update the settings.

5 Initializing the Setting

- ▶ The settings can be initialized.
- ▶ Pressing the [Initialize] key will display confirmation window. Press the [Initialize] key again on the confirmation window to initialize the settings.
(☞ "Each Bed Setup" P14-11)

Nurse Call Setup

By connecting the PHS nurse call system to this equipment, the alarm generation will be notified to the PHS of the hospital staffs. The alarm factors will be displayed on the PHS display.

⚠ WARNING

- The PHS nurse call system should be used as supplementary function of alarm notification. Make sure to monitor the alarm on this equipment as it may not be notified to the PHS depending on the nurse call system condition.

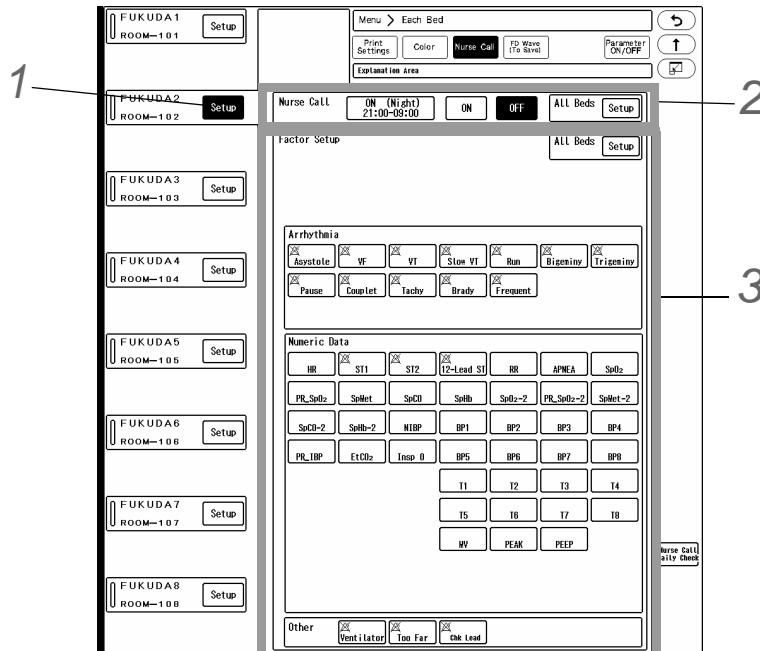
ON/OFF of nurse call system, nurse call factor, alarm duration before notification can be set.

⚠ WARNING

- When using the PHS nurse call system, make sure to set the "Bed Name" as it will be used for alarm notification to the PHS. If the "Bed Name" is not set, the patient cannot be specified on the nurse call system.
The "Bed Name" can be selected on the "Admit/Discharge" menu. (☞ "Entering the Patient Information" P6-2)

1 Press the [Menu], [Nurse Call] ("Each Bed") keys, and press the [Setup] key for the patient to perform the setup.

- The "Nurse Call" setup screen will be displayed.



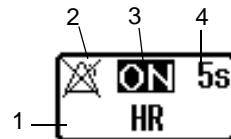
2 Nurse Call Mode Selection

- [Use (Night)] will be displayed only when [Enable] is selected for "Night Use" on the nurse call detail setup menu. (Initial Settings > External Device > Serial Comm.)
- To set the same setting for all beds, press the [Setup] key for "All Beds".

3 Nurse Call Factor Setup

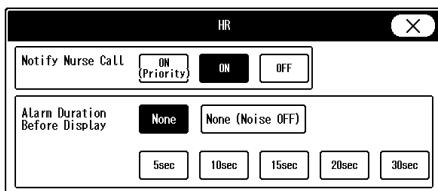
Select ON/OFF for each parameter. The information displayed inside each key is explained below.

- 1 The blue key indicates that it is selected as the nurse call factor.
- 2 The current alarm status (ON/OFF) is displayed.  is displayed when OFF, and nothing is displayed when ON.
- 3 This indicates that the parameter is set as the high priority factor for notification. It is displayed when [ON (Priority)] is selected for "Notify Nurse Call".
- 4 The alarm duration before notification is displayed. It will not be displayed if [None] is selected for "Alarm Duration Before Notification".



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

- ▶ The setup window will be displayed.



Example of [HR]

2 Set the "Notify Nurse Call" .

- ▶ [ON (Priority)]: The parameter will be set as the high priority alarm factor.
- ▶ [ON]: The parameter will be set as the normal alarm factor.
- ▶ [OFF]: The parameter will not be set as the alarm factor.

NOTE

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

3 Set the "Alarm Duration Before Notification".

The alarm will be notified to the nurse call system when the alarm duration exceeds the set duration.

- ▶ Select from [5sec.]/[10sec.]/[15sec.]/[20sec.]/[30sec.]/[None]/[None (Noise OFF)].
- ▶ For HR, Tachy, Brady, [None (Noise OFF)] will be displayed.
- ▶ [None], [Noise OFF]: Alarm will be notified to the nurse call system at alarm generation without any delay.

REFERENCE

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

4 To set the same setting for all beds, press the [Setup] key for "All Beds".

Full Disclosure Waveform Setup

REFERENCE

- The parameters to save as full disclosure waveform can be set. Refer to the following chapter.
(☞ "To Select the Waveform to Store" P10-1)

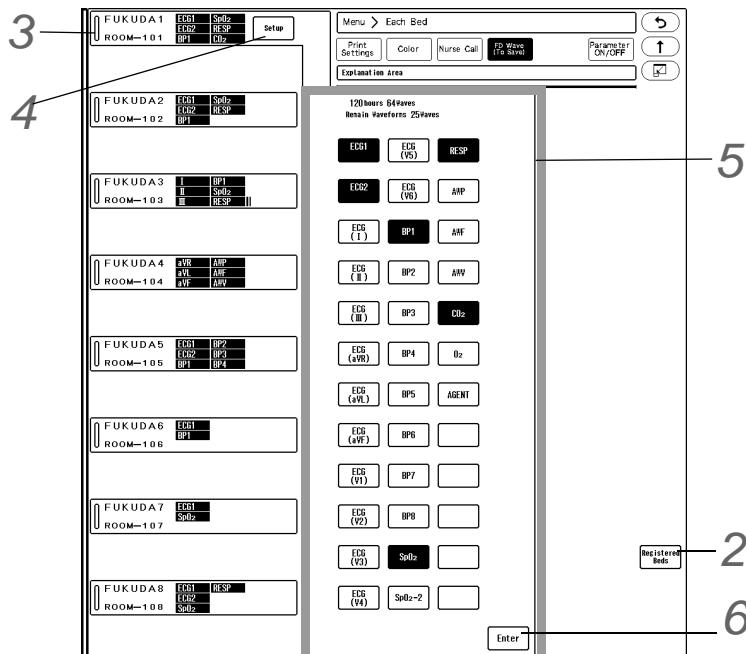
Data Server Output Waveform Setup

The beds and waveforms to output to the data server can be set. There are following 2 types of settings.

- Displayed Beds: Maximum of 16 beds which are displayed on the home display.
- Registered Beds: Maximum of 32 beds which are previously registered.

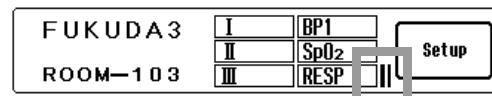
1 Press the [Menu], [Data Server Waveform] ("Each Bed") keys.

► "The screen to set the data server waveform will be displayed."



2 Select from [Displayed Beds] or [Registered Beds].

3 Press the [Setup] key for the bed to perform the setup. On the bed selection area, maximum of 6 selected parameters will be displayed. If there are more than 6 parameters, bar mark will be displayed. (shown on right)



4 Press the [Setup] key.

5 Select the waveform to output. At the upper part of the display, the remaining quantity of waveforms will be displayed.

NOTE

- There are following restrictions for waveform selection depending on the data server

communication protocol.

Protocol	Waveform Quantity	Selectable Waveform
Ver.01	Total: 32 Waveforms For Each Bed: 8 Waveforms Maximum of 16 Beds	ECG1, ECG2, BP1, BP2, SpO ₂ , RESP, CO ₂
Ver.02	Total: 32 Waveforms For Each Bed: 8 Waveforms Maximum of 16 Beds	ECG1, ECG2, BP1 to BP8, SpO ₂ , SpO ₂ -2, RESP, AWF, AWP, AWV, AGT, CO ₂ , O ₂
Ver.03	Total: 64 Waveforms For Each Bed: 8 Waveforms Maximum of 32 Beds	

6 Press the [Enter] key.

- ▶ The settings will be finalized.

7 Repeat the procedure from step 2 to 6 and set the output waveform for other beds.

Parameter ON/OFF

REFERENCE

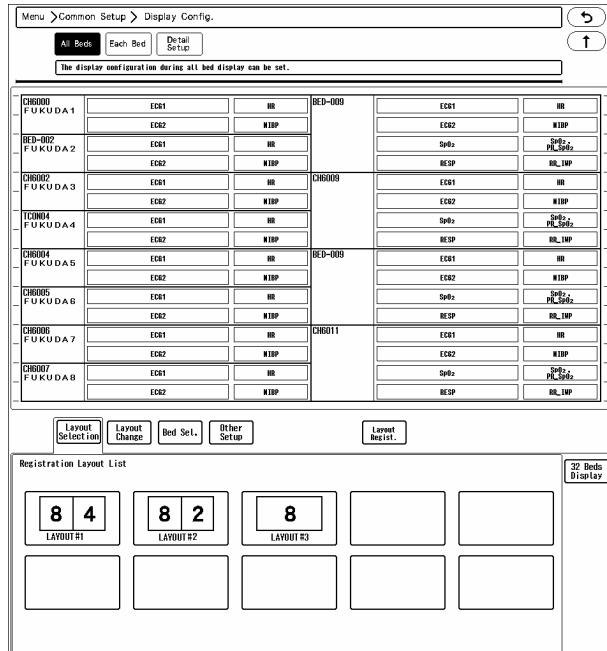
- For setup procedure for Parameter ON/OFF, refer to the following chapter.
(☞ "Parameter ON/OFF" P8-24)

Display Configuration of the Home Display

On the "Display Configuration" screen, the following setup can be performed.

All Beds	Layout Selection	The home display layout can be selected from the registered layouts.
	Layout Change	The layout of the home display can be set.
	Bed Selection	The beds to be displayed on the home display can be selected.
	Other Setup	The numeric data box size can be set.
Each Bed	Numeric Data	The parameters to be displayed and numeric data box size can be set.
	Waveform	The waveforms to be displayed can be set.
Detail Setup		The waveform sweep speed, patient name display, waveform thickness, etc. can be set.

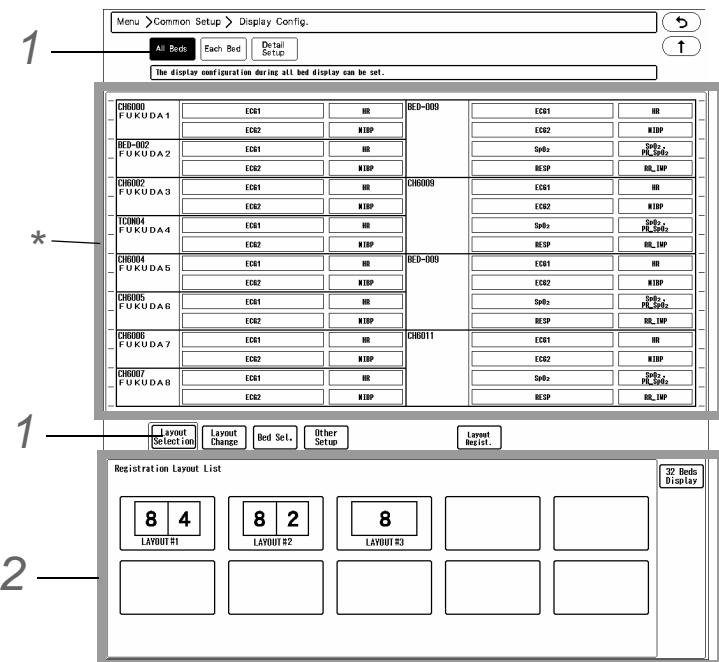
Press the [Menu], [Display Config.] ("Common Setup") on the central monitor display.



Setting/Registering the Layout

□ Selection from the Registered Layout

- 1** Press the [All Beds], [Layout Selection] keys.(Menu > Common Setup > Display Config.)
- 2** The list of registered layout will be displayed. Select the layout from the list.



- ▶ Whether or not to display the center split can be selected.
- ▶ The selected layout will be displayed on the preview area. (* part on the display example shown above.)
- ▶ To display 32 beds, select [32 Beds Display].

- ▶ To set a more detailed layout, refer to the next section, "Changing the Layout".

NOTE

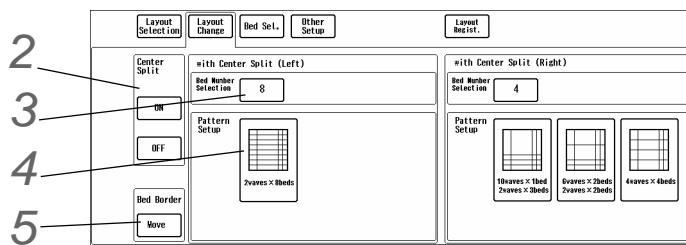
- ♦ When 32 beds display layout is set, extended display unit monitoring can not be performed.

□ Layout Change

More detailed layout can be set for the following items.
ON/OFF of Center Split

Number of Displaying Beds
Moving the Borderline between the Beds

- 1 Press the [Layout Change] key.



- 2 Center Split

- ▶ Select [ON] / [OFF] for "Center Split".

- 3 Quantity of Beds

- ▶ Select from 1/2/3/4/5/6/7/8 beds.
- ▶ If center split is set, the setting should be made for both left and right side of the home display.

- 4 Pattern Selection

- ▶ Depending on the settings made on step 2, 3, the selectable layout pattern will differ.

- 5 Borderline between the Beds

- 1 After pressing the [Move] key for "Bed Border", press the borderline on the preview area to display the cursors to move the borderline.

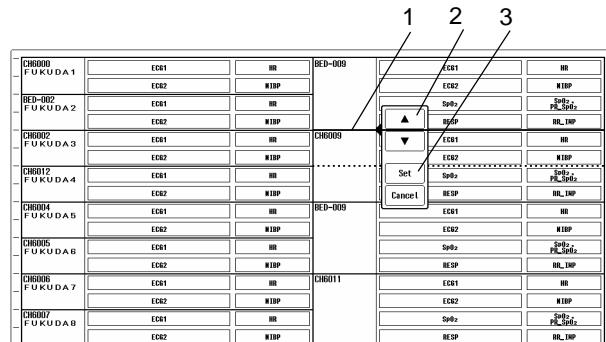
The selected borderline will be displayed in blue line.

- 2 Use the ▲ / ▼ keys to move the borderline.

The moved borderline will be displayed in blue dashed line.

To cancel the moved borderline, press the [Cancel] key.

- 3 By pressing the [Set] key, the moved borderline will be set.



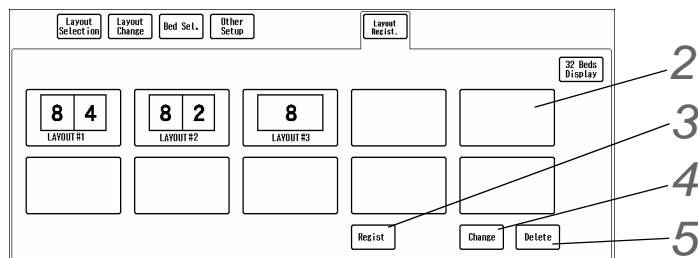
□ Layout Registration

The set layout can be registered. Maximum of 10 layouts can be registered. By registering frequently used layout, the layout setting procedure can be simplified.

The layout pattern includes the following settings.

ON/OFF of Center Split, Number of Displaying Beds, Bed Area Size, Numeric Data Box Size

- 1** Press the [Layout Registr.] key on the display configuration menu for all beds. (Common Setup > Display Config. > All Beds)



- 2** Select the area to register.
- 3** The set layout will be registered.
- 4** The name for the registered layout can be changed.
- 5** The registered layout will be deleted.

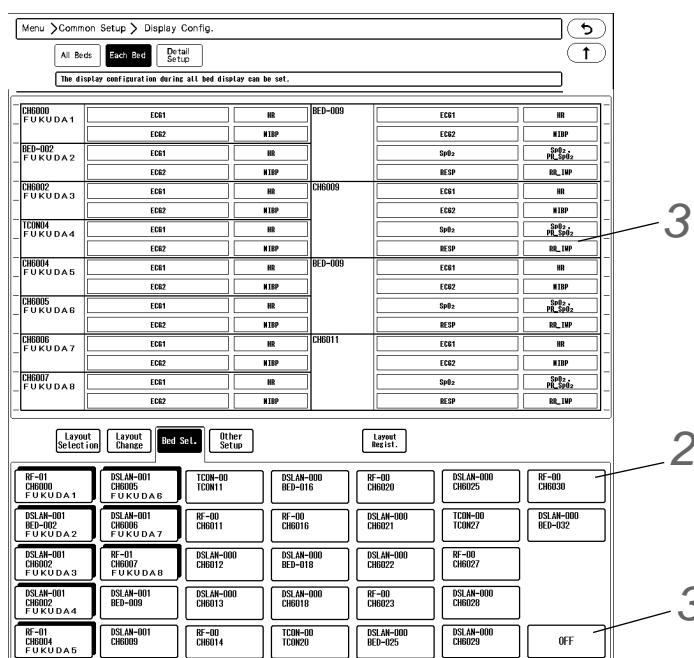
NOTE

- If [Regist] key is pressed while the registered layout is selected, the settings will be overwritten.

Selecting the Displaying Bed

The displaying beds can be selected from the registered beds. (Max. 32 beds)

- 1** Press the [Bed Sel.] on the display configuration menu for all beds. (Common Setup > Display Config. > All Beds)
- The list of registered beds will be displayed at the lower part of the display.
 - On the upper preview area, the current bed layout will be displayed.



2 From the bed selection list, select the bed to display.

The color of the key will change depending on the status.

White:	Selectable bed
White with blue shadow	Bed selected on other display unit
Blue:	Bed already selected and displayed on the preview area
Blue with blue shadow:	Bed selected on this equipment and other display unit

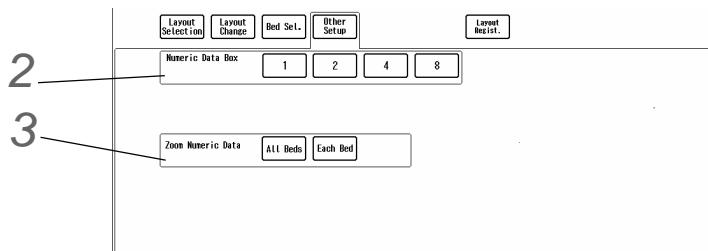
3 On the upper preview area, select the area to display the bed.

- ▶ By selecting [OFF] on the bed list and then pressing the preview area, the bed display can be cancelled.

Numeric Data Box Size

Set the numeric data box size.

- 1 Press the [Other Setup] key on the display configuration menu for all beds. (Common Setup > Display Config. > All Beds)



2 Numeric Data Box Size

- ▶ Select from [1] / [2] / [4] / [8].
When center split is set, the setting will be fixed to [2].

3 Zoom Numeric Data

The [Zoom Numeric Data] key function (enlarging/reducing the numeric data box) can be set to be applied to all beds or only to the selected bed.

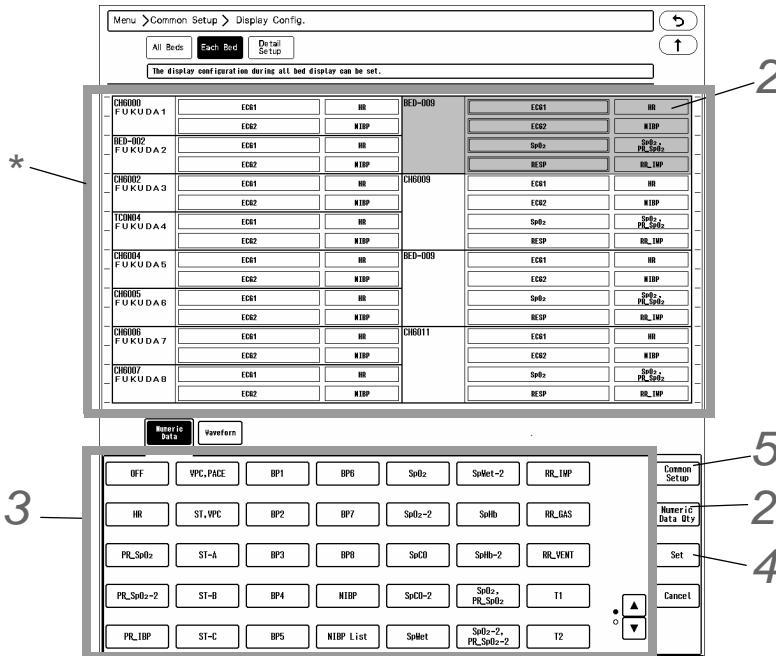
- ▶ [All Beds]: When the [Zoom Numeric Data] key (user key) is pressed, numeric data for all beds will be enlarged/reduced.
- ▶ [Each Bed]: When the [Zoom Numeric Data] key (user key) is pressed, numeric data for only the selected bed will be enlarged/reduced.

Numeric Data/Waveform

The numeric data and waveforms to be displayed for the home display can be selected. The numeric data box size can be also set.

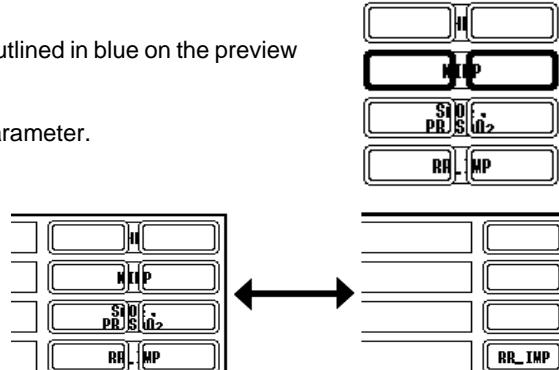
□ Numeric Data Selection

- 1 Press the [Numeric Data] key on the display configuration menu for each bed. (Common Setup > Display Config. > Each Bed)



- 2 Select the bed and set the numeric data box size.

- ▶ The numeric data box can be assigned to the area outlined in blue on the preview area. (* part on the display example shown above.)
- ▶ The selectable box size differs depending on the parameter. (☞ "Numeric Data Box Size Range" P16-8)
- ▶ To change the numeric data box size, press the [Numeric Data Quantity] key. Pressing this key will sequentially change the quantity of displayed numeric data and changes the numeric data box size.



- 3 Parameter Selection

- ▶ Select the parameters to be displayed.

- 4 Finalizing the Setting

- ▶ Press the [Set] key to finalize the settings for numeric data box display configuration.
- ▶ To set the displaying parameters for other beds, repeat the procedure from step 2 to 4.

- 5 Common Setup

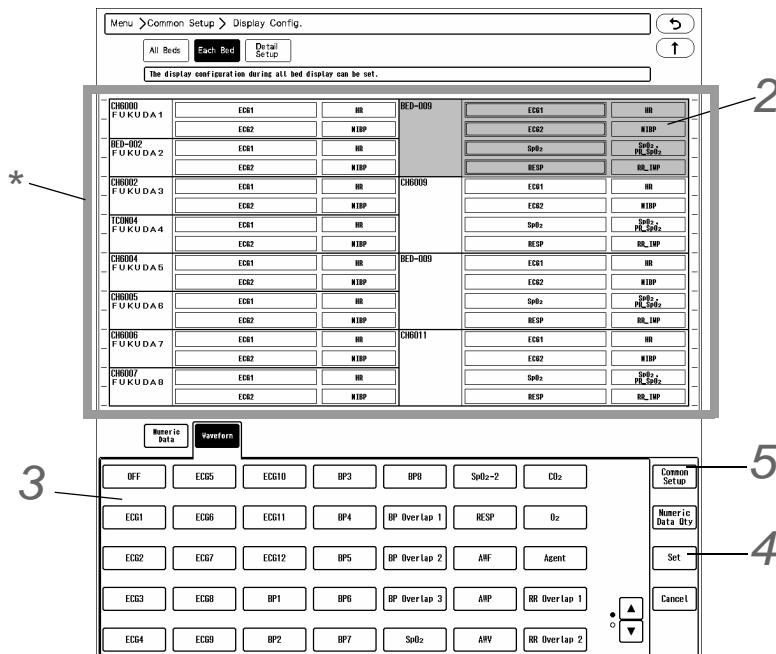
- ▶ The settings of the numeric data/waveform display will be applied to all beds.

NOTE

- The selected parameter may not be displayed depending on the numeric data box size.
In such case, <Size Error> will be displayed on numeric data area. Adjust the size.

□ Waveform Selection

- Press the [Waveform] key on the display configuration menu for each bed. (Common Setup > Display Config. > Each Bed)



- Select the bed and set the waveform display area size.

- The waveform can be assigned to the area outlined in blue on the preview area. (* part on the display example shown above.)

3 Waveform Selection

- Select the waveform to display.

4 Finalizing the Setting

- Press the [Set] key to finalize the settings for waveform display configuration.
- To set the displaying parameters or other beds, repeat the procedure from step 2 to 4.

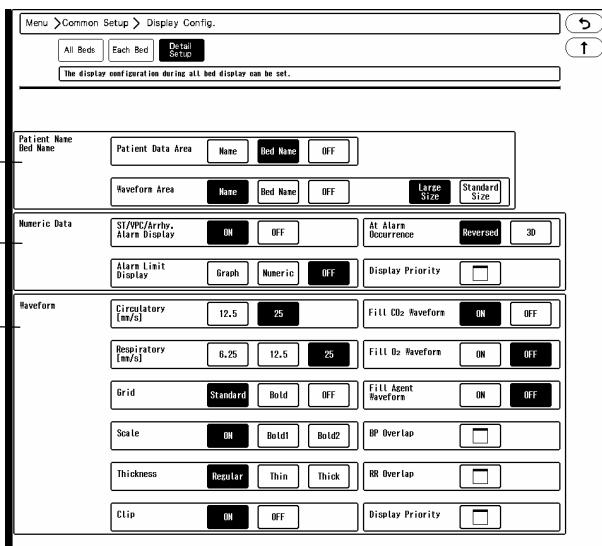
5 Common Setup

- The settings of the numeric data/waveform display will be applied to all beds.

Detail Setup

Detailed display setup for the Patient Name/Bed Name, Numeric Data, Waveform can be performed.

- 1** Press the [Detail Setup] key on the display configuration menu. (Basic Setup > Display Config.)



- 2** Patient Name/Bed Name Display

- ▶ For the patient data area and waveform area, select the items to be displayed from [Patient Name] / [Bed Name] / [OFF].
- ▶ For the waveform display area, select also the displaying size from [Large Size] / [Standard Size].

NOTE

- ♦ The same item cannot be assigned to both patient data area and waveform area.

- 3** Numeric Data Display Settings

- 1** ST/VPC/Arrhy. Alarm Display

- ▶ Whether or not to display the ST value, VPC (integrated value of 1 minute), arrhythmia alarm message inside the HR numeric data box can be selected.

- 2** Alarm Limit Display

- ▶ The alarm limit display inside the numeric data box can be selected from [Graph] / [Numeric] / [OFF].
- ▶ When [Graph] is selected, SYS alarm limit will be displayed for BP numeric data box.
- ▶ When [Numeric] is selected, the alarm limit for the parameter with the alarm turned OFF will not be displayed regardless of this setting.

- 3** At Alarm Occurrence

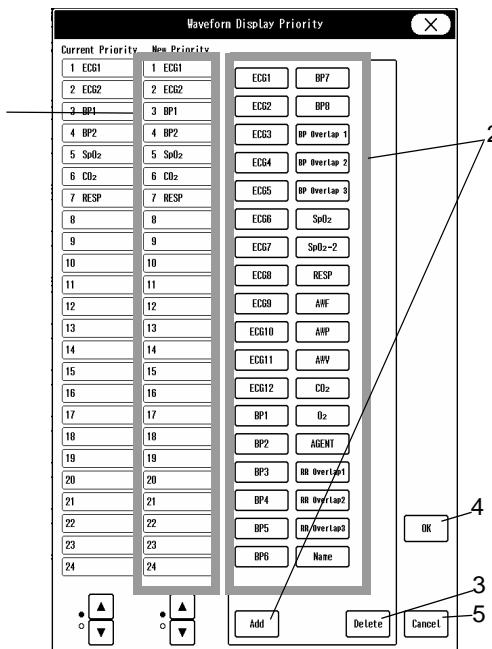
- ▶ How to display the numeric data box at alarm occurrence can be set.
- ▶ [Reversed]: The numeric data display will alternately change between standard display and reversed (highlighted) display.
- ▶ [3D]: The numeric data display will alternately change between standard display and 3D display.

4 Display Priority

- On the "Numeric Data Display Priority Window" (shown on right), the display priority of the parameter can be set.

When the quantity of numeric data box is changed, the display will change according to this display priority.

- 1 First, select the priority from 1 to 72 under "New Priority", and then select the parameter from the right.
- 2 Pressing the [Add] key will insert the parameter to the specified priority order, and the priority of the subsequent parameters will move down.
- 3 Pressing the [Delete] key will delete the parameter, and the priority of the subsequent parameters will move up.
- 4 [OK]: The settings will be finalized.
- 5 [Cancel]: The settings will be cancelled.



4 Waveform Display Settings

1 Circulatory Waveform Sweep Speed

- Select the ECG/BP/SpO₂ sweep speed from [12.5] / [25] (mm/s).

2 Respiratory Waveform Sweep Speed

- Select the RESP, CO₂ sweep speed from [6.25] / [12.5] / [25] (mm/s).

3 Grid

- The grid display on the ECG waveform background can be set.
- [ON]: Grid will be displayed.
- [Bold]: Grid will be displayed in bold format.
- [OFF]: Grid will not be displayed.

4 Scale

- The scale can be selected from [ON]/[Bold1]/[Bold2].

5 Thickness

- The thickness of the displayed waveforms can be selected from [Thin] / [Regular] / [Thick].

6 Waveform Clip

- Whether or not to clip the overlapped waveforms of the neighboring display area can be selected.
- [ON]: When the waveform amplitude exceeds the display area, the exceeded part of the waveform will be clipped.
- [OFF]: The whole waveform will be displayed even if the display area is exceeded. However, if the circulatory waveform exceeds to the respiratory waveform area, the exceeded part will be clipped, and vice versa.

7 Fill CO₂, O₂, Agent Waveform

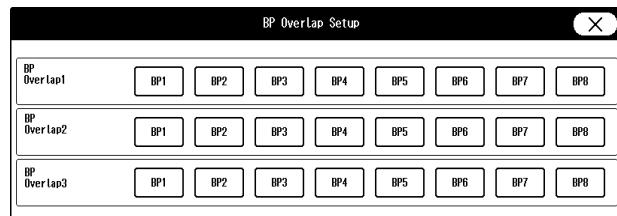
- [ON]: The waveform will be filled in with black color from the baseline.
- [OFF]: The waveform will not be filled in.

8 BP Overlap / RR Overlap Waveform

- ▶ The overlapping BP waveforms can be set for each overlap group 1 to 3.
- ▶ The overlapping RR waveforms can be set for each overlap group 1 to 3.

9 Display Priority

- ▶ Set the waveform display priority using the same procedure for setting the numeric data display priority. (Step 3 Numeric Data Display Settings / 4 Display Priority)



Exiting the Display Configuration Setup

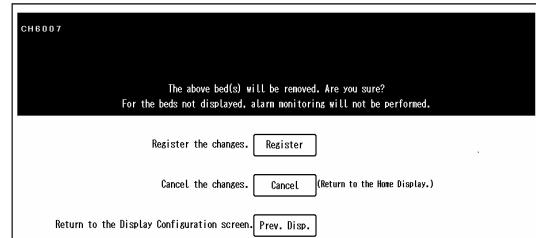
To end the display configuration setup, follow the procedure below.

1 Press the or key or any user keys other than [Home] to change the screen.

- ▶ A confirmation message will be displayed.

2 To register the settings, press the [Register] key.

- ▶ [Cancel] : The settings will be cancelled.
- ▶ [Prev. Disp]: The display will return to the display configuration menu.



Tone/Volume

In this section, tone/volume setup procedure for alarm sound, HR synchronized sound, key sound, boot/shutdown sound is explained.

WARNING

- ◆ Changing the setting for "Alarm System" (Initial Settings > Alarm) will also change the alarm volume and tone setting. Make sure to check the volume and tone when the setting is changed.
- ◆ The same tone/volume setting will be applied to this equipment and the extended display unit. When the volume is changed, make sure to check the sound on both display units.

CAUTION

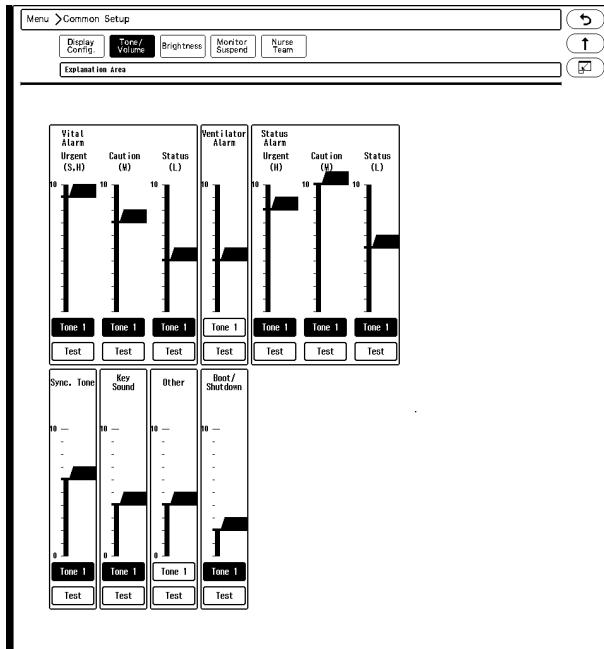
- ◆ If the alarm volume is set too low, alarm occurrence may not be recognized. Alarm sound for ECG, SpO₂, CO₂ will be different from the test sound. The set volume will be applied but the set tone will not be applied to these parameters.
- ◆ When [Standard Tone] is set for the "Alarm System", the alarm volume and tone for the ventilator alarm and equipment status alarm will be the same with that of the vital alarm.

NOTE

- ◆ The tone setup for synchronized sound is effective only for HR and BP synchronized sound. The tone for SpO₂ synchronized sound will change according to the SpO₂ value. The tone will increase as the SpO₂ value increases, and vice versa.

1 Press the [Menu], [Tone/Volume] ("Each Bed") keys.

- The tone/volume setup screen will be displayed.



2 Set the tone/volume for each sound.

- 1 Slide the up or down to adjust the volume. By releasing the finger from the key, / will be displayed to allow fine adjustment.
- 2 To change the tone, press the [Tone] key and select from the dropdown list.
The tone selection is different for synchronized sound, alarm sound, and key sound.
- 3 Press the [Test] key to check the set volume/tone.

REFERENCE

- The volume above the set minimum alarm volume can be set.
( Maintenance Manual "Alarm" P6-2)
- The order of alarm priority is Urgent (H) > Caution (M) > Status (L).
The volume is also set according to the alarm priority.
The volume for high priority alarm cannot be set lower than the lower priority alarm, and vice versa.
- The sound test cannot be performed when the vital alarm and equipment alarm is generated.

Brightness

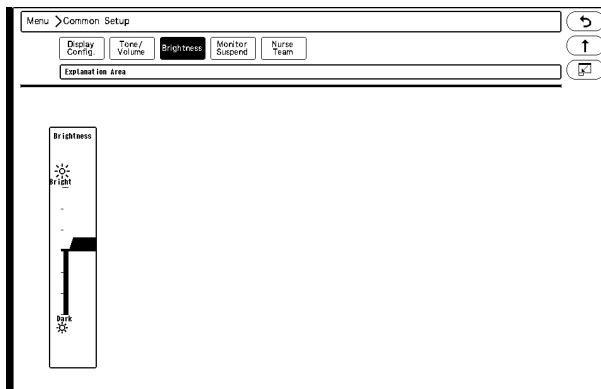
In this section, brightness adjustment of the monitor display is explained.

CAUTION

- This equipment utilizes LED for the backlight. Since this LED deteriorates by the life cycle, the display may become dark, scintillate, or may not light by the long term use. In such case, contact your nearest service representative.

1 Press the [Menu], [Brightness] ("Each Bed") keys.

- The brightness setup screen will be displayed.



- 2** Slide the up or down to adjust the brightness. When the slider is released, / will be displayed.
- 3** Press / to perform fine adjustment of the brightness.

Monitor Suspend Setup

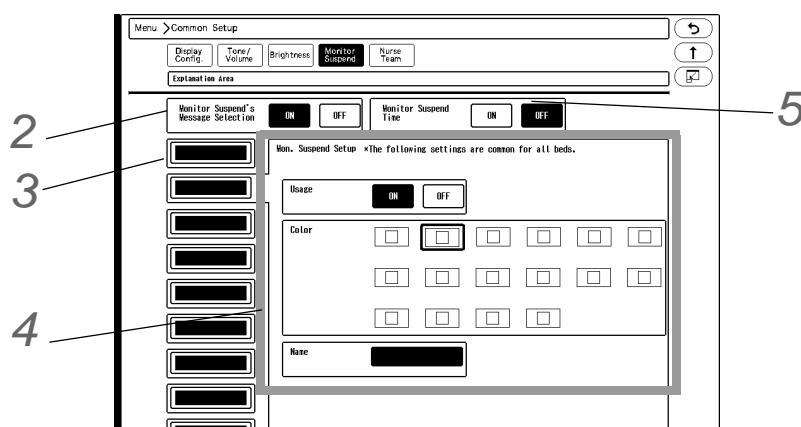
During monitoring suspended status, different messages in different colors according to the patient's destination can be displayed. Suspend timer function can be also used.

When using the monitoring suspend timer function, alarm sound will generate after the preprogrammed duration to remind the user to resume monitoring.

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

- 1** Press the [Menu], [Monitor Suspend] ("Common Setup") keys.

- The monitor suspend confirmation window will be displayed.



- 2** Select [ON] for "Monitor Suspend's Message Selection" to set the details (message, color, etc.)
- 3** Select the key to edit the monitor suspend message.
- 4** Set the details.

- "Usage": Select whether or not to use this monitor suspend message.
- "Color": Select the color. The background of the monitor suspend message will be displayed in the selected color.

- ▶ "Name": Set the message to be displayed. Use the touch panel keys or keyboard to enter the message up to 14 characters.

5 Select ON/OFF for "Monitor Suspend Time".

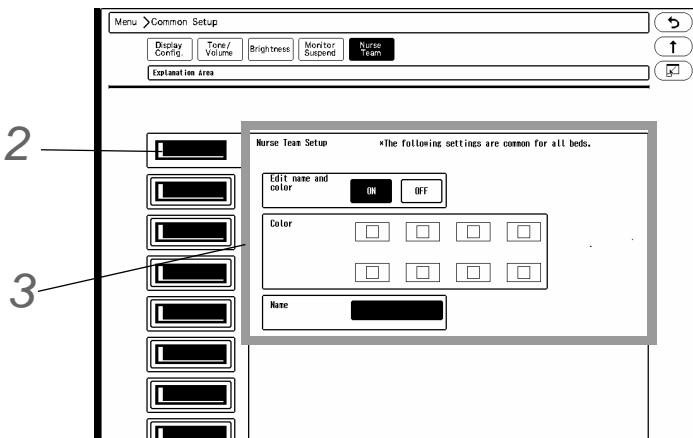
[ON] will turn ON the monitor suspend timer function, and timer will start when monitoring is suspended.
 (☞ "Suspend Monitoring" P6-9)

Nurse Team Setup

The nurse team colors can be displayed for each bed to distinguish the beds according to the nurse team. Maximum of 8 nurse teams can be set.

1 Press the [Menu], [Nurse Team] ("Common Setup") keys.

- ▶ The nurse team setup screen will be displayed.



2 Select the key to edit the nurse team.

3 Set the details.

- 1 "Edit name and color": Select whether or not to use this nurse team.
- 2 "Color": Select the color for the nurse team.
 The set color will be displayed on the waveform area of each bed according to the nurse team.
- 3 "Name": Set the nurse team name. Use the touch panel keys or keyboard to enter the name up to 14 characters.

Chapter 13 Troubleshooting

Message List	13-1
Messages Displayed inside the Numeric Data Box	13-8
Troubleshooting	13-12
Wired Network (DS-LANIII), TCP/IP Network.....	13-12
Telemetry, TCON	13-12
Bed Register.....	13-14
Alarm	13-14
Display.....	13-15
General.....	13-16
Recorder Unit (HR-800).....	13-17
Laser Printer	13-17
CF Card	13-18
Remote Control	13-19
PHS Nurse Call System	13-19
EMR Link Function	13-20
Mouse/Keyboard	13-20
Slave Monitor.....	13-21
Bed Transfer/Exchange.....	13-21
Extended Display Unit	13-22

Chapter 13 Troubleshooting

Message List

In this section, the displayed messages on this equipment are described.

For the vital alarm message, there are numeric data alarm and arrhythmia alarm, and the delay time are as follows.

- ♦ Numeric Data Alarm: Adult/Child: 5 sec., Neonate: none
- ♦ Arrhythmia Alarm: Adult/Child/Neonate: none



CAUTION

- ♦ The alarm level can be changed on the "Alarm Level" under the "Initial Settings".

The following table shows the alarm level selection for each parameter.

There are 5 alarm levels.

Ex.) HR alarm level : "S H M x x"

S:	Top Priority (Top Priority Alarm)
H:	High Priority (Urgent Alarm)
M:	Medium Priority (Cautionary Alarm)
L:	Low Priority (Status Alarm)
N:	Notification (Notification Alarm)

The alarm level that cannot be set will be indicated by "x".

For the HR Alarm, the alarm level of S (Top) / H (High) / M (Medium) can be set, and L (Low) / N (Notification) cannot be set.

Numeric Data Alarm

Parameter	Message	Default Level	Alarm Level Selection	Note	
-	Alarm Susp: xxx s	N	x x x x N	"xxx s" indicates remaining time.	
ECG	Upper HR	H	S H M x x		
	Lower HR				
ST	Upper ST1	M	x H M x x		
	Lower ST1				
	Upper ST2	M	x H M x x		
	Lower ST2				
12-Lead ST	Upper ST (xxx)	M	x H M x x	(xxx) indicates lead I to V6.	
	Lower ST (xxx)				
BP1 to BP8	Upper ###	H/M	x H M x x	### indicates BP label. Default Alarm Level BP1: H, BP2 to BP8: M	
	Lower ###				
	Upper PR_IPB	H	x H M x x		
	Lower PR_IPB				
SpO ₂ , SpO ₂ -2	Upper SpO ₂ ##	H	x H M x x	## indicates the label when used.	
	Lower SpO ₂ ##				
	Upper SpCO##	M	x H M L x		
	Upper SpMet##	M	x H M L x		
	Upper SpHb##	M	x H M L x		
	Lower SpHb##				
	Upper PR_SpO ₂ ##	H	x H M x x		
	Lower PR_SpO ₂ ##				
NIBP	Upper NIBP	H	x H M x x		
	Lower NIBP				
T1 to T8	Lower Tn (###)	M	x H M L x	n: 1 to 8 ### indicates TEMP label.	
	Lower Tn (###)				
Tb	Upper Tb	M	x H M L x		
	Lower Tb				
RESP	Upper RR	H	x H M x x		
	Lower RR				
	Apnea Alarm	H	S H M x x		
CO ₂	Upper CO ₂ -E	H	x H M x x		
	Lower CO ₂ -E				
	Upper CO ₂ -I	M	x H M x x		
	Upper RR	H	x H M x x		
	Lower RR				
	Apnea Alarm	H	S H M x x		
Anesthetic agent	Upper CO ₂ -E	H	x H M x x		
	Lower CO ₂ -E				

Parameter	Message	Default Level	Alarm Level Selection	Note
	Upper CO ₂ -I	M	x H M x x	### indicates the label for AGT-1, AGT-2.
	Upper O ₂ -E	H	- H M - -	
	Lower O ₂ -E			
	Upper O ₂ -I	H	x H M x x	
	Lower O ₂ -I			
	Upper N ₂ O-E	H	x H M x x	
	Lower N ₂ O-E			
	Upper N ₂ O-I	H	x H M x x	
	Lower N ₂ O-I			
	Upper ###-E	H	x H M x x	
	Lower ###-E			
	Upper ###-I	H	x H M x x	
	Lower ###-I			
	Upper MAC	H	x H M x x	
SPIRO	Upper MV-E	M	x H M L x	
	Lower MV-E			
	Upper PEAK	M	x H M L x	
	Lower PEAK			
	Lower PEEP	M	x H M L x	
VENT	Upper RR	H	x H M x x	
	Lower RR			
	Apnea Alarm	H	S H M x x	

 Arrhythmia Alarm**CAUTION**

- The alarm message for the arrhythmia alarm will continue to be displayed for 30 seconds after the alarm is resolved.

Message	Default Level	Alarm Level Selection	Note
LEARN	N	x x x x N	
Arrhythmia Alarm OFF	N	x x x x N	
Asystole	H	S H x x x	
VF	H	S H x x x	
VT	H	S H x x x	
Slow VT	H	x H x x x	
Run	H	x H M x x	
Couplet	M	x H M L x	
Pause	M	x H M L x	
Bigeminy	M	x H M L x	

Message	Default Level	Alarm Level Selection	Note
Trigeminy	M	x H M L x	
Frequent	M	x H M L x	
Tachy	H	S H M x x	
Brady	H	S H M x x	

Arrhythmia Status

Message	Level	Note
Cannot analyze	L	
ECG Low	L / N	Level L when "Suspend Arrhy. Analysis during Noise Interference" is [ON]
ECG Artifact	L / N	Level L when "Suspend Arrhy. Analysis during Noise Interference" is [ON]
ECG1 Low	N	
ECG2 Low	N	
ECG1 Artifact	N	
ECG2 Artifact	N	

NOTE

- The <ARRHY OFF> message will be displayed when all arrhythmia alarm is set to OFF.

Measurement Status

Message	Level	Note
Alarm Sound Suspended	N	
Chk DS-LAN Comm	N	
TLM Receive	M	Too Far Alarm
TLM Receive	N	Interference with other equipments
Chk TLM Battery	M	Chk TLM Battery Alarm
Chk TCON Reception	N	TCON signal cannot be received, or data cannot be received by TCON
TCON Set. Changing	N	Changing TCON setting.
TCON Set. Failed	N	Failed to change TCON setting.
NIBP meas. failed.	M	
Chk Electrode	M/L	"M" if "Alarm Judgement" ("During Lead OFF") is set to [ON], and HR or RR is not measurable. "L" if other than above.
Chk Electrode (xx)	M/L	xx: lead type "M" if "Alarm Judgement" ("During Lead OFF") is set to [ON], and HR or RR is not measurable. "L" if other than above.
ECG Artifact	N	Noise interference on ECG
SpO ₂ Check Sensor	L/N	"L" if "Alarm Judgement" ("During Check SpO ₂ Sensor") is set to [ON]. "N" if [OFF]
SpO ₂ ## Check Sensor	L/N	When SpO ₂ label is used. Alarm level is same as "SpO ₂ Check Sensor".
CVA Detect	L	
Check CO ₂	L	
Check SPIRO function.	M	

NOTE

- <NIBP meas. failed> alarm will be cancelled when [Alarm Silence] key is pressed. Pay attention not to cancel the important alarm.

System Status

Message	Level	Details
Central ID is duplicated.	M	Central ID is duplicated with other central monitor.
Check PHS comm.	M	Communication error with the PHS nurse call system.
Check PHS call target	N	All the PHS nurse call targets are not functioning.
Check PHS monitor ID	N	Monitor ID is not set for the PHS nurse call system.
Updating PHS room info.	M	Receiving room information from the nurse call system controller.
Check TCON Comm.	N	Communication error with the TCON system.
TCON Interference	N	Noise is interfering.
Chk TCON Reception	N	When TCON "C2" is set, communication with the TCON administrator (C1) fails.
Check extended memory	M	Error on the extended memory.
Check PC/CF Card	N	CF card error, or the card cannot be identified.
Check Data Server Comm.	N	When a data server is used, communication with the data server fails.
Check EMR comm.	N	When EMR link function is used, communication with the patient data server fails.
Check Patient Server Comm.	N	When "Search ID" is used, communication with the patient data server fails.
Check SNTP Comm.	N	When a SNTP server is used, communication with the SNTP server fails.
Check multimonitor conn.	N	Serial communication with the extended display unit fails.
Check Backup Battery	N	Backup battery is depleted.
EMR Offline	N	When EMR link function is used, EMR offline is set.

External Equipment Alarm**CAUTION**

- For the SV-900 ventilator, alarm factor will not be transmitted to the central monitor.

Message	Default Level	Alarm Level Selection	Note
Ventilator			No transmission of ventilator alarm factor
VENT_AWP			
VENT_MV			
VENT_APNEA			
VENT_CONT.HP			
Upper VENT_FiO ₂			
Lower VENT_FiO ₂	H	S H x x x	
Upper VENT_CO ₂			
Lower VENT_CO ₂			
Upper VENT_RR			
Lower VENT_RR			
VENT_PEEP			
VENT_COMM			
VENT_URGENT			

 Printer Status

Message	Level	Note
Check Printer	N	Printer error is generated.
Check Cassette	N	The printer cassette is open.
Check Paper	N	There is no paper.
Printing in process	N	Printing in process

Messages Displayed inside the Numeric Data Box

□ HR

Message
Upper HR Alarm
Lower HR Alarm
Cannot Analyze
Check Electrodes
Low Amplitude
Noise Interference

□ ST

Message
Lower ST Alarm
Upper ST Alarm

□ BP1 to 8

Level H for BP1 and ART, Level M for other label

Message
Lower BP Alarm
Upper BP Alarm

□ Pulse Rate (BP Source)

Message
Upper PR Alarm (BP)
Lower PR Alarm (BP)

□ NIBP

Message
Upper NIBP Alarm
Lower NIBP Alarm
Measurement Failed.

❑ SpO₂/SpCO/SpMet/SpHb

Message
Upper SpO ₂ Alarm
Lower SpO ₂ Alarm
Check Sensor Attach.
No Pulse Detected
Pulse Search
Upper SpCO Alarm
Upper SpMet Alarm
Upper SpHb Alarm
Lower SpHb Alarm

❑ PR-SpO₂

Message
Upper PR alarm (SpO ₂)
Lower PR alarm (SpO ₂)

❑ TEMP1 to 8

Message
Upper TEMP alarm
Lower TEMP alarm

❑ Tb

Message
Lower Tb Alarm
Upper Tb Alarm

❑ RR (Impedance)

Message
Apnea Alarm
Upper RR Alarm
Lower RR Alarm
CVA detected

❑RR (Ventilator)

Message
Apnea Alarm
Upper RR Alarm
Lower RR Alarm

❑RR (Gas)

Message
Apnea Alarm
Upper RR Alarm
Lower RR Alarm

❑CO₂

Message
Upper CO ₂ -E Alarm
Lower CO ₂ -E Alarm
Upper CO ₂ -I Alarm
GAS Zeroing
CAL. Error
Sensor error
GAS Warm Up

□ Gas (MGU-800)

Message
Upper CO ₂ -E Alarm
Lower CO ₂ -E Alarm
Upper CO ₂ -I Alarm
Upper O ₂ -E Alarm
Lower O ₂ -E Alarm
Upper O ₂ -I Alarm
Lower O ₂ -I Alarm
Upper N ₂ O-E Alarm
Lower N ₂ O-E Alarm
Upper N ₂ O-I Alarm
Lower N ₂ O-I Alarm
Upper AGT-E Alarm*
Lower AGT-E Alarm*
Upper AGT-I Alarm*
Lower AGT-I Alarm*
Upper MAC Alarm
Upper RR Alarm
Lower RR Alarm
Apnea Alarm

*: The selected or detected label will be displayed for the agent label.

□ SPIRO (MGU-810)

Message
Check SPIRO
Upper RR Alarm
Lower RR Alarm
Apnea Alarm
Upper MV Alarm
Lower MV Alarm
Upper PEAK Alarm
Lower PEAK Alarm
Upper PEEP Alarm
Lower PEEP Alarm

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 (DS-LANIII), TCP/IP Network

Situation	Cause	Solution
The waveforms and numeric data for the wired network beds are not displayed.	The central ID is duplicated.	Make sure to set a unique central ID for each central monitor. (1 to 16) (☞ "Central ID" P6-20)
	The Bed ID of the bedside monitor or LAN-ID of the telemetry receiver is duplicated.	Make sure to set a unique Bed ID for the bedside monitor and LAN-ID for the telemetry receiver.
	The administrator does not exist.	One of the central monitors must have the Central ID, "001" in a network system. (☞ "Central ID" P6-20)
	A HUB not compatible to wired network is used.	For the DS-LANIII network, use the recommended switching HUB. Do not confuse the HUB for DS-LAN and TCP/IP network.
	A central monitor which is not compatible is used.	The following central monitors can not be used with the DS-LANIII network. DS-5700 DS-5800N/NX/NXMB DS-7600/7600W with software version V05 and prior
	DS-LAN Cable (Ethernet branch cable or connection cable) is not correctly connected. Or, the wire is broken.	Check if DS-LAN cable is properly connected. Or, replace the DS-LAN cable.
	The network connecting device is malfunctioning.	Replace the device.
	A monitor with DS-LANII setting is used.	Make sure to set DS-LANIII for all the monitors.

Telemetry, TCON

Situation	Cause	Solution
The waveform transmission is often interrupted.	A low battery mark is displayed in the waveform area for the telemetry receiving bed.	Replace the transmitter battery with a new one.
	The patient is located too far from the receiver antenna.	Check the antenna system.
	There is a metallic obstruction (elevator, door, etc.) between the transmitter and receiver.	Try to prevent metallic obstruction between the transmitter and receiver.

Situation	Cause	Solution
A noise is interfering on the waveform, and the waveform suddenly changes.	[OFF] is selected for the AC filter.	Select [ON] for "AC Filter" under ECG setup. (☞ "Detail Setup" P8-7)
	The AC filter frequency is not selected correctly.	Set the correct frequency ([50Hz] or [60Hz]) for "AC Filter". (☞ Maintenance Manual "Other Setup" P6-24)
	[OFF] is selected for the ECG drift filter.	Select [ON] for "Drift Filter" under ECG setup. (☞ "Detail Setup" P8-7)
	A transmitter with the same channel ID or close frequency is used nearby.	Stop using the other transmitter.
The waveform is not transmitted The waveform is not displayed.	Antenna is disconnected from the telemetry receiver.	Connect the antenna securely.
	The battery is installed with opposite polarity.	Verify the (+) (-) direction of the battery and install correctly.
	The battery of the transmitter is depleted.	Replace the transmitter battery with a new one.
	The channel setup is not correct.	The antenna connection and receiver setup should correspond.
	A transmitter with an interfering channel ID is used nearby.	Use the transmitter with a channel ID that does not interfere.
TCON data cannot be received. The <Chk TCON Receive> message is displayed.	The Bidirectional Wireless Communications Module is not connected to the bedside monitor.	Check the connection. If not properly connected, securely connect it.
	The TCON port set on the serial communication menu (Initial Settings > External Device > Serial Comm.) and the port which TCON is actually connected does not match.	Check if the port which TCON is connected and the port set on the serial communication menu are the same. If not, set it correctly.
	The TCON group between this equipment and the bedside monitor is different.	If the group is different between the equipments, TCON communication cannot be performed. Set the same TCON group.
	The distance between this equipment and the bedside monitor is too far. Or, some obstruction is in between and transmission is cut off.	Install this equipment and the bedside monitor so that the distance in between is within 50m. Try to prevent metallic obstruction between the transmitter and receiver.
	The base station is not set.	To construct the TCON System, a base station must be set. Set this equipment or another central monitor (DS-7600, DS-7700) as the base station. If another central monitor is set as the base station, set this equipment as the remote station.
	[OFF] is set for TCON ID.	Select [C1] for the base station and [C2] for the remote station.
	A certain parameter cannot be displayed. The NIBP measurement of the TCON bed cannot be performed from this equipment.	Improve the communication status.
	If the bed uses wireless telemetry and TCON (LW+T), poor reception can be considered.	Improve the communication status of the telemeter.

Bed Register

Situation	Cause	Solution
A bed cannot be selected on the "Bed Register" screen.	The remaining displayable bed is 0.	The maximum numbers of beds that can be registered are 32 beds. ( Maintenance Manual "Bed Register" P6-20)
The bed is wired network bed, and the bed ID or channel ID is not displayed.	The wired network setup is incorrect.	Check the wired network connection.
	The central ID, room/bed ID is incorrect.	Check if the Central ID, Room/Bed ID of this equipment and the monitors connected to the DS-LANIII are not duplicated. If duplicated, set the correct ID.
The Room ID and Bed ID of the TCON bed are not displayed.	The TCON setting is incorrect.	Check the settings of this equipment and TCON.
	A communication error between this equipment and the bedside monitor can be considered, or if this equipment is the remote station, a communication error with the base station can be considered.	Improve the communication status. The communication status with the base station can be verified via the TCON mark

Alarm

Situation	Cause	Solution
Alarm does not generate.	Alarm is suspended.	Cancel the [Alarm Suspend] under Alarm setup of the Individual Bed Display. ( "Alarm Suspend" P7-13)
	Alarm setup for the parameter is set to [OFF].	On the alarm setup menu for the corresponding parameter, set the alarm [ON]. ( "Alarm Limit Setup for Each Parameter" P7-4)
	The alarm threshold level is not set for the parameter.	Set the upper/lower alarm threshold level on the alarm setup menu for the corresponding parameter. ( "Alarm Limit Setup for Each Parameter" P7-4)
Alarm sound is not generated.	Alarm sound is suspended.	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. Whether or not to link the alarm sound suspend function can be set on the "Alarm Setup" under the "Initial Settings" menu. ( Maintenance Manual "Alarm" P6-2)
	Alarm is silenced.	Press the [Resume All Al. Sound] key on the alarm setup window of the Individual Bed Display.
Alarm sound is difficult to recognize.	The volume of the alarm sound is too low.	If the alarm volume is set too low, alarm occurrence may not be recognized. On the "Tone/Volume" menu, increase the alarm volume. ( "Tone/Volume" P12-29)
Arrhythmia alarm does not generate. Arrhythmia alarm is not displayed.	The arrhythmia alarm is set to [OFF].	On the "Arrhythmia Alarm" screen, select [ON] for the alarm of the corresponding arrhythmia. ( "Arrhythmia Alarm Setup" P7-6)
	The precision of arrhythmia detection has decreased.	Perform the arrhythmia learn process. ( "To Perform Arrhythmia Learning" P7-8)

Situation	Cause	Solution
	<p>Due to noise and myoelectricity interference, arrhythmia analysis is suspended.</p> <p>When "Suspend Arrhy. Analysis during Noise Interference" is set to [ON] (Initial Settings > Alarm), arrhythmia analysis will be suspended at noise and myoelectricity interference.</p> <p>The <Cannot analyze> message will be displayed when the analysis suspended duration exceeds 30 seconds.</p>	Check the electrode attachment on the bedside monitor or telemetry transmitter, and remove the noise source.
Alarm generated on the bedside monitor can not be silenced or suspended from this equipment.	[NG] is set for "Alarm Suspend/Alarm Silence from Central Monitor" (Initial Settings > Alarm)	Set to [OK]. (Maintenance Manual "Alarm" P6-2)
HR alarm, PR alarm does not generate. ON] can not be selected for the alarm setting.	For the DS-7000 series bedside monitors, the alarm for the parameter not selected for the "HR/PR Alarm Source" (ECG/SPO ₂ /BP) on the bedside monitor will be automatically set to OFF on this equipment.	Setup cannot be performed on the central monitor.
Alarm indicator does not light.	"Pattern Setup" under "Alarm Indicator" (Initial Settings > Alarm) is set to [OFF].	Set the alarm indicator flashing pattern for each alarm level. (Initial Settings > Alarm) (Maintenance Manual "Alarm" P6-2)
The [Alarm Silence] key does not function.	[Disable] is set for "All Beds Alarm Silence Key". (Initial Settings > Alarm)	When [Disable] is set for "All Beds Alarm Silence Key" (Initial Settings > Alarm), [Alarm Silence] key for the fixed key, user key, remote control unit will be disabled. Set to [Enable] when using the [Alarm Silence] key.

Display

Situation	Cause	Solution
A certain parameter cannot be displayed.	The parameter is not set to be displayed on the bedside monitor.	Set the parameter to be displayed on the bedside monitor.
	The parameter is set to [OFF] on the "Parameter ON/OFF" screen.	On the "Parameter ON/OFF" screen, select [ON] for the parameter to be displayed. ("Parameter ON/OFF" P8-24)
Waveform and numeric data for certain bed cannot be displayed.	If using a wired network system, there is no central monitor with the Central ID, "001". Or, the Central ID is duplicated	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, make sure not to duplicate the Central ID with other monitors. (Maintenance Manual "Room ID/Central ID Setup" P2-4)
	Monitoring is suspended for that bed.	Press the [Resume] key and resume monitoring for that patient.
	Monitoring is suspended on the bedside monitor.	Resume monitoring on the bedside monitor.
	The bed to be displayed is not selected under [Bed Sel.]. (Common Setup > Display Config.)	Select the bed under [Bed Sel.]. (Common Setup > Display Config.) ("Selecting the Displaying Bed" P12-23)
	The waveform/numeric data to be displayed are not selected under [Waveform] / [Numeric Data]. (Common Setup > Display Config. > Each Bed)	Select the waveform/numeric data to be displayed. ("Numeric Data/Waveform" P12-25)

Situation	Cause	Solution
	The bedside monitor is not properly connected to the DS-LANIII network.	Connect using the Ethernet branch cable (CJ-522) or LAN interface cable (CJ-530).
	The power is turned OFF on the bedside monitor or telemetry receiver.	Turn ON the power.
	The software version of the telemetry receiver does not correspond.	Contact your nearest service representative.
The ECG waveform and HR are not displayed.	[BP] is selected for HR alarm source on the DS-7000 series bedside monitor.	Select [HR]/[SpO ₂] for HR alarm source.
The BP numeric data, BP waveform, NIBP numeric data are not displayed.	The BP measurement unit (mmHg/kPa) is different between the bedside monitor and the central monitor.	If the measurement unit is different between the bedside monitor and the central monitor, BP waveform, BP numeric data, NIBP numeric data will not be transmitted from the bedside monitor. In such case, it will be treated as not measured data, and will not be displayed on the central monitor. Make sure to set the same measurement unit for the bedside monitor and the central monitor. (☞ Maintenance Manual "Unit" P6-7)
The temperature numeric data is not displayed.	The temperature measurement unit (°C/°F) is different between the bedside monitor and the central monitor.	If the temperature measurement unit is different between the bedside monitor and the central monitor, the temperature data will not be transmitted from the bedside monitor. In such case, it will be treated as not measured data, and will not be displayed on the central monitor. Make sure to set the same measurement unit for the bedside monitor and the central monitor. (☞ Maintenance Manual "Unit" P6-7)

General

Situation	Cause	Solution
The data was initialized when the power was turned ON.	The power has been turned OFF for more than 5 minutes.	When the power has been turned OFF for more than 5 minutes, NIBP list will be deleted. To retain the data, turn ON the power within 5 minutes.
	Internal memory error is generated.	Contact your nearest service representative.
The data is initialized each time the power is turned ON.	The internal switch is set to initialize.	The setting of the rotary switch needs to be changed. Contact your nearest service representative.
	The backup battery is depleted.	The long-term backup battery needs to be replaced. Contact your nearest service representative.
The display is too dark.	The display brightness is not adjusted.	Due to the LCD characteristic, the visible range is limited. Adjust to the appropriate brightness on the "Brightness Setup" screen. (☞ "Brightness" P12-30)
The "Check Backup Battery" message is displayed.	The battery for the backup memory is depleted.	The long-term backup battery needs to be replaced. Contact your nearest service representative.
There is an offset in the touch panel.	The detecting location is misaligned due to change over time.	Calibration needs to be performed. Contact your nearest service representative.
The touch panel does not function properly.	A scratch on the touch panel surface or foreign object entering the touch panel junction is causing misdetection of the key area.	The touch panel needs to be replaced. Contact your nearest service representative.
The date/time is displayed in yellow.	The time synchronization with the SNTP server or patient data server has failed.	Check the connection with the SNTP server or patient data server.

Recorder Unit (HR-800)

Situation	Cause	Solution
The "Check Paper" message is displayed.	There is no paper.	Set the paper in the paper holder.
The "Check Cassette" message is displayed.	The paper holder is open.	Close the cassette until it locks into place with a click sound.
The "Check Paper" or "Check Cassette" message is not displayed, but printing cannot be performed.	The paper is not correctly installed. The front and backside of the paper is set oppositely.	Set the paper in the paper holder so that the logo, FUKUDA DENSHI CO.,LTD appears on the upper surface. (☞ "Installing the Recording Paper (Optional)" P5-3)
Only the ECG waveform is printed.	The waveforms to be printed is not set under "Print Settings".	Set the printing waveforms for manual, alarm, periodic printing for each bed. (☞ "Printing Condition/Output Destination Setup" P11-2)
Alarm printing does not function.	The alarm printing mode is set to OFF.	Set [ON] for "Alarm Printing". (Each Bed > Print Settings > Alarm Printing) Also, set the printing waveforms and alarm factors. (☞ "Alarm Printing Setup" P11-3)
	Alarm is set to OFF for the parameter.	On the alarm setup menu for the corresponding parameter, set the alarm [ON]. Also, set the upper and lower alarm limit. (☞ "Alarm Limit Setup for Each Parameter" P7-4)
Periodic printing does not function.	The periodic printing mode is set to [OFF].	Set [Printer] or [Recall] for "Periodic Printing". (Each Bed > Print Settings > Periodic Printing) Also, set the printing waveforms and periodic interval/timer. (☞ "Periodic Printing Setup" P11-5)
Telemetry remote printing does not function.	The event button on the transmitter is not pressed long enough to transmit the signal to this equipment.	Press the event button for more than 3 seconds.
	The telemetry remote printing function is set to [OFF].	Select [ON] for "LX Remote Printing". (Initial Settings > User I/F > Display/Print) (☞ Maintenance Manual "Display/Print" P6-9)
Remote printing does not function.	A recorder is equipped on the bedside monitor.	Perform the printing on the bedside monitor. If a recorder is equipped on the bedside monitor, telemetry remote printing will not function.
The "Check Printer" message is displayed.	The thermal head temperature has increased.	Damage to the thermal head can be considered. Contact your nearest service representative.

Laser Printer

Situation	Cause	Solution
The data is not output to the laser printer.	The paper cassette is not firmly closed.	Close the paper cassette.
	The paper cassette is empty.	Install the paper in to the paper cassette.
	Printer cable is disconnected.	Connect the printer cable.
	Printer is set to offline mode.	Set the printer to online mode.
	HUB failure has occurred.	Check the LED on the HUB if it is properly communicating. If the LED is not lighted, contact your nearest service representative.
	Other monitor is in process of printing.	Suspend the ongoing printing or wait until the printing is complete.

Situation	Cause	Solution
	The network setup for the laser printer is not performed.	Contact your nearest service representative.
	The MAC address, IP address setting of the printer is incorrect.	Set the correct MAC address, IP address and restart the printer.
	The network board of the laser printer is malfunctioning.	Check if any error message or error code is displayed on the printer LCD. If displayed, contact your nearest service representative.
The data cannot be output to the printer.	Printer cable is disconnected.	Connect the printer cable.
	Printer is set to offline mode.	Set the printer to online mode.
	Printer is in sleep mode.	Change the printer setting so that it will not enter into sleep mode.
Printer output does not stop.	Printing operation was performed too frequently.	Wait until the printing is complete. Or, deleted the stacked data. Do not turn off the power of the printer during printing as it may cause a printing error.
The printed output is incomplete or frame only.	The printer cover or paper cassette was opened during printing, or the printer was left out of paper for a certain time.	Do not open the cover or paper cassette during printing. Also, supply new pad of paper immediately when the paper is out.
	The system was restarted during printing.	Do not restart the system during printing.
Printer output is garbled.	The power of the printer was reset during printing.	When resetting the printer power, it should be done after the printing is complete.
The [Print] key does not function.	The stacked data has reached the maximum quantity (64).	Wait until the quantity of stacked data decreases. Or, press the [Cancel Printing] key displayed at the lower part of the home display to delete the stacked data. (☞ "Laser Printer Operation" P11-17)

CF Card

Situation	Cause	Solution
The <There is no card in the slot.> message is displayed on the CF card screen.	CF card is not inserted or not correctly set in the CF card slot.	Set the card correctly in the card slot.
The "Error reading from card." or "Error writing to card." message is displayed on the "PC/CF Card Data Transfer" screen.	Error is detected during read/write process.	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. Format the card again on the used equipment and try the write/read process again. (☞ Maintenance Manual "Backup/Copy of the Data" P3-1)
	The card is not properly inserted.	Remove the card and insert it again properly.
	Unspecified card is used.	Use the specified CF card. (☞ "Optional Accessories" P15-1)
	The number of times of write operation for the CF card has reached its maximum capacity.	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 "CF Card" screen does not function.	The CF card is write-protected.	Cancel the write-protect function.

Situation	Cause	Solution
	Unspecified card is used.	Use the specified CF card.
	The card is defective.	Replace with a new card.

Remote Control

Situation	Cause	Solution
The remote control does not function.	The remote control bed ID is not correct.	Set the correct remote control ID. (Maintenance Manual "Remote Control Setup" P1-7)
	The remote control room ID is not correct.	Set the correct remote control ID. (Maintenance Manual "Remote Control Setup" P1-7)

PHS Nurse Call System

Situation	Cause	Solution
The <Check PHS comm.> message is displayed. Or, <Failed> is displayed as a result of Nurse Call Daily Check.	Communication error with nurse call system.	Check the connection with the nurse call system. (Maintenance Manual "Connecting the Nurse Call System" P5-3)
On the "Nurse Call Daily Check" screen, the check key ([1] / [2] / [3]) remains to be lit in blue and other check keys do not function.	The check key lit in blue is in process of nurse call.	The key will remain blue until the nurse call connection is verified at the call target (base station, PHS, etc.). Verify the connection at the call target.
The <Check PHS call target> message is displayed.	All the PHS nurse call targets (base station, PHS, etc.) are not functioning.	Check the power and connection of the nurse call targets (base station, PHS, etc.).
The <Check PHS monitor ID> message is displayed.	For the "Detail Setup" of "Nurse Call" (Initial Settings > External Devices > Serial Comm.), "Monitor ID" is set to [0].	"Monitor ID" should be set in the range from 1 to 99, and make sure that it does not duplicate with other central monitors. (Maintenance Manual "Nurse Call Detail Setup" P5-5)

EMR Link Function

Situation	Cause	Solution
The <Check EMR comm.> message is displayed. The <Check Data Server Comm.> message is displayed.	There is a communication failure between the DS-8900 system and the patient data server.	Check the communication status of the DS-8900 system, patient data server, and EMR machine.
	The network setup is incorrect.	Set the correct IP address and port number on the network setup menu (Initial Settings > External Device > Network). ( Maintenance Manual "Patient Data Server" P2-16)
	The patient data server system has gone down.	Check if the patient data server is properly operating. If not, refer to the operation manual of the patient data server.
	The connection cable is disconnected.	Verify that the DS-8900 system, patient data server, EMR machine is connected properly. If not, connect them properly.
	The protocol of data server setting on this equipment does not correspond with the setting on the data server.	Check if protocol of data server setting on this equipment corresponds with the setting on the data server. If not, set it correctly.

Mouse/Keyboard

Situation	Cause	Solution
The mouse pointer does not move.	A mouse other than recommended is used.	If a mouse other than recommended is used, it may not function or may suddenly stop functioning. Use the recommended mouse.
	The keyboard and mouse are not properly connected.	Properly connect the keyboard and mouse to the corresponding connectors.
	The mouse setup is incorrect.	The "USB" setting under "Initial Settings" may not be correct. Make sure that the correct setting is made according to the connected mouse.
The mouse stopped functioning.	The mouse is not recognizing the control signal from the DS-8900 system.	Press the [Home] key on the touch panel. (The mouse control signal from this equipment will reset.) If the mouse still does not function, the mouse connector may be disconnected. Securely plug in the connector again.
The keyboard is not functioning.	A keyboard other than recommended is used.	If a keyboard other than recommended is used, it may not function or may suddenly stop functioning. Use the recommended keyboard.
	The keyboard and mouse are not properly connected.	Properly connect the keyboard and mouse to the corresponding connectors.
	The keyboard is disconnected.	Connect the keyboard. If it does not function within 30 seconds, securely plug in the connector again.

Slave Monitor

Situation	Cause	Solution
Nothing is displayed on the slave monitor, or the display flickers.	The display resolution does not satisfy the specification.	Use a slave monitor with resolution of Full HD (1920dot x 1080dot) . Do not use any monitors which has the function to display higher resolution than the actual resolution.
	Synchronization has failed.	Use the monitor which satisfies the following horizontal/vertical frequency. Horizontal Frequency: 67.5kHz Vertical Frequency: 60Hz
	The connection cable is disconnected.	Securely connect the cable to the slave output connector on the DS-8900 and the other end to the connector on the slave monitor.

Bed Transfer/Exchange

Situation	Cause	Solution
The central monitor for the new bed is not displayed for "Other Unit".	The connection cable is disconnected.	Check if the DS-8900 system for transferring the data (original and new) is properly connected.
	The network setup is incorrect.	Set the correct IP address and port number on the network setup menu (Initial Settings > External Device > Network).
	The server does not exist within the network for central monitor communication.	Assign one central monitor within the network to [Server]. (Initial Settings > External Devices > Network > Central Monitor Comm.)
The <TCP/IP network is disconnected. (Central Monitor Communication Error)> message is displayed.	The connection cable for the central monitor assigned as server is disconnected.	Check if the DS-8900 system for transferring the data (original and new) is properly connected.
	The network setup is incorrect.	Set the correct IP address and port number on the network setup menu. (Initial Settings > External Device > Network)
	The server does not exist within the network for central monitor communication.	Assign one central monitor within the network to [Server]. (Initial Settings > External Devices > Network > Central Monitor Comm.)
The <TCP/IP network is disconnected. (Bed exchange data communication error.)> message is displayed.	The connection cable is disconnected.	Check if the DS-8900 system for transferring the data (original and new) is properly connected.

Extended Display Unit

Situation	Cause	Solution
Nothing is displayed on the extended display unit.	The connection cable is disconnected.	Connect the LC-8026T and DS-8900 using the display unit connection cable (CJ-731B).
	The power of the extended display unit is not turned ON.	Connect the AC power cable to the extended display unit, and turn ON the main power.
	[OFF] is selected for "Extended Display Unit Usage".	Select [ON] for "Extended Display Unit Usage". (Initial Settings > External Device > Extended Display) ( Maintenance Manual "Setup" P1-10)
	32 beds display mode is used.	When 32 beds display mode is used, monitoring on the extended display unit cannot be performed.

Chapter 14 Setup Item/Default Value

Patient Admit/Discharge	14-1
Alarm Setup	14-1
Parameter Setup	14-2
Review Function	14-5
Basic Setup for Individual Bed Display	14-9
Menu (Central Monitor Display)	14-11
Functions	14-11
Each Bed Setup.....	14-11
Common Setup.....	14-15

Chapter 14 Setup Item/Default Value

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	Detail	Default	Setting at Discharge
ID	Numeric, Alphabet, Symbol (20 characters)	Blank	Default
Patient Name	Numeric, Alphabet, Symbol (16 characters)	Blank	Default
Birth Date	Birth Date	Blank	Default
Age	0 to 999 years or 0 to 999 days	0 year	Default
Height	0 to 300	0.0cm	Default
Weight	0 to 350	0.0kg	Default
BSA	0 to 9.99	0.0m ²	Default
Admit Date	Blank	Blank	Default
Bed Name	The set bed name will be displayed, or <Bed name unselected> will be displayed.	No selection	Default
Patient Classification	Adult, Child, Neonate	Adult	No Change
Sex	Male, Female	No selection	Default
Nurse Team	Red, Orange, Yellow, Yellow-green, Green, Light Blue, Blue, Purple (Colored Block)	Not registered.	Default
Pacemaker	Used, Not Used	Not Used	Default

Alarm Setup

Item	Detail	Default	Setting at Discharge
System Alarm	Suspend, ON	Suspend	-
Each Parameter	Refer to "Admit Setup" under "Initial Settings" on Chapter 8 "Setup Item/Default Value" of Maintenance Manual.		Admit Setup

Parameter Setup

ECG

Item	Detail	Default	Setting at Discharge
Lead	I, II, III, aVR, aVL, aVF, V, V1 to V6	ECG1: II ECG2: I ECG3: III ECG4: aVR ECG5: aVL ECG6: avF ECG7: V1 ECG8: V2 ECG9: V3 ECG10: V4 ECG11: V5 ECG12: V6	Default
Waveform Size	Auto, x1/4, x1/2, x1, x2, x4	ECG1 to ECG12: x1	Default
Filter	Monitor, Diagnosis, ESIS	Monitor	No Change
Synchronized Mark/Tone	ECG, SpO ₂ -1, SpO ₂ -2, BP	ECG	No Change
Pacemaker	*Same with "Patient Admit/Discharge" section.		
Pacemaker Pulse	ON, OFF, Distinct Color	Distinct Color	No Change
Pace Pulse Mask Time	Auto, 10ms, 20ms, 40ms, OFF	Auto	No Change
Drift Filter	ON, OFF	ON	No Change
AC Filter	ON, OFF	ON	No Change
Auto Lead	ON, OFF	OFF	No Change
ST/VPC/Arrhy. Alarm Display	ON, OFF	ON	No Change

RESP

Item	Detail	Default	Setting at Discharge
Waveform Size	x1/4, x1/2, x1, x2, x4	x1	Default
RR Synchronized Mark	ON, OFF	ON	No Change
RR/APNEA Alarm Source	Auto, Impedance, Ventilator CO ₂ /GAS	Auto	No Change
CVA Detect	ON, OFF	OFF	Default

SpO₂

Item	Detail	Default	Setting at Discharge
Waveform Size	x1/4, x1/2, x1, x2, x4	x1	Default
Synchronized Mark/Tone	*Same with selection for ECG Setup.		

NIBP

Item	Detail	Default	Setting at Discharge
NIBP Periodic Measurement	OFF, Interval, Timer	OFF	Default
Measurement Interval	2min, 2.5min, 3min, 5min, 10min, 15min, 20min, 30min, 60min, 120min	120 min	No Change
Timer	00:00 to 23:00	No Selection	No Change
Patient Classification	*Same with "Patient Admit/Discharge" section.		
PR	ON, OFF	OFF	No Change
MAP	ON, OFF	ON	No Change
Time Display	Elapsed, Meas.	Elapsed	No Change

 BP1 to 8

Item	Detail	Default	Setting at Discharge
Scale*	20, 50, 75, 100, 150, 200, 250, 300mmHg	200mmHg	Default
	4, 8, 12, 16, 20, 24, 32, 40kPa	24kPa	
Synchronized Mark/Tone	*Same with selection for ECG Setup.		
Display Type	S/M/D, S/D, M	S/M/D	No Change

*: The scale selection will differ depending on the label.

 TEMP1 to 8

Item	Detail	Default	Setting at Discharge
Label	T#, Tsk, Tre, Tes, Tco, US1 to US7	T* (T1 to T8)	No Change

 CO₂

Item	Detail	Default	Setting at Discharge
Unit	mmHg, kPa, %	mmHg	No Change
Scale	0-50, 0-100mmHg	0 to 50mmHg	Default
	0-4, 0-8, 0-10kPa	0-4kPa	
	0-4, 0-8, 0-10%	0-4%	

 Ventilator

Item	Detail	Default	Setting at Discharge
AWP Scale	10, 20, 30, 50, 120cmH ₂ O	50cmH ₂ O	Default
AWF Scale	±5, ±10, ±20, ±50, ±180L/min	±50L/min	
AWV Scale	50, 250, 500, 1000, 3000mL	500mL	

Multigas Concentration

Item	Detail	Default	Setting at Discharge
CO ₂ Scale	0-50, 0-100mmHg	0 to 50mmHg	Default
	0-4, 0-8, 0-10kPa	0-4kPa	
	0-4, 0-8, 0-10%	0-4%	
O ₂ Scale	18-30, 18-60, 18-100, 0-30, 0-60, 0-100%	18-30%	Default
Agent Scale	0-4, 0-8, 0-16%	4%	Default
AWP Scale	10, 20, 30, 50, 120cmH ₂ O	50cmH ₂ O	Default
AWF Scale	±5, ±10, ±20, ±50, ±180L/min	±50L/min	
AWV Scale	50, 250, 500, 1000, 3000mL	500mL	
Wave Clip	ON, OFF	ON	No Change

Review Function

Graphic Trend

Item	Detail	Default	Setting at Discharge	
Trend A	(H Module) HR, ST1, ST2, ST (I to V6), SpO ₂ , SpO ₂ -2, PR_SpO ₂ , PR_SpO ₂ -2, VPC, NIBP, BP1 to 8, PR_IBP, PDP, CPP, T1 to 8, Tb, RR_IMP, APNEA, EtCO ₂ , InspCO ₂ , RR_GAS, ExpN ₂ O, InspN ₂ O, ExpAGT, InspAGT, MAC, RR_VENT, ExpO ₂ , InspO ₂ , PI, PI-2, PVI, PVI-2, SpCO, SpCO-2, SpMet, SpMet-2, SpHb, SpHb-2, PEAK, PEEP, ExpMV	Upper Row: HR, OFF, OFF, NIBP Middle Row: SpO ₂ , OFF, T1, RR_IMP Lower Row: OFF, OFF, OFF, OFF	No Change	
Trend B	(Vigilance) SvO ₂ , ScvO ₂ , CCO, CCI, BT (Other) BIS, Lt-rSO ₂ , Rt-rSO ₂ , S1-rSO ₂ , S2-rSO ₂	Upper Row: HR, BP1, T1, NIBP Middle Row: SpO ₂ , EtCO ₂ , ST (II), RR_GAS Lower Row: OFF, OFF, OFF, OFF	No Change	
Trend C		Upper Row: HR, T1, BP1, NIBP Middle Row: SpO ₂ , InspCO ₂ , EtCO ₂ , InspAGT Lower Row: OFF	No Change	
Trend D		Upper Row: OFF, OFF, OFF, OFF Middle Row: OFF, OFF, OFF, OFF Lower Row: OFF, OFF, OFF, OFF	No Change	
Time Span	20min, 1h, 2h, 4h, 8h, 12h, 16h, 24h	4 hours	No Change	
Graphic Display	A: B: C: D: E:			
Scale, Display Selection	HR, PR_SpO ₂ , PR_IBP	100, 200, 300bpm (Graphic A)	300bpm	No Change
	ST1, ST2, ST (I to V6)	± 0.2, ± 0.5, ± 1.0, ± 2.0mV ± 2.0, ± 5.0, ± 10.0, ± 20.0mm (Graphic B)	± 0.5mV ± 5.0mm	No Change
	VPC	20, 50, 100 beats (Graphic C)	20 beats	No Change
	BP1 to BP8 (S/D/M)	20, 50, 100, 150, 200, 300mmHg 4, 8, 16, 20, 24, 40kPa (Graphic D)	200mmHg 24kPa	No Change
	PDP, CPP	20, 50, 100, 150, 200, 300mmHg 4, 8, 16, 20, 24, 40kPa (Graphic A)	200mmHg 24kPa	No Change
	NIBP (S/D/M)	100, 150, 200, 300mmHg 16, 20, 24, 40.0kPa (Graphic E)	200mmHg 24kPa	No Change
	T1 to T8	20.0-45.0, 30.0-40.0°C (Graphic A)	30.0-40.0°C	No Change
	SpO ₂ , SpO ₂ -2	0-100, 50-100, 80-100% (Graphic A)	80-100%	No Change
	SpCO, SpCO-2	20, 40, 100% (Graphic A)	20%	No Change
	SpMet, SpMet-2	10, 15, 100% (Graphic A)	10%	No Change
	SpHb, SpHb-2	10.0-20.0, 0-25.0g/dL (Graphic A)	10.0-20.0g/dL	No Change

Item	Detail		Default	Setting at Discharge
PI, PI-2 PVI, PVI-2 RR_IMP, RR_VENT, RR_GAS APNEA EtCO ₂ , InspCO ₂ ExpO ₂ , InspO ₂ ExpN ₂ O, InspN ₂ O ExpAGT, InspAGT SvO ₂ , ScvO ₂ CCO CCI BT BIS MAC PEAK PEEP ExpMV Lt-rSO ₂ Rt-rSO ₂ S1-rSO ₂ S2-rSO ₂	10, 20% (Graphic A)	10% <input checked="" type="checkbox"/>	10% <input checked="" type="checkbox"/>	No Change
	30, 60, 100% (Graphic A)	30% <input checked="" type="checkbox"/>	30% <input checked="" type="checkbox"/>	No Change
	50, 100, 150Bpm (Graphic A)	50Bpm <input checked="" type="checkbox"/>	50Bpm <input checked="" type="checkbox"/>	No Change
	15, 30 sec (Graphic C)	15 sec. <input checked="" type="checkbox"/>	15 sec. <input checked="" type="checkbox"/>	No Change
	50, 100mmHg 4.0, 8.0, 10.0kPa 4.0, 8.0, 10.0% (Graphic A)	50mmHg, 4.0kPa, 4.0% <input checked="" type="checkbox"/>	50mmHg, 4.0kPa, 4.0% <input checked="" type="checkbox"/>	No Change
	50, 100% (Graphic A)	100% <input checked="" type="checkbox"/>	100% <input checked="" type="checkbox"/>	No Change
	50, 100% (Graphic A)	100% <input checked="" type="checkbox"/>	100% <input checked="" type="checkbox"/>	No Change
	4.0, 8.0, 10.0% (Graphic A)	8.0% <input checked="" type="checkbox"/>	8.0% <input checked="" type="checkbox"/>	No Change
	0-100, 50-100, 80-100% (Graphic A)	0-100% <input checked="" type="checkbox"/>	0-100% <input checked="" type="checkbox"/>	No Change
	6.0, 12.0, 20.0L/min (Graphic A)	6.0L/min <input checked="" type="checkbox"/>	6.0L/min <input checked="" type="checkbox"/>	No Change
	6.0, 12.0, 20.0L/min/m ² (Graphic A)	6.0L/min/m ² <input checked="" type="checkbox"/>	6.0L/min/m ² <input checked="" type="checkbox"/>	No Change
	20.0-45.0, 30.0-40.0°C (Graphic A)	20.0-45.0°C <input checked="" type="checkbox"/>	20.0-45.0°C <input checked="" type="checkbox"/>	No Change
	25, 50, 75, 100 (Graphic A)	100 <input checked="" type="checkbox"/>	100 <input checked="" type="checkbox"/>	No Change
	5.0, 10.0% (Graphic A)	5.0% <input checked="" type="checkbox"/>	5.0% <input checked="" type="checkbox"/>	No Change
	10, 20, 50, 100 cmH ₂ O (Graphic A)	20 cmH ₂ O <input checked="" type="checkbox"/>	20 cmH ₂ O <input checked="" type="checkbox"/>	No Change
	10, 20, 50, 100 cmH ₂ O (Graphic A)	20 cmH ₂ O <input checked="" type="checkbox"/>	20 cmH ₂ O <input checked="" type="checkbox"/>	No Change
	6.0, 12.0, 20.0L/min (Graphic A)	12.0L/min <input checked="" type="checkbox"/>	12.0L/min <input checked="" type="checkbox"/>	No Change
	20-100 (Graphic A)	20-100 <input checked="" type="checkbox"/>	20-100 <input checked="" type="checkbox"/>	No Change
	20-100 (Graphic A)	20-100 <input checked="" type="checkbox"/>	20-100 <input checked="" type="checkbox"/>	No Change
	20-100 (Graphic A)	20-100 <input checked="" type="checkbox"/>	20-100 <input checked="" type="checkbox"/>	No Change
	20-100 (Graphic A)	20-100 <input checked="" type="checkbox"/>	20-100 <input checked="" type="checkbox"/>	No Change
Alarm Display Selection	[Arrhythmia] Asystole, VF, VT, Slow VT, Run, Bigeminy, Trigeminy, Pause, Couplet, Tachy, Brady, Frequent [Numeric Data] HR, ST, NIBP, RR, APNEA, SpO ₂ , PR, SpCO, SpMet, SpHb, SpO ₂ -2, PR-2, SpCO-2, SpMet-2, SpHb-2, PR_IBP, BP1 to BP8, T1 to T8, Tb, CO ₂ , O ₂ , N ₂ O, Agent, MAC, MV, PEAK, PEEP		All ON	No Change

□ Tabular Trend

Item	Detail	Default	Setting at Discharge
Display Time Interval	10sec, 30sec, 1min, 2min, 2.5min, 5min, 10min, 15min, 30min, 60min, NIBP	5 min	No Change
Group	A to F	A	No Change
Fixed Parameters	0 to 6 param.	0 param.	No Change
List Selection	OFF (H Module) HR, VPC, VPC_HOUR, ST1, ST2, ST(I) to ST(V6), SpO ₂ , PR_SpO ₂ , SpO ₂ _2, PR_SpO ₂ _2, BP1-S to BP8-S, BP1-D to BP8-D, BP1-M to BP8-M, NIBP-S to NIBP-M, PR_IBP, CPP, PDP, PCWP, T1 to T8, Tb, PI, PI-2, PVI, PVI-2, SpCO, SpCO_2, SpMet, SpMet_2, SpHb, SpHb_2, EtCO ₂ , InspCO ₂ , APNEA, RR_IMP, RR_GAS, RR_VENT, O ₂ -E, O ₂ -I, N ₂ O-E, N ₂ O-I, AGT-E, AGT-I, AGT2-E, AGT2-I, E-TV, I-TV, E-MV, P-PEAK, PEEP, P-MEAN (Vigilance) SvO ₂ , ScvO ₂ , B-Temp, CCO, CCI (Ventilator) E-TV, I-TV, MV, P-PEAK, PEEP, P-MEAN (Other) BIS, SQI, EMG, SR, Lt-rSO ₂ , Rt-rSO ₂ , S1-rSO ₂ , S2-rSO ₂		
	Group A	HR, VPC, ST1, ST2, NIBP_S, NIBP_D, SpO ₂ , PR_SpO ₂ , BP1_S, BP1_D, BP1_M, BP2_S, BP2_D, BP2_M, EtCO ₂ , RR_GAS, RR_IMP, APNEA, T1, T2	No Change
	Group B	HR, VPC, ST(I), ST(II), ST(III), ST(aVR), ST(aVL), ST(aVF), ST(V1), ST(V2), ST(V3), ST(V4), ST(V5), ST(V6)	No Change
	Group C	HR, RR_IMP, RR_GAS, RR_VENT, SpO ₂ , P_PEAK, P_MEAN, P_PEEP, E_TV, I_TV, MV, O ₂ -I, EtCO ₂ , APNEA	No Change
	Group D	SvO ₂ , CCO, CCI, B-TEMP	No Change
	Group E	BIS, SQI, EMG, SR	No Change
	Group F	HR, SpO ₂ , NIBP-S, NIBP-D, NIBP-M, BP1-S, BP1-D, BP1-M, RR_GAS, EtCO ₂ , O ₂ -I, AGT-I	No Change
Filtering [Sampling Interval]	10sec., All	All	Initialize

□ Recall

Item	Detail	Default	Setting at Discharge
Waveform	OFF, ECG1, ECG2, BP1 to BP8, SpO ₂ , SpO ₂ -2, CO ₂ , Alarm	Wave 1: ECG1 Wave 2: OFF	No Change
Display Selection	Asystole, VF, VT, Slow_VT, Run, Bigeminy, Trigeminy, Pause, Couplet, Tachy, Brady, Frequent, HR, ST, NIBP, RR, APNEA, SpO ₂ , PR, SpCO, SpMet, SpHb, SpO ₂ -2, PR-2, SpCO-2, SpMet-2, SpHb-2, PR_IBP, BP1 to BP8, T1 to T8, Tb, CO ₂ , O ₂ , N ₂ O, AGENT, MAC, MV, PEAK, PEEP	Select All	No Change
Recall Factor	Asystole, VF, VT, Slow_VT, Run, Bigeminy, Trigeminy, Pause, Couplet, Tachy, Brady, Frequent, HR, ST, NIBP, RR, APNEA, SpO ₂ , PR, SpCO, SpMet, SpHb, SpO ₂ -2, PR-2, SpCO-2, SpMet-2, SpHb-2, PR_IBP, BP1 to BP8, T1 to T8, Tb, CO ₂ , O ₂ , N ₂ O, AGENT, MAC, MV, PEAK, PEEP	Select All	No Change
List Display	18 waves	18 waves	No Change

Alarm History

Item		Detail	Default	Setting at Discharge
Display Selection	Alarm Level	S, H, M, L, N	Select All	No Change
	Alarm Type	Numeric Data, Arrhy., Equip. Status, Admit/Disch., Other	Select All	No Change

Full Disclosure Waveform

Item	Detail	Default	Setting at Discharge
Compressed Waveform Quantity	1 to 6	0	No Change
Compressed Waveform Parameter	OFF, ECG1, ECG2, ECG (I) to ECG (V6), BP1 to BP8, SpO ₂ , SpO ₂ -2, RESP, AWP, AWF, AWV, CO ₂ , O ₂ , Agent	All OFF	No Change
Enlarged Waveform Quantity	1 to 6	0	No Change
Enlarged Waveform Parameter	OFF, ECG1, ECG2, ECG (I) to ECG (V6), BP1 to BP8, SpO ₂ , SpO ₂ -2, RESP, AWP, AWF, AWV, CO ₂ , O ₂ , Agent	All OFF	No Change
Trend Display	ON, OFF	OFF	No Change
Time per Line	10sec., 30sec., 1min	30 sec.	No Change
Slide Show Interval	3sec., 5sec., 10sec., 20sec., 30sec.	10 sec.	No Change
Enlarged Waveform Scroll Interval	1sec., 5sec., 10sec.	1sec.	No Change
Size of ECG1, ECG2, ECG (I) to (V6)	x1/4, x1/2, x1, x2, x4	x1 for all waveforms	No Change
BP Scale	20, 50, 75, 100, 150, 200, 250, 300 mmHg 4, 8, 12, 16, 20, 24, 32, 40kPa	200 mmHg 24.3kPa	No Change
SpO ₂ Size	x1/4, x1/2, x1, x2, x4	x1 for all waveforms	No Change
RESP Size	x1/4, x1/2, x1, x2, x4	x1 for all waveforms	No Change
CO ₂ Scale	0-50, 0-100mmHg, 0-4, 0-8, 0-10kPa, 0-4, 0-8, 0-10%	0-100mmHg 0-8kPa 0-8%	No Change
O ₂ Scale	18-30, 18-60, 18-100, 0-30, 0-60, 0-100%	18-30%	No Change
Agent Scale	0-4, 0-8, 0-16%	0-4%	No Change
AWP Scale	10, 20, 30, 50, 120cmH ₂ O	50cmH ₂ O	No Change
AWF Scale	±5, ±10, ±20, ±50, ±180L/min	±50L/min	No Change
AWV Scale	50, 250, 500, 1000, 3000mL	500mL	No Change

Basic Setup for Individual Bed Display

Display Configuration

All Beds

Item	Detail	Default	Setting at Discharge
Layout	Display Pattern (Size) Standard (Position) Right (Size) Standard (Position) Right&Bottom (Size) Large (Position) Right (Size) Large (Position) Right&Bottom (Size) 12-Lead (Position) Right (Size) 12-Lead (Position) Right&Bottom Large (Bottom 1 row) Large (Bottom 2 rows)	Large (Bottom 2 rows)	No Change
	Numeric Data Box Right Layout, Left Layout	Right Layout	
Measurement Selection	OFF, HR, PR_SpO ₂ , PR_SpO ₂ _2, PR_IBP, [VPC,PACE], [ST,VPC], ST-A, ST-B, ST-C, BP1 to BP8, NIBP, NIBP List, SpO ₂ , SpO ₂ _2, SpCO, SpCO_2, SpMet, SpMet_2, SpHb, SpHb_2, [SpO ₂ , PR_SpO ₂], [SpO ₂ _2, PR_SpO ₂ _2], RR_IMP, RR_GAS, RR_VENT, T1 to T8, Tb, [T1,T2], [T3,T4], [T5,T6], [T7,T8], VENT, [SvO ₂ , CO], BIS, INVOS, CO ₂ , O ₂ , N ₂ O, Agent, [RR, CO ₂ , Agent, O ₂ , N ₂ O], [CO ₂ ,Agent,O ₂ ,N ₂ O], [RR,Agent,O ₂ ,N ₂ O], [Agent,O ₂ ,N ₂ O], SPIRO, [GAS,SPIRO]	HR, SpO ₂ , RESP, BP1, NIBP, CO ₂	No Change
Waveform Selection	OFF, ECG1 to ECG12, ECG 1 Cascade to ECG12 Cascade, BP1 to BP8, BP Overlap 1, BP Overlap 2, BP Overlap 3, SpO ₂ , SpO ₂ -2, RESP, AWF, AWP, AWV, CO ₂ , O ₂ , Agent, Block Cascade, RR Overlap 1, RR Overlap 2, RR Overlap 3	ECG1, SpO ₂ , BP1, RESP, CO ₂	No Change
User Key	OFF, Home, Menu, User Key Up/Down, Alarm Silence, Alarm Suspend, NIBP Start/Stop, Print Start/Stop, Monitor Suspend, Freeze, Admit/Discharge, Scale, Trend, Tabular Trend, NIBP List, Recall, Full Disc. Wave, NIBP Auto Mode, Alarm Setup (All), Alarm Setup (Basic), Display Config., Print (LBP) Cancel, Print Settings, Color, Nurse Call Setup, Full Disc. Wave (To Save), Data Server Output Setup, Parameter ON/OFF	Page 1 1: Menu 2: Alarm Silence 3: Admit/Discharge 4: Trend 5: Tabular Trend 6: Recall 7: Full Disc. Wave 8: Alarm Setup (Basic) 9: Print Start/Stop 10: Home Page 2 1: Menu 2: Alarm Silence 3 to 8: OFF 9: Print Start/Stop 10: Home	No Change

Detail Setup

Item	Detail	Default	Setting at Discharge
Alarm Limit Display	OFF, Numeric, Graph	Graph	No Change
At Alarm Occurrence	Reversed, 3D	Reversed	No Change
Grid	OFF, Standard, Bold	Standard	No Change
Scale	ON, Bold1, Bold2	ON	No Change
Thickness	Thin, Regular, Thick	Regular	No Change
Clip	ON, OFF	ON	No Change
Fill CO ₂ Waveform	ON, OFF	ON	No Change

Detail Setup

Item	Detail	Default	Setting at Discharge
Fill O ₂ Waveform	ON, OFF	OFF	No Change
Fill Agent Waveform	ON, OFF	OFF	No Change
BP Overlap	BP1 to BP8	BP Overlap 1: BP1, BP2, BP3, BP4 BP Overlap 2: no selection BP Overlap 3: no selection	No Change
RR Overlap	CO ₂ , O ₂ , Agent	RR Overlap 1: CO ₂ , O ₂ , Agent RR Overlap 2: no selection RR Overlap 3: no selection	No Change
ST Wave	Ref., OFF	Ref.	No Change
ST/VPC/Arrhy. Alarm Display	ON, OFF	ON	No Change
Block Cascade	Wave Quantity	2, 3, 4, 5, 6	2
	Waveform	OFF, ECG1 to 12, BP1 to BP8, SpO ₂ , SpO ₂ -2, RESP, AWP, AWF, AWV, CO ₂ , O ₂ , AGENT	Wave 1: ECG1 Wave 2: ECG2 Wave 3 to 6: OFF

Menu (Central Monitor Display)

Functions

All Beds Alarm Settings

Item	Detail	Default	Setting at Discharge
Alarm Items	Basic, Circ., Resp/Gas, Arrhy., ST, List, Priority (Top), Priority (High), Priority (Med.), Priority (Low)	Basic	No Change
Highlight	Alarm ON, Alarm OFF, Nurse Call ON, Nurse Call OFF, OFF	OFF	No Change

All Beds Events

Item	Detail	Default	Setting at Discharge
Event A	[Arrhythmia] Asystole, VF, VT, Slow VT, Run, Bigeminy, Trigeminy, Pause, Couplet, Tachy, Brady, Frequent [Numeric Data] HR, ST, NIBP, RR, APNEA, SpO ₂ , PR, SpCO, SpMet, SpHb, SpO ₂ -2, PR-2, SpCO-2, SpMet-2, SpHb-2, PR_IBP, BP1-BP8, T1-T8, Tb, CO ₂ , O ₂ , N ₂ O, ISO, HAL, ENF, SEV, DES, MAC, MV, PEAK, PEEP [Other] Ventilator, Too Far, Lead OFF, SpO ₂ Check Sensor	Line 1: HR Line 2: Asystole Line 3: VF Line 4: VT	No Change
Event B		Line 1: HR Line 2: SpO ₂ Line 3: NIBP Line 4: BP1	No Change
Event C		Line 1: RR Line 2: APNEA Line 3: CO ₂ Line 4: OFF	No Change
Event D		Line 1: Chk Electrode Line 2: SpO ₂ Sensor Chk Line 3: OFF Line 4: OFF	No Change

Each Bed Setup

Print Settings

Manual Printing

Item	Detail	Default	Setting at Discharge
Waveform	ECG1, ECG2, BP1 to 8, SpO ₂ , SpO ₂ -2, RESP, CO ₂ , O ₂ , AGENT, AWF, AWP, AWV	ECG1	No Change
Print Duration	12 sec., 24 sec., Cont.	24 sec.	No Change
Delay Time	None, 8sec., 16 sec.	8 sec.	No Change

Alarm Printing

Item	Detail	Default	Setting at Discharge
Mode	ON, OFF	OFF	No Change
Factor	Alarm for each arrhythmia, parameter	Selection: HR, Asystole, VF, VT, Slow VT, Run, Tachy, Brady	No Change
Waveform	ECG1, ECG2, BP1 to 8, SpO ₂ , SpO ₂ -2, RESP, CO ₂ , O ₂ , Agent, AWF, AWP, Alarm	Selection: ECG1	No Change
Print Duration	12 sec, 24 sec.	12 sec.	No Change

Periodic Printing

Item	Detail	Default	Setting at Discharge
Print Settings	Printer, Recall, OFF	OFF	No Change
Printing Mode	Interval, Timer	Interval	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	All OFF	No Change
Waveform	ECG1, ECG2, BP1 to 8, SpO ₂ , SpO ₂ -2, RESP, CO ₂ , O ₂ , Agent, AWF, AWP, AWV	Selection: ECG1	No Change
Print Duration	6 sec., 12 sec., 24 sec.	12 sec.	No Change

12-Lead Printing Setup

Item	Detail	Default	Setting at Discharge
Printing Format	3 Waves x 4, 3 Waves x 4 + Rhy., 6 Waves x 2, 12 Waves, 2 Waves x 6	3 Waves x 4	No Change
Position	Center, Proportional, OFF	OFF	No Change
Wave Format	Regular, Reverse	Regular	No Change
Printer Auto Scale	ON, OFF	OFF	No Change
Print Calibration	ON, OFF	OFF	No Change
Lead Boundary	ON, OFF	OFF	No Change

Printer

Item	Detail	Default	Setting at Discharge
Graphic Trend	Recorder Unit, Laser Printer	Recorder Unit	No Change
Tabular Trend		Recorder Unit	No Change
Recall Enlarged Waveform		Recorder Unit	No Change
Full Disc. Compressed Wave		Recorder Unit	No Change
Full Disc. Zoom Wave		Recorder Unit	No Change
12-Lead Waveform		Recorder Unit	No Change

Color Setup

Item	Detail	Default	Setting at Discharge
Palette	Light, Clear, Deep, Vivid	Vivid	No Change

Item	Detail	Default	Setting at Discharge
HR	Red (1), Orange (2), Orange (3), Yellow (4), Yellow (5), Green (6), Peppermint (7), Cyan (8), Blue (9), Violet (10), Magenta (11), Pink (12), White (13)	Green (6)	No Change
ST		Green (6)	No Change
VPC		White (13)	No Change
PACE		White (13)	No Change
NIBP		Cyan (8)	No Change
SpO ₂ /SpCO/SpMet/SpHb SpO ₂ -2/SpCO-2/SpMet-2/SpHb-2		Yellow (4)	No Change
CO ₂		Cyan (8)	No Change
RESP		White (13)	No Change
BP1		Red (1)	No Change
ART		Red (1)	No Change
PAP		Yellow (4)	No Change
CVP		Cyan (8)	No Change
ICP		Peppermint (7)	No Change
IAP		Pink (12)	No Change
LVP		Orange (2)	No Change
LAP		Green (6)	No Change
RAP		Magenta (11)	No Change
UAP		Blue (9)	No Change
RVP		Peppermint (7)	No Change
US1 to US5 (BP)		White (13)	No Change
BP2		Cyan (8)	No Change
BP3		Yellow (4)	No Change
BP4		Green (6)	No Change
BP5		Orange (2)	No Change
BP6		Pink (12)	No Change
BP7		Blue (9)	No Change
BP8		Peppermint (7)	No Change
TEMP1 to 8, Tb		Orange (2)	No Change
Tsk, Tre, Tes, Tco, US1 to US7		Orange (2)	No Change
AWF		Green (6)	No Change
AWP		Yellow (4)	No Change
AWV		Cyan (8)	No Change
BIS		White (13)	No Change
INVOS		White (13)	No Change
SvO ₂ , CO		White (13)	No Change
MV+CO		White (13)	No Change
Patient Name		White (13)	No Change

Nurse Call Setup

Item		Detail	Default	Setting at Discharge
Nurse Call		ON, OFF	OFF	Admit Setup
Nurse Call Factor	(Arrhythmia) Asystole, VF, VT, Slow VT, Run, Couplet, Pause, Bigeminy, Trigeminy, Frequent, Tachy, Brady (Numeric Data) HR, ST1 to 2, 12ST, RR, APNEA, SpO ₂ , SpO ₂ _2, PR_SpO ₂ , PR_SpO ₂ _2, SpMet, SpMet_2, SpCO, SpCO_2, SpHb, SpHb_2, NIBP, BP1 to BP8, PR_IBP, EtCO ₂ , InspCO ₂ , T1 to T8, MV, PEAK, PEEP (Other) Ventilator, Too Far, Check Lead	ON, OFF	All OFF	Admit Setup
When Nurse Call Factor Setup is ON	Alarm Duration Before Notification	None, None (Noise OFF), 5 sec., 10 sec., 15 sec., 20 sec., 30 sec.		

Full Disclosure Waveform

Item		Detail	Default	Setting at Discharge
Waveforms to Save	ECG1, ECG2, ECG (I) to ECG (V6) , BP1 to BP8, SpO ₂ , SpO ₂ _2, RESP, AWP, AWF, AWV, CO ₂ , O ₂ , AGENT	user selection	no selection	No Change

Data Server Waveform

Item	Detail	Default	Setting at Discharge
Waveform Selection	OFF, ECG1, ECG2, SpO ₂ , SpO ₂ -2, RESP, BP1 to BP8, AWF, AWP, AWV, Agent, CO ₂ , O ₂	OFF	No Change

Parameter ON/OFF

Item	Detail	Default	Setting at Discharge
ECG, BP1 to BP8, NIBP, SpO ₂ 1, SpO ₂ -2, RESP, CO ₂ , T1 to 8, SvO ₂ /CCO, GAS, BIS, INVOS, SPIRO, VENT	ON, OFF	ON	Admit Setup

Common Setup

Display Configuration

All Beds

Item	Detail		Default
Layout Selection	Selection from registered layouts		-
32 Beds Display	-		OFF
Center Split	ON, OFF		ON
Layout Change	(1 bed) [16waves x 1bed] (2 beds) [8waves x 1bed, 4waves x 1bed], [10waves x 1bed, 6waves x 1bed], [8waves x 2beds] (3 beds) [12waves x 1bed, 2waves x 2beds], [8waves x 1bed, 4waves x 2beds], [6waves x 2beds, 4waves x 1bed] (4 beds) [10waves x 1bed, 2waves x 3beds], [6waves x 2beds, 2waves x 2beds], [4waves x 4beds] (5 beds) [8waves x 1bed, 2waves x 4beds], [5waves x 2beds, 2waves x 3beds], [4waves x 3beds, 2waves x 2beds] (6 beds) [6waves x 1bed, 2waves x 5beds], [4waves x 2beds, 2waves x 4beds] (7 beds) [4waves x 1bed, 2waves x 6beds] (8 beds) [2waves x 8beds]		Left: 4 beds 4waves x 4beds Right: 4 beds 4waves x 4beds
Bed Selection	Registered Beds, OFF	Selection from registered beds	None
Other Setup	Numeric Data Box	1, 2, 4, 8	2
	Zoom Numeric Data	All Beds, Each Bed	All Beds
Layout Registration	Quantity of beds (left, right), etc.		1. 8 beds display (left 2, right 6) 2. 7 beds display (left 3, right 4) 3. 16 beds display (left 8, right 8) 4 to 10: not registered

Each Bed

Item	Detail	Default
Numeric Data	OFF, HR, PR_SpO ₂ , PR_SpO ₂ -2, PR_IBP, [VPC,PACE], [ST,VPC], ST-A to C, BP1 to 8, NIBP, NIBP List, SpO ₂ , SpO ₂ -2, SpCO, SpCO-2, SpMet, SpMet-2, SpHb, SpHb-2, [SpO ₂ ,PR_SpO ₂], [SpO ₂ -2, PR_SpO ₂ -2], RR_IMP, RR_GAS, RR_VENT, T1 to 8, [T1, T2], [T3, T4], [T5, T6], [T7, T8], VENT, [SvO ₂ ,CO], BIS, CO ₂ , O ₂ , N ₂ O, Agent, [RR,CO ₂ ,Agent,O ₂ ,N ₂ O], [CO ₂ ,Agent,O ₂ ,N ₂ O], [RR,Agent,O ₂ ,N ₂ O], [Agent,O ₂ ,N ₂ O], [Agent,N ₂ O], [GAS,SPIRO], SPIRO	HR, NIBP, [SpO ₂ ,PR_SpO ₂], RR_IMP
Waveform	OFF, ECG1 to 12, ECG1 to 12 cascade, BP1 to 8, BP Overlap 1 to 3, SpO ₂ -1, SpO ₂ -2, RESP, AWF, AWP, AWV, CO ₂ , O ₂ , Agent, RR Overlap 1 to 3, Patient Name	ECG1, ECG2, SpO ₂ , RESP

Detail Setup

Item	Detail	Default
Patient Name/ Bed Name	Patient Data Area	Name, Bed Name, OFF
	Waveform Area	Name, Bed Name, OFF
		Large Size, Standard Size
Numeric Data	ST/VPC/Arrhy.Alarm Display	ON, OFF

Detail Setup

Item	Detail	Default
Alarm Limit Display	Graph, Numeric, OFF	Graph
	Reversed, 3D	Reversed
Display Priority	OFF, HR, PR_SpO ₂ , PR_SpO ₂ -2, PR_IBP, [VPC,PACE], [ST,VPC], ST-A to C, BP1 to 8, NIBP, NIBP List, SpO ₂ , SpO ₂ -2, SpCO, SpCO-2, SpMet, SpMet-2, SpHb, SpHb-2, [SpO ₂ ,PR_SpO ₂], [SpO ₂ -2, PR_SpO ₂ -2], RR_IMP, RR_GAS, RR_VENT, T1 to 8, [T1, T2], [T3, T4], [T5, T6], [T7, T8], VENT, [SvO ₂ ,CO], BIS, CO ₂ , O ₂ , N ₂ O, Agent, [RR,CO ₂ ,Agent,O ₂ ,N ₂ O], [CO ₂ ,Agent,O ₂ ,N ₂ O], [RR,Agent,O ₂ ,N ₂ O], [Agent,O ₂ ,N ₂ O], [Agent,N ₂ O], [GAS,SPIRO], SPIRO	1.HR 2.BP1 3.BP2 4.SpO ₂ , PR_SpO ₂ 5.NIBP 6.CO ₂ 7.PR_IMP 8.T1, T2 9-72. no selection
Wave Select	Circulatory [mm/s]	12.5, 25
	Respiratory [mm/s]	6.25, 12.5, 25
	Grid	Standard, Bold, OFF
	Scale	ON, Bold1, Bold2
	Thickness	Regular, Thin, Thick
	Wave Clip	ON, OFF
	Fill CO ₂ Waveform	ON, OFF
	Fill O ₂ Waveform	ON, OFF
	Fill Agent Waveform	ON, OFF
	BP Overlap	BP1 to 8 BP Overlap1: BP1 to 4 BP Overlap 2: no selection BP Overlap 3: no selection
RR Overlap	CO ₂ , O ₂ , Agent	RR Overlap1: CO ₂ , O ₂ , Agent RR Overlap 2: no selection RR Overlap 3: no selection
	Display Priority	ECG1 to 12, BP1 to 8, BP Overlap 1 to 3, SpO ₂ , SpO ₂ -2, RESP, AWF, AWP, AWV, CO ₂ , O ₂ , AGENT, RR Overlap 1 to 3, Patient Name 1.ECG1 2.ECG2 3.BP1 4.BP2 5.SpO ₂ 6.CO ₂ 7.RESP 8-48. no selection

 Tone/Volume

Item	Detail		Default
Vital Alarm	Urgent, Caution	Volume: 11 levels	4
		Tone: 5 types*	2
	Status	Volume: 11 levels	4
		Tone: 4 type*	2
Ventilator Alarm	Volume: 11 levels		4
	Tone: 1 type		1
Status Alarm	Urgent, Caution, Status	Volume: 11 levels	4
		Tone: 1 type*	2

Item	Detail	Default
Sync. Tone	Volume: 11 levels	2
	Tone: 5 types	1
Key Sound	Volume: 11 levels	4
	Tone: 3 types	1
Other	Volume: 11 levels	4
	Tone: 1 type	1
Boot Sound / Shutdown Sound	Volume: 11 levels	2
	Tone: 3 types	1

* When [Fukuda Tone] is selected for "Alarm System", the tone can be selected from 8 levels.

Brightness

Item	Detail	Default
Brightness	7 levels	Third Level

Monitor Suspend Setup

Item	Detail	Default
Monitor Suspend's Message Selection	ON, OFF	OFF
Monitor Suspend Time	ON, OFF	OFF
Label 1	ON/OFF	Blank
Label 2	Label: Max. 14 characters Color: 16 colors	Blank
Label 3		Blank
Label 4		Blank
Label 5		Blank
Label 6		Blank
Label 7 to 15		OFF

Nurse Team Setup

Item	Detail	Default
Team 1	ON/OFF	ON, Red
Team 2	Label: Max. 14 characters Color: 8 colors	ON, Orange
Team 3		ON, Yellow
Team 4		ON, Yellow-green
Team 5		ON, Green
Team 6		ON, Light Blue
Team 7		ON, Blue
Team 8		ON, Purple

Chapter 15 Accessories

Accessories	15-1
Optional Accessories	15-1

Chapter 15 Accessories

Accessories

This section lists the accessories for the DS-8900 system.

CAUTION

- ♦ Use only the spare parts specified for this equipment. Otherwise, proper function cannot be executed.
- ♦ For quality improvement, specifications are subject to change without prior notice.

- ♦ Power Cable: CS-24 (3m)
- ♦ DS-8900 System Operation Manual (This Manual)
- ♦ DS-8900 System Maintenance Manual
- ♦ Parts Replacement Label
- ♦ DS-LAN Cable Retainer
- ♦ Screw (Double Washer Sems M3x8): For attaching the DS-LAN cable retainer

REFERENCE

- ♦ For procedure to use the DS-LAN cable retainer, refer to  Maintenance Manual "Connection Procedure" P2-3.

Optional Accessories

The following products are available as optional accessories for the DS-8900 system.

Purchase them as required.

CAUTION

- ♦ Use only the spare parts specified for this equipment. Otherwise, proper function cannot be executed.
- ♦ For quality improvement, specifications are subject to change without prior notice.

□ Recorder Unit

Item	Model Type	Note
Recorder Unit	HR-800	Used with roll type thermal paper (50mm width).
Thermal Paper (Roll Type)	OP050-01TDR	50mm width
Unit Connection Cable	CJO-09SS0.3	For connecting the Recorder Unit (0.3m)
Unit Connection Cable	CJO-09SS1.5	For connecting the Recorder Unit (1.5m)

□ DS-LAN Network

Item	Model Type	Note
Ethernet Branch Cable	CJ-522A	Length 1m (For HUB connection)
Ethernet Branch Cable	CJ-522B	Length 2m (For HUB connection)
Ethernet Branch Cable	CJ-522C	Length 4m (For HUB connection)
Ethernet Branch Cable	CJ-522D	Length 10m (For HUB connection)
Ethernet Branch Cable	CJ-522E	Length 20m (For HUB connection)
Connection Cable	CJ-530A	Length: 2.5m (For direct connection to equipments)
Connection Cable	CJ-530B	Length: 5m (For direct connection to equipments)
Connection Cable	CJ-530C	Length: 10m (For direct connection to equipments)
Ethernet HUB	-	For DS-LANIII network. Use the recommended product.

□ TCON System

Item	Model Type	Note
Bidirectional Wireless Communications Module	HTC-702	
HTC Holder	OAO-79A	

□ CF Card (For Data Transfer)

Item	Model Type	Note
CF Card	FCF-128	128MByte
CF Card	FCF-1000	1GByte

□ Supplementary Device

Item	Model Type	Note
Mouse	-	Use the product recommended by Fukuda Denshi.
Keyboard	-	Use the product recommended by Fukuda Denshi.
Remote Control Unit	CF-820	

□ External Equipment Connection

Item	Model Type	Note
General RS232 Serial Cable	CJ-725	Serial Communication (Cross)
Relay Cable (Straight)	CJ-726	Serial Communication (Straight)
Network Cable	CJO-17SS2.5	TCP/IP Network Connection (Cross)
Connection Cable	CJ-502	Nurse Call System Connection (Cross)

❑ Extended Display Unit

Item	Model Type	Note
Extended Display Unit	LC-8026T	26-inch LCD Touch Panel

❑ Other Setup

Item	Model Type	Note
Ground Cable	CE-01A	Clip Type
Ground Cable	CE-11	DIN Type
Fixing Bracket	OAO-80A	
DynaBase Software	CVW-6000	For data storage and remote viewing of the data

Chapter 16 Specification

Specification/Performance.....	16-1
Specification	16-1
Performance	16-2
Measurement Unit for Each Parameter	16-3
External Connection	16-4
RS-232C Connector Output Signal (Serial Connector)	16-4
Technical Information	16-5
Settings for Each Alarm System.....	16-5
Alarm Limit Range for Each Parameter.....	16-6
Arrhythmia Type	16-8
Numeric Data Box Size Range.....	16-8

Chapter 16 Specification

Specification/Performance

This section states the specification and performance of this equipment.

Specification

Size 650±30 (W) x242±30 (D) x467±30 (H) mm (not including the protrusion)

Weight (not including the accessory) 18±1kg

Environmental Conditions

Operating Environment

Surrounding Temperature	10 to 40°C
Relative Humidity	30 to 85 % (non-condensing)
Atmospheric Pressure	800 to 1060hPa

Transport/Storage Environment

Surrounding Temperature	-10 to 60°C
Relative Humidity	10 to 95 % (non-condensing)
Atmospheric Pressure	800 to 1060hPa

Safety

General Standard

ANSI/AAMI ES60601-1: 2005 and A1: 2012
(Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance (IEC 60601-1: 2005, mod.))

EMC Standard

IEC 60601-1-2: 2007 (Medical Electrical Equipment - Part 1: General Requirements for Safety - 2. Collateral Standard: Electromagnetic Compatibility - Requirements and Tests)

Type of protection against electric shock

Class I Equipment

The degree of protection against ingress of water

IPX0 (no protection)

Protection against Ignition of Flammable Gas

Not provided

Operation Mode

Continuous Operating Equipment

Power Supply

Voltage

AC 100-240V

Frequency

50/60 Hz

Power Consumption

90 VA and below

Usable Life

6 years

According to self-certification.

(☞ Maintenance Manual "Periodic Replacement" P8-1)

Performance

Display

Display Element	26 inch wide (diagonal) color LCD
Resolution	1920×1080 dot (Full HD)
Waveform Trace	Stationary Trace
Touch Panel	Resistive Touch Panel
Fixed Keys	2 fixed keys (Home, Alarm Silence)
Displayed Parameter	ECG, RESP, TEMP, SpO ₂ -1/SpO ₂ -2 (Arterial Oxygen Saturation), Pulse Rate, BP1-8, NIBP, CO ₂ concentration, O ₂ concentration, N ₂ O concentration, AGENT, SvO ₂ (Mixed Venous Oxygen Saturation), CCO (Continuous Cardiac Output), CCI (Continuous Cardiac Index), BT (Blood Temperature), SpCO (Carboxyhemoglobin Concentration), SpMet (Methemoglobin Concentration), SpHb (Total Hemoglobin Concentration), MVe (Expiratory Minute Volume), TVe (Expiratory Tidal Volume), TVi (Inspiratory Tidal Volume), PEAK (Peak Airway Pressure), PEEP (Peak End Expiratory Pressure), MEAN (Mean Airway Pressure), ScvO ₂ (Central Venous Oxygen Saturation), rSO ₂ (Regional oxygen saturation), BIS
Waveform	ECG, RESP, BP, SpO ₂ -1/SpO ₂ -2 (Arterial Oxygen Saturation), CO ₂ concentration, O ₂ concentration, AGENT (anesthetic gas concentration), AWP (Airway Pressure), AWF (Airway Flow), AWV (Airway Volume)
Sweep Speed	ECG, SpO ₂ -1/SpO ₂ -2, BP: 12.5, 25 mm/sec. RESP, CO ₂ , O ₂ , AGENT, AWP, AWF, AWV: 6.25, 12.5, 25 mm/sec.
Network Configuration	DS-LAN III Network, TCON System
Alarm Function	Alarm Sound Pressure: Maximum: 81.7dB, Minimum: 45.4dB (Standard Tone) HR Synchronized Tone Sound Pressure: Maximum: 83.3dB, Minimum: 32.0dB SpO ₂ Synchronized Tone Sound Pressure: Maximum 81.0dB, Minimum 29.0dB

CAUTION

- The parameters that can be monitored on this equipment differs depending on the bedside monitor, transmitter, and software version.
- The DS-LAN II network cannot be used.

NOTE

- The sound rhythm for the synchronized tone (HR, SpO₂) is different with that of the alarm sound. Changing the tone and volume will also allow to distinguish the synchronized tone with the alarm sound.

Measurement Unit for Each Parameter

The measurement units of the parameters for this equipment are as follows.

Parameter	Details	Display	Unit (Default unit is underlined.)
ECG	HR	HR	bpm (beats per minute)
	ST Level	ST1/ST2	mm/mV
	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/mV
Respiration	Respiration Rate	RR (RESP)	Bpm (breaths per minute)
	Apnea	APNEA	s (second)
BP	Blood Pressure 1 to 8	BP1 to 8	mmHg/kPa
	Central Venous Pressure	CVP	mmHg/cmH ₂ O*
Non-Invasive Blood Pressure	Non-Invasive Blood Pressure	NIBP	mmHg/Pa
SpO ₂	Arterial Oxygen Saturation	SpO ₂ , SpO ₂ -2	%
	Pulse Rate	PR, PR-2	bpm (beats per minute)
	Carboxyhemoglobin Concentration	SpCO, SpCO-2	%
	Methemoglobin Concentration	SpMet, SpMet-2	%
	Total Hemoglobin Concentration	SpHb, SpHb-2	g/dL
Temperature	TEMP 1 to 8	T1 to 8	°C/°F
CO ₂ Concentration	End Tidal CO ₂ Concentration	EtCO ₂	mmHg / kPa / %
	Inspiratory CO ₂ Concentration	InspCO ₂	mmHg / kPa / %
Gas Data	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	%
Airway Pressure	Peak Airway Pressure	PEAK	cmH ₂ O
	Mean Airway Pressure	MEAN	cmH ₂ O
Peak End Expiratory Pressure	Peak End Expiratory Pressure	PEEP	cmH ₂ O

Parameter	Details	Display	Unit (Default unit is underlined.)
Ventilatory Volume	Expiratory Minute Ventilation Volume	MVe	L/min
	Expiratory Tidal Volume	TVe	L/min
	Inspiratory Tidal Volume	TVi	L/min
Oximeter Data	Mixed Venous Oxygen Saturation	SvO ₂	%
	Central Venous Oxygen Saturation	ScvO ₂	%
	Continuous Cardiac Output	CCO	L/minute
	Continuous Cardiac Index	CCI	L/minute/m ²
	Blood Temperature	BT	°C
BIS Monitor Data	Bispectral Index	BIS	(no unit)
	Signal Quality Index	SQI	%
	Electromyograph	EMG	dB
	Suppression Ratio	SR	%
INVOS 5100C Monitor Data	Regional Cerebral Oxygen Saturation	Lt-rSO ₂ , Rt-rSO ₂ , S1-rSO ₂ , S2-rSO ₂	%

*: 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.

External Connection

This section lists the connector pin assignments.

RS-232C Connector Output Signal (Serial Connector)

□COM1 to COM4 Connector

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

Technical Information

Settings for Each Alarm System

Alarm Operation	Fukuda Tone (1) Tone 1 to 4 (2) Tone 5 to 8	Melodic Tone	Standard Tone
Vital Alarm Sound			
Level H	(1) Continuous melodic tone (2) Continuous rapid tone	ECG: Continuous melodic tone with rising pitch SpO ₂ , O ₂ : Continuous melodic tone with falling pitch CO ₂ : Continuous melodic tone with mixed low and high pitch Other than above: Continuous melodic tone	Continuous tone
Level M	(1) Alternate high and low pitch in 5 seconds interval (2) Rapid tone in 5 seconds interval	ECG: Rising pitch in 4 seconds interval melodic tone SpO ₂ , O ₂ : Falling pitch in 4 seconds interval melodic tone CO ₂ : Mixed low and high pitch sound in 4 seconds interval melodic tone Other than above: 4 seconds interval melodic tone	4 seconds interval tone
Level L	(1) 15 seconds interval melodic tone (2) 15 seconds interval tone	17 seconds interval melodic tone	17 seconds interval tone
Equipment Status Alarm Sound			
Level H	(1) Continuous melodic tone (2) Continuous rapid tone	Continuous melodic tone	Continuous tone
Level M	(1) Alternate high and low pitch in 5 seconds interval (2) Rapid tone in 5 seconds interval	4 seconds interval melodic tone	4 seconds interval tone
Level L	(1) 15 seconds interval melodic tone (2) 15 seconds interval tone	17 seconds interval tone	17 seconds interval tone
Volume Setup			
Level H, M, L	The volume for low level alarm cannot be set higher than the higher level alarm.		
Tone Setup			
Level H	Vital Alarm: Setup can be performed. Equipment Status Alarm: Setup can be performed.	Vital Alarm: Setup can be performed. Equipment Status Alarm: Setup cannot be changed.	
Level M			
Level L			
Setup other than above			
Ventilator Alarm Sound	Sound: Continuous tone Tone: Cannot be changed. Volume: Can be adjusted.	Sound: Continuous melodic tone Tone: Cannot be changed. Volume: Can be adjusted.	Continuous tone

Alarm Limit Range for Each Parameter

The alarm limit for the bedside monitor and central telemetry receiver can be set in the following range.

Item	Alarm Limit Range		[Auto] Setting *	
	Lower Limit	Upper Limit		
	Adjustable Increments			
HR	20 to 295bpm	22 to 300bpm	Upper: current value +40bpm Lower: current value -40bpm	
	25bpm or lower: 1bpm increments 25bpm or above: 5bpm increments			
ST 12-Lead ST	-2.0 to +1.8mV	-1.8 to +2.0mV	Upper: current value +0.2mV (+2mm) Lower: current value -0.2mV (-2mm)	
	0.1mV increments			
	-20 to +18mm	-18 to +20mm		
	1mm increments			
RR (Adult)	5 to 145Bpm	10 to 150Bpm	Upper: current value +20Bpm Lower: current value -20Bpm	
	5Bpm increments			
RR (Child/Neonate)	0 to 148Bpm	4 to 150Bpm	Upper: current value +20Bpm Lower: current value -20Bpm	
	2Bpm increments			
APNEA	-	10 to 60 sec.	15 sec.	
	1 sec. increments			
BP1 to 8	0 to 295mmHg	2 to 300mmHg	When BP label is BP1/ART: Upper: current value +40mmHg (+5.0kPa) Lower: current value -20mmHg (-3.0kPa) When BP label is other than BP1/ART: Upper: current value +20% Lower: current value -20%	
	0 to 50mmHg: 2mmHg increments 50mmHg or above: 5mmHg increments			
	0.0 to 39.5kPa	0.2 to 40.0kPa		
	0 to 7.0kPa: 0.2kPa increments 7.0kPa or above: 0.5kPa increments			
CVP	0.0 to 38cmH ₂ O	2 to 40cmH ₂ O	Upper: current value +40mmHg (+5.0kPa) Lower: current value -20mmHg (-3.0kPa)	
	1cmH ₂ O increments			
NIBP	10 to 295mmHg	15 to 300mmHg	Upper: current value +40mmHg (+5.0kPa) Lower: current value -20mmHg (-3.0kPa)	
	5mmHg increments			
	1.6 to 39.5kPa	1.8 to 40.0kPa		
	0.5kPa increments			
SpO ₂ /SpO ₂ -2	50 to 99%	51 to 100%	Upper: OFF Lower: 90%	
	1% increments			
PR/PR-2	20 to 295bpm	22 to 300bpm	Upper: current value +40bpm Lower: current value -40bpm	
	25bpm or lower: 1bpm increments 25bpm or above: 5bpm increments			
EtCO ₂	1 to 98mmHg	3 to 100mmHg	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 13.3kPa		
	0.1kPa increments			
	0.1 to 13.1%	0.3 to 13.3%		
	0.1% increments			

Item		Alarm Limit Range		[Auto] Setting *	
		Lower Limit	Upper Limit		
		Adjustable Increments			
InspCO ₂		-	1 to 24mmHg	3mmHg (0.3kPa/0.3%)	
		1mmHg increments			
		-	0.3 to 0.4kPa		
		0.1kPa increments			
		-	0.3 to 0.4%		
		0.1% increments			
TEMP		30.0 to 44.0°C	31.0 to 45.0°C	Upper: +2°C (+3°F) Lower: -2°C (-3°F)	
		0.5°C increments			
		86.0 to 111.0°F	88.0 to 113.0°F		
		1.0°F increments			
GAS	O ₂ _E, O ₂ _I	18 to 100%		N/A Depends on the detected gas type.	
		2% increments			
	N ₂ O_E, N ₂ O_I	0 to 100%			
		2% increments			
	ISO	Insp ISO	0.5 to 6.0%		
		Exp ISO	0.5% increments		
	SEV	Insp SEV	0.5 to 8.0%		
		Exp SEV	0.5% increments		
	HAL	Insp HAL	0.5 to 6.0%		
		Exp HAL	0.5% increments		
	ENF	Insp ENF	0.5 to 6.0%		
		Exp ENF	0.5% increments		
	DES	Insp DES	0.5 to 18.0%		
		Exp DES	0.5% increments		
MV _e (Adult)		2.0 to 18.0L/min	4.0 to 20.0L/min	N/A	
		0.5L/min increments			
MV _e (Child/Neonate)		0.5 to 4.5L/min	1.0 to 5.0L/min	N/A	
		0.5L/min increments			
PEAK		8 to 98cmH ₂ O	10 to 100cmH ₂ O	N/A	
		1cmH ₂ O increments			
PEEP		2 to 48cmH ₂ O	4 to 50cmH ₂ O	N/A	
		1cmH ₂ O increments			
SpCO/SpCO-2		-	1 to 40%	N/A	
		1% increments			
SpMet/SpMet-2		-	1 to 15%	N/A	
		1% increments			
SpHb/SpHb-2		1.0 to 24.0g/dL	2.0 to 24.5g/dL	N/A	
		0.1g/dL increments			

*: 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.

Arrhythmia Type

The following 12 types of arrhythmia alarm generated on the bedside monitor and central telemetry receiver can be displayed on this equipment.

⚠ CAUTION

- The arrhythmia detection result differs depending on the model type and software version of the bedside monitor and central telemetry receiver connected to the network.

Arrhythmia	Setting	Detection Criteria (The arrhythmia analysis is performed on the bedside monitor.)
Asystole	ON, OFF 3 to 10 sec., 1 sec. increments	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.* ¹
Slow VT	ON, OFF	9 or more continuous ventricular beats are detected.* ²
Run (Consecutive VPC)	ON, OFF 2 to 8 sec., 1 sec. increments	Continuous VPC exceeding the preprogrammed value (2 to 8 beats) is detected.* ³
Couplet (Couplet Ventricular Extrasystole)	ON, OFF	2 continuous VPC beats are detected.
Pause	ON, OFF 1.5 to 5.0 sec., 0.5 sec. increments	Cardiac arrest exceeding the preprogrammed duration is detected.
Bigeminy (Ventricular Bigeminy)	ON, OFF	QRS pattern of V-x-V-x-V-x is detected.* ⁴
Trigeminy	ON, OFF	QRS pattern of x-x-V-x-x-V is detected.* ⁴
Frequent (Frequent VPC)	ON, OFF 1 to 50 beats/min., 1 sec. increments	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: HR: 140bpm / 120bpm and above

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

*3: HR Lower Limit for RUN (0 to 100bpm)

*4: x indicates N, P, F, ?.

Numeric Data Box Size Range

The adjustable size of the numeric data box depends on the parameter.

Adjustable Size of the Numeric Data Box

Yes: Setup can be performed.

No: Setup cannot be performed.

Parameter	Size						
	W6xH1	W6xH2	W6xH3	W3xH1	W3xH2	W3xH3	W1.5xH1
HR	Yes						
PR_SpO ₂ , PR_SpO ₂ -2	Yes						
PR_IBP	Yes						
VPC, PACE	Yes						

Adjustable Size of the Numeric Data Box		Yes: Setup can be performed.			No: Setup cannot be performed.		
Parameter		Size					
		W6xH1	W6xH2	W6xH3	W3xH1	W3xH2	W3xH3
ST, VPC	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ST-A, ST-B, ST-C	No	Yes	Yes	No	Yes	Yes	Yes
BP1 to BP8	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NIBP	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NIBP List	Yes	Yes	Yes	Yes	Yes	Yes	No
SpO ₂ , SpO ₂ -2	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SpCO, SpCO-2	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SpMet, SpMet-2	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SpHb, SpHb-2	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SpO ₂ , PR_SpO ₂	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SpO ₂ , PR_SpO ₂ -2	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RR_IMP	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RR_GAS	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RR_VENT	Yes	Yes	Yes	Yes	Yes	Yes	Yes
T1 to T8	No	No	No	Yes	Yes	No	Yes
Tb	No	No	No	Yes	Yes	No	Yes
T1,T2	Yes	Yes	Yes	Yes	Yes	Yes	Yes
T3,T4	Yes	Yes	Yes	Yes	Yes	Yes	Yes
T5,T6	Yes	Yes	Yes	Yes	Yes	Yes	Yes
T7,T8	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VENT	No	No	No	No	Yes	Yes	No
SvO ₂ , CO	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BIS	Yes	Yes	Yes	Yes	Yes	Yes	Yes
INVOS	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CO ₂	Yes	Yes	Yes	Yes	Yes	Yes	Yes
O ₂	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N ₂ O	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Agent	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RR, CO ₂ , Agent, O ₂ , N ₂ O	No	Yes	Yes	No	Yes	Yes	No
CO ₂ , Agent, O ₂ , N ₂ O	No	Yes	Yes	No	Yes	Yes	No
RR, Agent, O ₂ , N ₂ O	No	Yes	Yes	No	Yes	Yes	No
Agent, O ₂ , N ₂ O	No	Yes	Yes	No	Yes	Yes	No
Agent, N ₂ O	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SPIRO	No	Yes	Yes	No	Yes	Yes	No
GAS, SPIRO	No	Yes	Yes	No	Yes	Yes	No

Index

<p>Numerics</p> <p>12-Lead ST Waveform 12-8</p> <p>12-lead Waveform Printing 10-6</p> <p>12-lead Waveform Printing Setup 11-7</p> <p>A</p> <p>Accessories 15-1</p> <p>Admit 6-2</p> <p>Admit Date/Time 6-7</p> <p>Admit/Discharge 6-1</p> <p>Alarm Classification 7-2</p> <p>Alarm History 7-19</p> <p>Alarm Indicator 2-2</p> <p>Alarm Level 7-2</p> <p>Alarm Limit Display 12-7, 12-27</p> <p>Alarm Message Display Area 7-3</p> <p>Alarm Printing 7-12, 11-3</p> <p>Alarm Settings List 7-9</p> <p>Alarm Silence 7-13</p> <p>Alarm Silence Key 2-2, 4-1</p> <p>alarm sound 12-29</p> <p>Alarm Sound Suspend 7-15</p> <p>Alarm Suspend 7-13</p> <p>Alarm System 7-2</p> <p>All Beds Alarm Events 7-17</p> <p>All Beds Alarm Settings 7-10</p> <p>Arrhy. Relearn 7-8</p> <p>Arrhythmia</p> <ul style="list-style-type: none"> Analysis 6-3 Arrhythmia Alarm 7-6, 7-7 Asystole 16-8 Bigeminy 16-8 Brady 16-8 Couplet 16-8 Frequent 16-8 Pause 16-8 Run 16-8 Slow VT 16-8 Tachy 16-8 Trigeminy 16-8 Type and Detection Criteria 16-8 VF 16-8 VT 16-8 <p>Arrhythmia Alarm Detail Setup 7-7</p> <p>Asystole 7-9</p> <p>At Alarm Occurrence 12-7</p> <p>Auto Lead 8-10</p> <p>B</p> <p>Backup 14-1</p> <p>Barcode Reader 6-4</p> <p>Battery Cover 2-3</p> <p>Bed Border 12-22</p> <p>Bed Exchange 6-11, 12-9</p> <p>Bed Name 6-3</p>	<p>Bed Selection 12-23</p> <p>Bed Selection Key 3-3</p> <p>Bed Transfer 6-11, 12-9, 12-10</p> <p>BIS Monitor Data 8-24</p> <p>Block Cascade 12-8</p> <p>BP Detail Setup 8-17</p> <p>BP Overlap 12-8</p> <p>C</p> <p>Center Split 12-21</p> <p>Central Monitor Minimize Key 3-4</p> <p>Central Monitor User Key 3-4</p> <p>CF Card Slot 2-3</p> <p>Changing the Quantity of Displayed Numeric Data .. 4-3</p> <p>Clock 3-4</p> <p>Color Setup 12-15</p> <p>Compressed Waveform Printing 10-6</p> <p>Cover for Maintenance 2-3</p> <p>CVA Detect 8-12</p> <p>D</p> <p>Daily Check List 5-5</p> <p>Default 14-1</p> <p>Delete Recall 9-14</p> <p>Discharge 6-12</p> <p>Discharged List 12-13</p> <p>Discharged on EMR 6-9</p> <p>Display Configuration</p> <ul style="list-style-type: none"> All Beds 12-9 Center Split 12-22 Detail Setup 12-7, 12-27 Layout 12-3, 12-21 Layout Change 12-22 Preview Area 12-21, 12-25 <p>Display Priority 12-28, 12-29</p> <p>Divider Function 9-15</p> <p>Divider Mode 9-15</p> <p>DS-LAN Connector 2-3</p> <p>Dual Display 3-11</p> <p>E</p> <p>ECG Detail Setup 8-7</p> <p>ECG related alarms during Lead-Off condition 7-16</p> <p>EMR Communication 3-3</p> <p>EMR link function 6-7</p> <p>EMR notice icon 6-8</p> <p>Enlarge/Reduce the Numeric Data Box Size 4-4</p> <p>Enlarged Waveform Printing 10-6</p> <p>Event Key 3-3, 7-11, 7-16</p> <p>Event List 3-3, 7-11</p> <p>Extended Display Unit 3-11</p> <p>Extended Display Unit Connector 2-3</p> <p>External Equipment Alarm Message 13-7</p> <p>External Equipment Connector 2-3</p> <p>External Monitor Connector 2-3</p>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

F	L
Fill CO ₂ , O ₂ , Agent Waveform 12-8	LAN Connector 2-3
Filter 8-7	Laser Printer 1-1
AC Filter 8-10	Laser Printer Status 3-4
ECG Drift Filter 8-9	Layout Registration 12-22
Fixed Key 4-1	
Floating Window 3-10	M
Full Disclosure Waveform 10-1	Magnetic Card Reader 6-4
Time Search 10-7	Main Power Supply LED 5-1
Waveform Selection 10-1	Main Power Supply Switch 2-2
Full Disclosure Waveform Display 10-3	Manual Printing 11-2
Scroll 10-4	Measurement Status Message 13-5
 G	Menu 3-7
Graphic Remote Printing 11-12	Central Monitor Display 3-8
Graphic Symbols 11-12	Individual Bed Display 3-9
Graphic Symbols of Power Supply ii	Message
Graphic Trend 9-2	Cancel Printing 11-17
Grid Display 12-7, 12-28	Check Cassette 11-16
 H	Check Printer 11-16
Home Display	Chk TLM Receive 7-16
Control Keys, Central Monitor Information Area ... 3-4	LP Com Error 11-17
Control Keys/Central Monitor Information Area 3-6	LP Waiting 11-17
Displayed Items 3-2	Paper Out 11-16
Information Display Area for Each Bed 3-2	Printer Busy 11-16
Parameter 12-25	Minimize Key 3-10
Waveform/Numeric Data Area 3-3	Monitor Suspend 6-10
Home Key 2-2	Resume 6-11
HR synchronized sound 12-29	Monitor Suspend Setup 12-31
 I	Monitor Suspend Time 6-9
I/O Connector 2-3	Monitor Suspend's Message Selection 6-9
Icon	Mouse 4-2
Information Display Area for Each Bed 3-3	Mouse Connector 2-2
Numeric Data Box 3-4	9-16
Waveform Area 3-3	 N
Individual Alarm Silence 7-14	NIBP Auto Mode 8-13
Individual Bed Display	NIBP Detail Setup 8-14
Display Procedure 3-5	Night Mode 12-13
Displayed Items 3-5	Numeric Data
Parameter 12-4	Alarm Limit Range 16-6
Patient Information Display Area 3-5	Numeric Data Alarm 7-4
Waveform/Numeric Data Area 3-6	Numeric Data Alarm Message 13-2
Individual Bed Display Configuration 12-2	Numeric Data Box Size 12-24
Interval 8-13	Numeric Data Display Settings 12-7
INVOS Monitor Data 8-24	Nurse Call Daily Check 5-5
 K	Nurse Call Setup 12-17
Key 9-16	Nurse Call System 7-12
key sound 12-29	Nurse Team 6-3
Keyboard 4-2	Nurse Team Setup 12-32
Keyboard Connector 2-2	 O
Optional Accessories 15-1	
Output Printer 11-9	

Index

P

Pace Pulse Mask Time	8-8
Pacemaker	6-3, 8-7
Pacemaker Pulse	8-8
Paper Feed Key	11-16
Parameter ON/OFF	8-24
Patient Classification	6-3
Patient Data Server	6-4
Patient ID	6-2
New Information	6-6
Patient Name	6-2
Patient Name Display	12-27
Periodic Printing Setup	11-5
Potential Equalization Terminal	2-2
Power Supply Connector	2-2
Power Supply LED	2-2
PR Display	8-14
Print Key	11-16
	11-10
Printed Measurement Status	11-15
Printer Status Message	13-7
Printing Range	10-6
Printing Type	11-1

R

Recall	7-12, 9-11
Recall Display Selection	9-14
Recall Factor	9-12
Recall List Printing	9-14
Recorder Unit Status	3-4
Remote Control	4-2
Remote Control Sensor	2-2
Remote Printing	11-12
Remote Printing from the Telemetry Transmitter .	11-13
Resume Alarm Sound	7-14
Return to Home Display	3-1
Review Data of the Discharged Patient	9-16
Review Data Printing	11-14
Room ID Display	12-27
RR Overlap	12-8
RR Synchronized Mark	8-12
RR/APNEA Alarm Source	8-12

S

Scale Display	12-7
Search ID	6-5, 6-6
Serial Connector	2-3
Serial Connector (COM A)	2-3
Serial Connector (COM5)	2-3
Setup for ST Level Alarm	8-4
Short Cut Key	4-4
Shortcut Keys	3-2
Shortcut Menu	1-3
Slave Monitor	3-11
Slave Output Connector	2-2

Slide Show	10-4
Slow VT	7-9
Speaker	2-2
ST Reference Point / Measurement Point	8-4
ST Reference Waveform	8-3
ST/VPC/Arrhy. Alarm Display	8-10, 12-27
Stacked Data	11-17
Stacked Quantity	11-17
Status I/O Connector	2-3
Suspend Monitoring	6-9
SvO ₂ /CCO Monitor Data	8-24
Sweep Speed	12-28
Synchronized Mark/Tone	8-7, 8-17
System Composition	1-1
System Status Display	3-4
System Status Message	13-6

T

Tabular Trend	9-7
Tabular Trend Group	9-9
Tabular Trend Setup	9-9
TCON Mark	3-4
TEMP Alarm	8-19
Time	
Yellow Display	3-4
Time Bar	7-17, 9-1
Timer	8-13
Too Far Alarm	7-16
Touch Key	4-1
Touch Panel	2-2
Transmit Event	10-5

U

U-LINK Connector	2-3
User Key	4-8
Individual Bed Display	12-6

V

VF	7-9
VT	7-9

W

Warning Label	i
Waveform Clip	12-7, 12-28
Waveform Display Settings	12-7
Waveform Remote Printing	11-12
Waveform Size	
Auto	8-5
ECG Waveform Size Selection	8-5
RESP	8-11
Waveform Thickness	12-7
Window	3-10, 4-5

Z

Zoom Numeric Data	12-24
-------------------------	-------

The company and product names used in this manual are trademarks or registered trademarks of respective companies.

FUKUDA DENSHI CO.,LTD.

3-39-4 Hongo, Bunkyo-ku, Tokyo, Japan
Tel: +81-3-5684-1455 Fax: +81-3-3814-1222
<http://www.fukuda.com>

Printed in Japan 4L011077A 201502