DynaScope 7000 Series

Bedside Monitor

DS-7200 System

Ver.08

Operation Manual

《 **Monitoring Operation** 》

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

FUKUDA DENSHI

This operation manual is for the DS-7200 System Version 08.

⚠CAUTION	FEDERAL LAW RESTRICTS THIS DEVICE TO SALE BY OR ON THE ORDER OF A PHYSICIAN.

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

Blood pressure measurements determined with this device are equivalent to those obtained by a trained observer using the cuff/stethoscope auscultation method, within the limits prescribed by the American National Standard, Electronic or automated sphygmomanometers.

Preface

Thank you for purchasing this product.
Before using this product, read the following precautions to make sure the product is used correctly and safely.

Composition of This Operation Manual

The DS-7200 System Operation Manual is composed of the following 3 sections.

≪General Description≫

This section is composed of the chapters stating the general description of the device and basic operation procedure.

1. General Description	:	Describes the outline of this equipment.
2. Basic Operation	:	Describes the basic operation for monitoring.
3. Vital Application	:	Describes the procedure for vital application, etc.

≪Monitoring Operation≫

This section is composed of the chapters explaining the detailed monitoring procedures and setup procedures.

4. Monitoring Setup	:	Describes the procedures to set the monitor according to the monitoring purpose.
5. Admit / Discharge of a Patient	:	Describes the procedure to admit or discharge a patient.
6. Parameter Setup	:	Describes the procedure to set the measurement condition, size, scale, etc. for each parameter.
7. Function	:	Describes about the functions such as arrhythmia analysis, trend, recall, etc.
8. System Configuration	:	Describes about the system configuration such as night mode, alarm mode, display mode, etc.

≪Maintenance≫

This section is composed of the chapters describing the installation procedure, maintenance, technical information, accessories, etc.

9. Installation	:	Describes about the environment for use, wireless system, etc.
10. Maintenance	:	Describes about the maintenance, troubleshooting of this equipment.
11. Technical Information	:	Lists the specification, default settings, pin assignments of external connector, etc.
12. Accessories	:	Lists the accessories and optional accessories for this equipment.

Safety Precautions

- Read the "Safety Precautions" 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.

⚠ DANGER	Failure to follow this message may cause immediate threat of death or serious injury, or complete failure of the equipment.

⚠ WARNING	Failure to follow this message may result in death or serious injury, or complete failure of the equipment.

⚠ CAUTION	Failure to follow this message may cause injury or failure to the equipment.

NOTE	A note is not related to product safety, but provides information about the correct use and operating procedures to prevent incorrect operation and malfunction of the equipment.

Labels Attached to the Unit

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

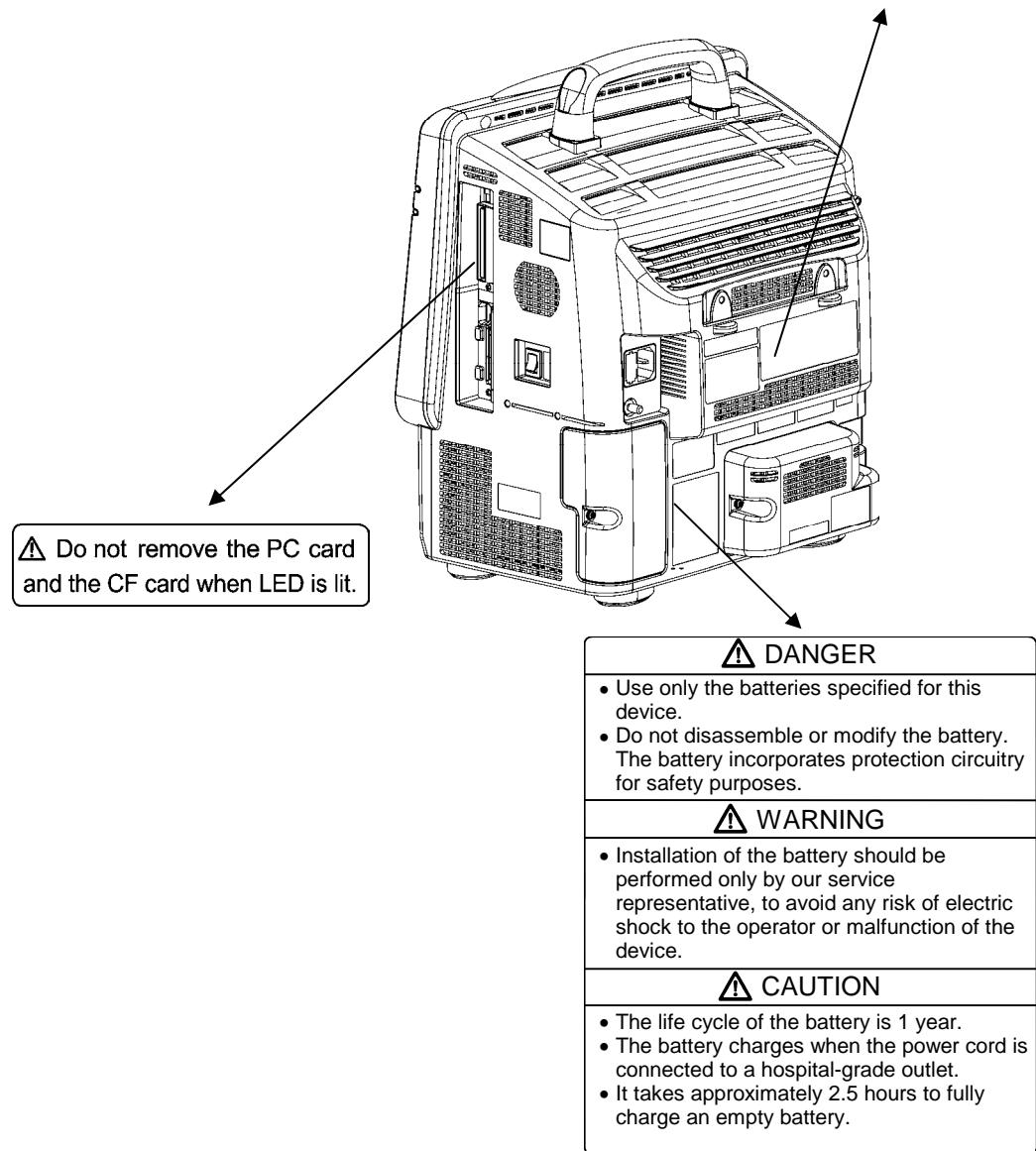| ⚠ CAUTION	Do not damage or erase the warning labels attached to the unit.
	These warning labels contain descriptions important for handling and operating the unit properly and safely. A damaged label may compromise safe operation.

DS-7200 System

> ### ⚠ 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 the cover.
> Refer servicing to qualified service personnel.

⚠ Do not remove the PC card
and the CF card when LED is lit.

⚠ DANGER
• Use only the batteries specified for this device.   • Do not disassemble or modify the battery. The battery incorporates protection circuitry for safety purposes.
⚠ WARNING
• Installation of the battery should be performed only by our service representative, to avoid any risk of electric shock to the operator or malfunction of the device.
⚠ CAUTION
• The life cycle of the battery is 1 year.   • The battery charges when the power cord is connected to a hospital-grade outlet.   • It takes approximately 2.5 hours to fully charge an empty battery.

HU-71/HU-72/HU-73 Option Unit

⚠ **DANGER**

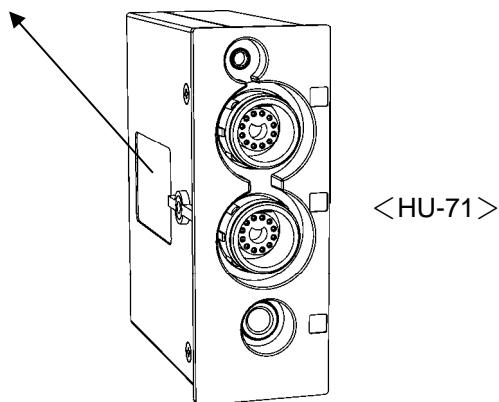Risk of explosion if used in the presence of flammable anesthetics.
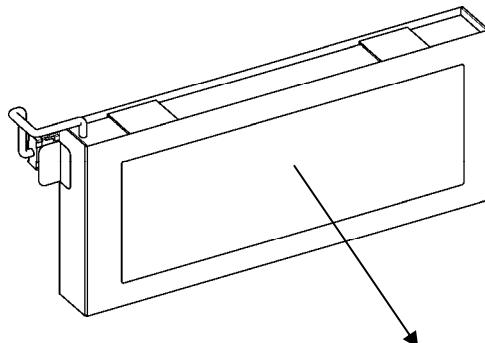
⚠ **CAUTION**

Before connecting, read instruction manual.

⚠ **CAUTION**

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

＜HU-71＞

OAO-12B Battery Pack

Li-ion リチウムイオン電池パック	Li-ion Battery Pack		CE
形　式　/　Type　　：　OAO-12B	容　　量　/　Capacity　：　6600mA·h		**FUKUDA DENSHI**
電　圧　/　Voltage　：　14.8V DC	製造番号　/　Lot No.		

⚠　危　険	⚠　DANGER
発熱、発火、破裂、液漏れの危険がありますので次の事項をお守り下さい。 ・電池パックを機器に接続するときは、コネクタの向きを確かめて確実に装着して下さい。 ・この電池パックは指定の機器以外には使用しないで下さい。 ・電池の充電は指定の機器本体のみで行って下さい。 ・電極や端子のショートや改造、分解をしないで下さい。 ・火中投入、加熱、高温下での放置、充電をしないで下さい。 ・クリップ、ピンなど金属製の物と一緒に保管しないで下さい。 ・電池には寿命があります。劣化した電池パックは使用しないで下さい。 ・電池パックに釘を刺したり、ハンマーで叩いたり、踏みつけたり、外装チューブを剥がしたり、キズをつけないで下さい。 ・電池パックに強い衝撃を与えたり、投げつけたりしないで下さい。	Please follow the precautions below, as improper use of the battery may cause heat, fire, explosion, or leakage. ・When installing the battery pack to the equipment, ensure the connector direction is correct. ・Do not use the battery pack with an equipment other than specified. ・The battery must be charged on specified equipment. ・Do not short the electrode or terminal, or remodel/disassemble the battery. ・Do not throw into the fire, heat, or leave/charge the battery under high temperature. ・Do not store the battery with metal such as clip or pin. ・The battery deteriorates with time. Do not use the deteriorated battery pack. ・Do not drive a nail in, hit with a hammer, step on the battery pack, or peel off or scratch the exterior tube. ・Do not apply strong impact or throw the battery pack.

・限りあるこれらの資源の有効活用のため、リサイクルにご協力ください。
　リサイクル処理は弊社販売店・代理店に提出いただくか、各自治体の処理方法に従ってください。

To effectively use these limited resources, your cooperation in recycling the battery will be appreciated.
・For recycling procedure, refer to Fukuda Denshi service representative, or follow the local regulations.

発売元　フクダ電子株式会社	Distributed by　：　Fukuda Denshi Co.,Ltd.
製造元　ファルタ・マイクロバッテリー・プライベート・リミテッド	Manufactured by　：　VARTA Microbattery Pte.,LTD.

(01)04538612225079

MADE IN KOREA

Measurement Unit for Each Parameter

The measurement units for this equipment are as follows.

Detail	Parameter	Display	Unit	Default
Heart Rate / Pulse Rate	ECG	HR	bpm	
	Invasive Blood Pressure	PR_IBP	bpm	
	SpO$_2$	PR_SpO$_2$	bpm	
	Non-Invasive Blood Pressure	PR_NIBP	bpm	
ST Level	ECG	ST	mm, mv	mm
VPC	ECG	VPC	bpm	
Respiration Rate	Impedance Respiration	RR_IMP	Bpm	
	CO$_2$	RR_CO$_2$	Bpm	
	Ventilator	RR_VENT	Bpm	
Apnea	Impedance Respiration	APNEA	s (second)	
	CO$_2$	APNEA	s (second)	
	Ventilator	APNEA	s (second)	
Invasive Blood Pressure	Invasive Blood Pressure	BP	mmHg, kPa cmH$_2$O (CVP only)	mmHg
Non-Invasive Blood Pressure	Non-Invasive Blood Pressure	NIBP	mmHg, kPa	mmHg
Arterial Oxygen Saturation	SpO$_2$	SpO$_2$	%	
	Perfusion Index	PI	%	
Temperature	Temperature	TEMP	°C / °F	°C
End-Tidal CO$_2$ Concentration	CO$_2$	EtCO$_2$	mmHg, kPa, %	mmHg
Inspiratory CO$_2$ Concentration	CO$_2$	InspCO$_2$	mmHg, kPa, %	mmHg
Cardiac Output	Cardiac Output	CO	L/minute	
	Cardiac Index	CI	L/minute/m^2	
Blood Temperature	Blood Temperature	Tb	°C / °F	°C
Injecate Temperature	Injecate Temperature	Ti	°C / °F	°C
Airway Flow	Airway Flow	AWF	L/minute	
Airway Pressure	Airway Pressure	AWP	cmH$_2$O	
Tidal Volume	Expiratory Tidal Volume	E_TV	mL	
	Inspiratory Tidal Volume	I_TV	mL	
	Tidal Volume	TV	mL	
	Inspiratory/Expiratory Ratio	I:E	(none)	
Respiratory Minute Volume	Minute Volume	MV	L/minute	
	Spontaneous Minute Volume	SMV	L/minute	
Compliance	Compliance	COMP	mL/cmH$_2$O	
	Static Compliance	S_COMP	mL/cmH$_2$O	
	Dynamic Compliance	D_COMP	mL/cmH$_2$O	
Airway Resistance	Expiratory Resistance	E_RES	cmH$_2$O/L/Sec	
	Inspiratory Resistance	I_RES	cmH$_2$O/L/Sec	
	Static Airway Resistance	S_RES	cmH$_2$O/L/Sec	
	Dynamic Airway Resistance	D_RES	cmH$_2$O/L/Sec	
Airway Pressure	Mean Airway Pressure	MEAN	cmH$_2$O	
	Maximum Airway Pressure	PEAK	cmH$_2$O	
	Pause Airway Pressure	PAUSE	cmH$_2$O	
	Minimum Airway Pressure	P_Min	cmH$_2$O	

bpm: beats per minute
Bpm: breaths per minute
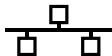
Detail	Parameter	Display	Unit	Default
Spontaneous Respiration	Spontaneous Respiration	S_RR	Bpm	
Peak End Expiratory Pressure	Peak End Expiratory Pressure	PEEP	cmH_2O	
Fraction of Inspiratory Oxygen	Fraction of Inspiratory Oxygen	FIO_2	%	
Vigilance Data ・Vigilance ・Vigilance CEDV ・VigilanceII ・Vigileo	Mixed Venous Oxygen Saturation	SvO_2	%	
	Central Venous Oxygen Saturation	$ScvO_2$	%	
	Arterial Oxygen Saturation	SaO_2	%	
	Oxygen Uptake Index	O_2EI	%	
	Oxygen Transport	DO_2	mL/minute	
	Oxygen Consumption	VO_2	mL/minute	
	Stroke Volume	SV	mL	
	Stroke Volume (STAT Mode)	SV_STAT	mL	
	Stroke Volume Index	SVI	mL/m^2	
	Stroke Volume Index (STAT Mode)	SVI_STAT	mL/m^2	
	Heart Rate	HR	bpm (beats per minute)	
	Mean Arterial Pressure	MAP	mmHg	
	Central Venous Pressure	CVP	mmHg	
	Continuous Cardiac Output	CCO	L/minute	
	Continuous Cardiac Output (STAT Mode)	CCO_STAT	L/minute	
	Continuous Cardiac Index	CCI	$L/minute/m^2$	
	Continuous Cardiac Index (STAT Mode)	CCI_STAT	$L/minute/m^2$	
	Systemic Vascular Resistance	SVR	$dynes\text{-}sec/cm^5$	
	Systemic Vascular Resistance Index	SVRI	$dynes\text{-}sec/cm^5$	
	Blood Temperature	BT	°C	
	Ejection Fraction	EF	%	
	Ejection Fraction (STAT Mode)	EF_STAT	%	
	End-Diastolic Volume	EDV	mL	
	End-Diastolic Volume (STAT Mode)	EDV_STAT	mL	
	End-Diastolic Volume Index	EDVI	mL/m^2	
	End-Diastolic Volume Index (STAT Mode)	EDVI_STAT	mL/m^2	
	End-Systolic Volume	ESV	mL	
	End-Systolic Volume Index	ESVI	mL	
	Stroke Volume Variance	SVV	%	
BIS Monitor Data	Bispectral Index	BIS	(no unit)	
	Signal Quality Index	SQI	%	
	Electromyograph	EMG	dB	
	Suppression Ratio	SR	%	

Graphic Symbols

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

Symbols indicated on the equipment

Symbol	Description
⚠	Caution; refer to accompanying documents Indicates the need to refer to related accompanying documents before operation.
⏚	Equipotential Terminal Indicates the terminal to equalize the potential difference when interconnecting the devices.
🚫	Inhibition The operation is inhibited. Refer to the instruction.
⏚	Protective Earth Indicates the protective earth inside the equipment.
∼	Alternating Current (Main Power Input Indicator)
⎓	Direct Current
🔋	Battery Charge (Battery Charge Indicator)
○	"OFF" for a Part of an Equipment Indicates the "OFF" condition for a part of an equipment.
⊙	"ON" for a Part of an Equipment Indicates the "ON" condition for a part of an equipment.
⚠	Electrostatic Sensitive Part Directly touching this connector part with hands should be avoided.
♥	Type CF Applied Part with Defibrillation-Proof Indicates the degree of protection against electric shock is Type CF Applied Part with defibrillation-proof.
🧍	Type BF Applied Part with Defibrillation-Proof Indicates the degree of protection against electric shock is Type BF Applied Part with defibrillation-proof.
🧍	Type BF Applied Part Indicates the degree of protection against electric shock is Type BF Applied Part.
⊖→	Signal Output Part
⊐→ ⊖→ GAS	GAS Output Part

Symbol	Description
	Signal Input Part
	Manufactured Date
	TCP/IP Network Connector Connects to TCP/IP network.
	RS-232C Connector Connects the related device.
	Eject Indicates the switch to remove the recorder paper cassette.

Symbols displayed on the screen

Symbol	Description
	Battery Mark During battery operation, battery status will be displayed.
	Alarm OFF Indicates the alarm is OFF.
	Heart Rate Synchronization Mark This mark flashes synchronizing to the heartbeat.
	Respiration Synchronization Mark This mark flashes synchronizing to the inspiration.
	Event Key This mark will be displayed when an alarm generates. Whether or not to display this icon can be selected on the monitor setup menu.
	Device Configuration Icon This mark will be displayed when device configuration has changed. Whether or not to display this icon can be selected on the monitor setup menu.
	Message Icon This mark will be displayed inside the parameter key when an alarm message is present for that parameter. Whether or not to display this icon can be selected on the monitor setup menu.
	TCON Antenna Mark Indicates the receiving condition of the Bidirectional Wireless Communication Module (HTC-702).
	SEC Alarm Display Indicates the SEC alarm status.
	Scroll Keys These keys will allow to scroll the screen.
	Laser Printer This mark will be displayed when a laser printer connected to the TCP/IP network is used.
	Laser Printer Output Indicates the current printing progress.

Precautions for Safe Operation of Medical Electrical Equipment

⚠CAUTION	Read the following precautions thoroughly to correctly operate the device.
	● Users should have a thorough knowledge of the operation before using this system.
	● Pay attention to the following when installing and storing the equipment.
	  • Do not install or store in an area where the equipment will be subject to splashing water.
	  • Do not install or store in an area where the environmental conditions, such as atmospheric pressure, temperature, humidity, ventilation, sunlight, dust, sodium, sulfur, will adversely affect the system.
	  • 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 there are chemical or gasses stored.
	  • 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.
	● Before operating the system, verify the following items.
	  • 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 device is used in conjunction with other equipment as it may cause erroneous judgment and danger.
	  • Ensure all patient connections are proper and secure.
	● During operation of the system, verify the following items.
	  • Always observe the system 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 device.
	● After using the system, verify the following items.
	  • Unplug all the cables from the patient before turning off the power.
	  • When unplugging the cables, do not apply excessive force by pulling on the cord. Pull by the connector part of the cable.
	  • Clean the accessories and cables, and keep them together in one place.
	  • Keep the unit clean to ensure proper operation of the next use.
	● If the equipment is damaged and in need of repair, user should not attempt service. Label the unit "OUT OF ORDER" and contact Fukuda Denshi.
	● Do not remodel the equipment.
	● Maintenance Check
	  • Make sure to periodically check the equipment, accessories and cables.
	  • Before reusing the device that has been left unused for a while, make sure that the device works normally and safely.
	● When using the electrosurgical knives or defibrillator with this equipment, verify proper attachment of patient ground plate, ECG electrode type for the electrosurgical knives, and paste volume, output energy for the defibrillator. Also, verify that proper ground is selected.

Precautions for Safe Operation of Medical Telemetry

⚠CAUTION	Precautions for Safe Operation of Medical Telemetry To operate the device correctly, read the following precautions carefully. ● The medical institution (hereinafter referred as "Institution") must decide the telemetry installation plan for the medical institution in order to prevent interference and interference between transmitters (telemetry based on destination country's radio law). ● 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 medical 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 be examined so as not to generate electronic interference. ● Based on the above examination result, the institution places each receiver antenna as required. In managing, be sure to follow the precautions below. ● 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 nominates 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 medical institution by giving proper instruction. ● The Overall Manager creates a management log, list of wireless channels, management status for the whole medical institution (hereinafter referred to as the "management log"). 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.

Precautions about the Maintenance

Safety Inspection and Maintenance

For safe operation of the equipment, regular inspection and maintenance is 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 if ;
- the equipment was subjected to extreme mechanical stress, e.g. after a heavy fall.
- the equipment was subjected to liquid spill.
- the monitoring function is interrupted or disturbed.
- parts of the equipment enclosure are cracked, removed, or lost.
- any connector or cable shows signs of deterioration.

Reference	Refer to "10. Maintenance" for details.

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

Maintenance, Modifications, and Repairs

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.
- Components are used in accordance with Fukuda Denshi operating instructions.

A full technical description of the DS-7200 system is available from your local Fukuda Denshi representative.

Precautions about the 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.) ➥ 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] ● 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. See this manual for disclosure of the pacemaker pulse rejection capability of this equipment.

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.

Defibrillation Safety

⚠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 directly contact the electrodes or medicament, 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 by the discharged energy. ● When defibrillating, do not touch the patient and the metal part of the device or cables. Electric shock may result by the discharged energy. ● This equipment will return to standard operating mode within 10 seconds. The stored data will not be affected. The measurement accuracy will temporarily decrease during defibrillation, but it will not compromise the safety of patient and the equipment.

Electrosurgery Safety

⚠WARNING	The monitoring system contains protection against interference generated by electrosurgical instruments. However, operating conditions, surgery site with respect to the location of ECG electrodes, or the type of instrument used, may cause noise on the ECG. The noise is generated at the tip of an electrical knife and is difficult to completely eliminate because of the frequency components of the ECG. To reduce electrosurgical interference, take the following precautions: Location Locate the electrosurgical unit as far as possible from this unit and the patient cable. This will help reduce interference on the ECG through the monitor or cables. Power Supply Connect the electrosurgical unit to a power supply that is different from that of the monitor. This will help prevent interference through the power cable. Electrode Placement The amount of interference is considerably different depending on the electrode position and surgery site. Place the ECG electrodes as far away as possible from the surgery site and the ground plate. Do not place electrodes in the path between the surgery site and the ground plate. If the electrodes are placed in this path, the amount of interference will be quite large. Position (+) and (–) electrodes as close as possible to each other. Ground Plate When using electrosurgical instruments, make sure the contact between the patient and the ground plate is secure. If the connection is incomplete, the patient may suffer a burn at the electrode site.

Precautions about Magnetic Resonance Imaging

⚠WARNING	● Do not operate this equipment in magnetic resonance imaging (MRI) environments. ● When conducting MRI test, remove the electrodes and sensors connected to the patient (test subject). The local heating caused by the induced electromotive force may cause burn injury to the patient (subject). For details, refer to the operation manual for the MRI testing device.

Precautions about Connections to Peripheral Devices

In the interest of safe and sufficient performance of this equipment, the connection of other manufacturers' equipment to the monitor is not authorized, unless the connection is explicitly approved by Fukuda Denshi. It is the user's responsibility to contact Fukuda Denshi to determine the compatibility and warranty status of any connection made to another manufacturer's equipment.

⚠WARNING	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.

⚠CAUTION	All the peripheral device connectors on the DS-7200 system are isolated from the power supply. The connecting peripheral devices should comply with IEC 60601-1 or should be isolated with the isolation transformer in compliance with IEC 60601-1. To prevent danger of electric shock, always position the peripheral devices away from the patient.

When connecting peripheral devices to DS-7200 system, it is the user's responsibility to verify that the overall system complies with IEC 60601-1-1, "Collateral Standard: Safety Requirements for Medical Electrical Systems".

Precautions about the 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. Not only the DS-7200 cannot deliver its maximum performance but may also result in increase in emission or decrease in immunity.

Precautions about the DS-7200 System

△DANGER	When connecting to other device, contact Fukuda Denshi service representative. Danger such as electric shock may result to the patient and operator.

△WARNING	• The DS-7200 system is not a life-support equipment.
	• The DS-7200 system is not intended for use during patient transport outside a healthcare facility, and is not considered as mobile equipment.
	• Do not connect unit or cable not authorized by Fukuda Denshi to any I/O connector. If done so by mistake, the DS-7200 system cannot deliver its maximum performance and the connected units may be damaged, resulting in a safety hazard.
	• If the DS-7200 system is used under an environment not fulfilling the specified condition, not only that the equipment cannot deliver its maximum performance, the equipment may be damaged and safety cannot be ensured. If using the equipment under condition other than specified, contact our service representative.
	• Use only the supplied 3-way AC power cable. Use of other cables may result in electric shock to the patient and the operator.
	• The power cable must be connected to the hospital grade outlet.
	• When using multiple ME equipment simultaneously, perform equipotential grounding to prevent potential difference between the equipment. Even a small potential difference may result in electric shock to the patient and the operator.
	• The setup for the alarm mode and display mode remains stored even when the power is turned off or when discharging procedure is performed. Before monitoring, make sure the current monitoring mode is suitable for the patient's condition.
	• The patient classification selection influences the precision of the QRS detection and NIBP measurement. Make sure the correct selection is made.
	• The pacemaker use selection influences the precision of the QRS detection and arrhythmia analysis. Make sure the correct selection is made.
	• If the QRS pace mask function is set to OFF , 10ms , or 20ms , 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 , or 20ms only if you are sure that pacing failure will not occur, or when the patient can be constantly monitored.
	• Be cautious when setting the "SpO_2 Averaging" duration as the SpO_2 alarm is based on the displayed SpO_2 value which is averaged from the duration set in "SpO_2 Averaging". The alarm occurrence time will be affected or may not occur for the transient value of SpO_2 depending on the set duration. (For Masimo® SpO_2 unit)
	• When measuring the SpO_2 of patient with high fever or peripheral circulatory insufficiency, check the sensor attachment periodically and change the attachment site. The temperature of the attachment site will rise 2 to 3°C due to the sensor heat which may result in compression necrosis and burn injury.
	• For the following case, accurate measurement of SpO_2 may not be possible.
	  • Patient with excessive abnormal hemoglobin (COHb, MetHb)
	  • Patient with the pigment injected to the blood
	  • Patient receiving CPR treatment
	  • When a sensor is applied to a limb with NIBP cuff, arterial catheter, or intracatheter
	  • When measuring at site with venous pulse
	  • Patient with body motion
	  • Patient with small pulse

⚠ WARNING	• Use only specified NIBP cuff. Refer to "12. Optional Accessories", for list of specified NIBP cuffs. These accessories may be purchased from Fukuda Denshi or NIBP cuff manufacturer that Fukuda Denshi recommends.
	• Before the NIBP measurement, make sure the patient classification (Adult / Child / Neonate) is properly selected. Otherwise, correct measurement cannot be performed, and congestion or other injury may result.
	• Use nonconductive parts for the BP circuit other than the transducer. Otherwise, the operator may get an electric shock if he/she touches a conductive part during defibrillation.
	• For MGU-721 with CAPNOSTAT 5® CO_2 sensor, use only specified airway adapter manufactured by "Respironics Novametrix, LLC". Refer to "12. Optional Accessories", for list of specified "Respironics Novametrix, LLC" airway adapters. These accessories may be purchased from Fukuda Denshi or any authorized "Respironics Novametrix, LLC" distributor.
	• For MGU-722, use only specified breath sampling products manufactured by "Oridion Medical 1987 Ltd.". Refer to "12. Optional Accessories", for list of specified "Oridion Medical 1987 Ltd." FilterLine® sampling products. These accessories may be purchased from Fukuda Denshi or any authorized "Oridion Medical 1987 Ltd." distributor.
	• When monitoring CO_2 (MGU-721/MGU-722), always consider the circumference of the intubation tube when using the airway adapter. If inappropriate airway adapter is used for a patient with low ventilation, CO_2 may mix in to the inspired air resulting in incorrect measurement, or apnea detection may become difficult.
	• When the system alarm is suspended, all the alarm will be suspended even if the parameter alarm is set to ON. Also, the alarm event will not be stored as recall.
	• 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.
	• When a parameter is in a connector-off condition, the alarm will be generated only on the bedside monitor and not on the central monitor. Make sure that the connector is securely connected. If the waveform/numeric data is not displayed for a monitored parameter, check the patient's condition and pay attention not to miss the connector-off condition.
	• Objective and constant arrhythmia detection is possible through the fixed algorithm incorporated in this monitor. However, excessive waveform morphology change, motion artifact, or the inability to determine the waveform pattern may cause an error, or fail to make adequate detection. Therefore, physicians should make final decisions using manual recording, alarm recording and recall waveform for evaluation.
	• The HR/PR alarm will not be generated unless the parameter key corresponded to the selected HR/PR source is displayed. Be sure to display the parameter key for the HR/PR source.
	• The alarm for the parameter not selected for the "HR/PR Alarm Source" (ECG/SpO_2/BP) will be set to OFF on the DS-7600 Central Monitor.
	  • The "HR/PR Alarm Source" setting will synchronize between the bedside monitor and the central monitor.
	  • For example, if PR is set as the HR/PR alarm source on the DS-7200, HR alarm will be set to OFF on the central monitor.
	• The purpose of the apnea alarm is to alert the user to evaluate for the possible occurrence of apnea events by identifying the absence of respiration. It is not intended to be classified as an "Apnea Monitor" and will not identify the condition creating the possible event. (Central, Obstructive or Mixed.)
	• When "Alarm System" setting (IEC/FUKUDA DENSHI) is changed on the Monitor Setup menu, make sure to check the alarm sound and alarm indicator.
	• When PURITAN-BENNETT Ventilator is used, APNEA alarm will not generate if ventilator is the RR/APNEA alarm source.

⚠ WARNING	● When selecting ⎡Silence⎤, ⎡Time Disp. Only⎤ or ⎡OFF⎤ (Alarm Pole) for the night mode, pay attention not to miss any important alarm by simultaneously monitoring the bed on other monitors such as central monitor. ● For the alarm mode, it is recommended to program the alarm mode in rough classification such as patient's age, monitoring purpose (ICU or surgery), and if necessary, perform unique setup for each patient. ● The RR/APNEA alarm will not be generated unless the parameter key corresponded to the selected RR/APNEA source is displayed. Be sure to display the parameter key for the RR/APNEA source. ● When lifting this device, hold the handle of the main unit. ● The "QRS SYNC" signal (No. 1) of the Status II connector is a delay output. (delay: 30 to 75msec, signal width: 100msec). Do not use it as a synchronizing signal for the defibrillator. Make sure the delay time of QRS SYNC signal fulfills the specifications of the connected device. ● Analog signal is a delay output. (about 35ms for ECG, BP) When connecting to a device using vital signs as trigger signals (ex. IABP), make sure the delay time fulfills the specifications of the connected device. The delay time may differ depending on the waveform shape or artifact interference. ● The slave monitor output of the DS-7200 is not isolated. If connecting a commercially available display unit which does not comply with IEC 60601, use an isolation transformer to ensure there is no excessive electric leakage current for safety of the operator and the patient. ● We cannot assure proper operation if TCP/IP network is connected incorrectly. When changing the network setting or upgrading the printer, contact our service representative. ● Make sure not to duplicate the IP address for DS-7200 system, laser printer, and the server. ● As DS-7200 is not corresponded to DHCP (Dynamic Host Configuration Protocol) IP address, set the IP address excluded at DHCP if DHCP server is in the network configuration. ● Be careful not to confuse the HUB used for the DS-LANII/III network and the HUB for the TCP/IP network. We cannot assure proper operation if used improperly. ● Use a 10M repeater HUB recommended by Fukuda Denshi for the DS-LANII network. If a 100M HUB or a switching HUB is used, a communication error may occur. ● On the network configuration menu, when a setting is changed and ⎡Enter⎤ key is pressed, a caution message will be displayed. All monitoring operation will be suspended until the system is restarted.

⚠CAUTION	● Systems 　• This equipment is intended to be used for only one patient. 　• The installation of this equipment and its option unit should be performed by our service representative or a person who is well acquainted with this equipment. 　• The internal switch setting will be performed by our service representative. Users should not open the maintenance cover. 　• PC Card Slot will be used by our service representative for maintenance purpose. Users should not use it. 　• The software upgrading will be performed by our service representative. The users should not attempt it. 　• Use only the accessories specified for this device. Otherwise, proper function cannot be executed. 　• Do not reuse a disposable product. 　• For quality improvement, specifications are subject to change without prior notice. 　• When the product is used in regions whose voltage is other than 110-120V, a cable appropriate to the regulations and voltage of the country in which the product is being used shall be used. 　• The display panel utilizes exclusive fluorescent light for the backlight. Since this fluorescent light deteriorates by the life cycle, the display may become dark, scintillate, or may not light by the long term use. In such case, contact your nearest service representative. 　• 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. In addition, do not apply pressure to any part of the panel for a prolonged time. 　• Do not use the touch panel with the film or adhesive tape 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. 　• Do not press the touch panel with strength or twist your finger on the panel. It may cause malfunction or damage the touch panel. 　• Due to its material characteristic, the touch panel expands/contracts depending on the temperature/humidity. When the touch panel is left unused for a while, or when the ambient temperature is low, the surface film of the touch panel may expand, but this is not an abnormal condition.　This expansion will be reduced in few hours or half a day after the power is turned ON. 　• When changing the CO_2 option unit (MGU-721/MGU-722), it is necessary to perform setting on the "Change Equipment Configuration (CO_2)" of the CONFIGURATION menu. 　• If not using the monitor for a long time, turn OFF the power switch. 　• When connecting the BIS monitor, make sure that the power of the patient monitor and the BIS monitor is turned OFF. 　• The connector of COM (1 to 3), StatusII (1 to 5), and analog output are isolated. 　• If the power supply is interrupted due to power failure, etc., the following will occur. 　　- If the power supply is resumed within 5 minutes, setup data are backed up and monitoring before the power failure can be resumed. 　　- If the power failure continues for more than 5 minutes, data such as ST data, OCRG data will be initialized. (For details, refer to "11 Technical Information　Setup Item".) 　　- For the CO_2 option unit (MGU-721/ MGU-722), it will be initialized and enter into warm-up state even if the power failure is within 30 seconds. ● ECG Monitoring 　• Use only the specified relay cables, lead cables, and electrodes. 　• The conductive parts of electrodes and associated connectors for applied parts, including the neutral electrode, should not contact other conductive parts including earth.

⚠ CAUTION	• The indication for continuous use of the electrode is about one day.
	• Replace the electrode if the skin contact gets loose due to perspiration, etc.
	• When an electrode is attached to the same location for a long period, some patients may develop skin irritation. Check the patient's skin condition periodically and change the electrode site as required.
	• For stable arrhythmia detection and ECG monitoring, verify proper electrode placement, lead, waveform size, and filter mode selection. If not properly selected, it may cause erroneous detection.
	• Always use the same type of electrodes. If different types of electrodes are used at the same time, the difference between the polarization potential from each electrode may interfere monitoring.
	• The threshold level for arrhythmia detection and QRS detection changes with ECG waveform size. Set a proper waveform size for monitoring.
	When the waveform size is ×1/4, ×1/2, or ×1, the detection threshold is 250μV. When the waveform size is ×2 or ×4, the detection threshold is 150μV.
	• When arrhythmia is present, HR measurement accuracy may be degraded.
	• Select the appropriate lead for ECG1, 2 to be used for arrhythmia detection, telemeter, central monitor transmission, and recording.
	• The selected lead for ECG1, 2 will be used for recall waveform and recording waveform as well as for arrhythmia analysis.
	• The QRS detection leads, arrhythmia detection leads, monitoring leads on the central monitor, recording leads are fixed as ECG1 and ECG2. Especially for arrhythmia detection, set the most appropriate leads with high QRS for ECG1 and ECG2.
	• Automatic size/position of the ECG is effective only at the time the ⎡AUTO⎤ key is pressed. This does not continually adjust size and position.
	• The ESIS mode can largely reduce the artifact such as electrosurgery noise and EMG, but it may also reduce the QRS amplitude. The ESIS mode should be selected only during electrosurgery.
	• 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 (as in a fusion beat), QRS detection will be suspended and the heart rate will be reduced.
	• If a pacemaker pulse is continuously detected due to AC frequency interference, QRS detection will be suspended and the heart rate will be reduced. Also arrhythmia detection will not be possible.
	
	● Respiration Monitoring
	  • When the following relay cables are used, respiration cannot be measured.
	    ・Relay Cable CI‑700E-3 (FA) (defibrillation and electrosurgery-proof, 3-electrode)
	    ・Relay Cable CI‑700E-4 (FA) (defibrillation and electrosurgery-proof, 4-electrode)
	    ・Relay Cable CI‑700E-5 (FA) (defibrillation and electrosurgery-proof, 5-electrode)
	  • When a defibrillator is used during respiration monitoring, a large offset voltage will be placed on the ECG electrodes, which may cause interruption of monitoring for a few seconds.

⚠CAUTION	● SpO₂ Monitoring • If the nail is rough, dirty, or manicured, accurate measurement will not be possible. Change the finger or clean the nail before attaching the probe and sensor. • The Dyna Alert estimates the change in circulatory dynamics from the photoplethysmogram (SpO₂) of the finger. Therefore, if the photoplethysmogram (SpO₂) is measured on the toe or forehead (with MAX-FAST), the Dyna Alert may not function depending on the patient's condition. • If irritation such as skin reddening or skin fit appears with the sensor use, change the attachment site or stop using the sensor. • When fixing the sensor with a tape, do not wind the tape too tight. At the same time, check the blood flow constantly so that congestion is not generated at the peripheral. • Even a short duration of attachment may inhibit the blood flow and generate compression necrosis and burn injury. • Change the sensor attachment site at regular time interval, which is specified for each SpO₂ sensor. The temperature of attachment site will rise 2 to 3°C due to the sensor heat which may result in compression necrosis and burn injury. • As skin for neonate / low birth weight infant is immature, change the sensor attachment site more frequently depending on the condition. • Excessive light may cause inaccurate measurements. In such cases, cover the sensor with opaque material. • When not performing the measurement, unplug the relay cable and sensor from the SpO₂ connector. Otherwise, the measurement data may be erroneously displayed by the ambient light. • The pulse wave is normalized for SpO₂ measurement. It does not indicate perfused blood volume. Check proper probe attachment by observing the pulse wave. • Precautions for Reusable Type Sensors 　・The light-emitting part of the sensor should be over the root of the fingernail. Do not insert the finger too far into the sensor as it may hurt the patient. 　・The DS-100A is intended for use on finger of adults weighing over 40 kg (approximate). Do not use them on children or neonates. Also do not apply them on the thumb or toe. 　・The DS-100A must be moved to a new site at least every 4 hours. Because individual skin condition affects the ability of the skin to tolerate sensor placement, it may be necessary to change the sensor site more frequently with some patients. If skin integrity changes, move the sensor to another site. • Precautions for Single-Patient-Use Type Sensors 　・Do not wind the tape too strong. It may obstruct the blood flow. 　・The sensor is contraindicated for use on patients who exhibit allergic reactions to the adhesive tape. 　・The Nellcor® OxiMax® sensor can be reused on the same patient as long as the adhesive tape attaches without slippage. But do not reuse it on other patients. It is intended for single patient use only. 　・The Masimo ®LNOP sensor can be reused on the same patient as long as the light emitting and receiving part is clean, and if it is still adhesive to the skin. But do not reuse it on other patients. It is intended for single patient use only. 　・For the Nellcor® single patient use type sensors, the site must be inspected every 8 hours (MAX-FAST®: 12 hours) to ensure adhesion, skin integrity, and correct optical alignment. If skin integrity changes, move the sensor to another site. 　・Do not reuse the sensor by resterilizing it. 　・Dispose the sensor after use. In the event of damage to the sterile packaging, do not use it.

⚠ CAUTION	• For Masimo® sensor, change the sensor attachment site every 4 hours for the reusable sensor, and every 8 hours for the disposable sensor. Exercise extreme caution with poorly perfused patients; skin erosion and pressure necrosis can be caused when the sensor is not frequently moved. Assess site at least every 2 hours with poorly perfused patients. • The SpO_2 patient cables (PC04, PC08, and PC12) are intended for Masimo SET sensors only. Connect them only to DS-7210M. If connected to other device, it will not function properly. • Measuring on a limb with NIBP cuff, arterial catheter, or intracatheter may result in incorrect measurement. • For additional warnings, cautions or contraindications when using sensors with DS-7210 Nellcor® model or DS-7210M Masimo® model, refer to each SpO_2 sensor instruction manual. • If SpO_2 measurement failure occurs due to the reason such as sensor detachment from the patient, SpO_2 measurement data will be displayed as "– – –". Be cautious as numeric data alarm will not generate in such case. • Precautions for DS-7210M Masimo® Model ・ The measurable pulse rate range is 25 to 240bpm. "×××" will be displayed if 25bpm and below or 240bpm and above is measured. ・ If ⬚High⬚ is selected for pulse wave sensitivity on the SpO_2 setup menu, the sensor-detached detection will become somewhat inaccurate. ・ If ⬚OFF⬚ is selected for "PI Display" under the SpO_2 configuration setup, "SpO_2 Low Perfusion" alarm will be indicated by message display only. The alarm sound will not be generated. ● NIBP Monitoring • Select the appropriate cuff size which best fits the arm circumference. If the cuff size is inappropriate, it may cause measurement error. • Do not use a cuff which is worn out. The cuff may burst during inflation. • Do not reuse the disposable NIBP cuff. • If there is any air leakage, correct NIBP measurement cannot be performed. Make sure that the connection is secure. • Correct NIBP measurement cannot be performed if artificial heart lung machine is used or if the pulse is difficult to detect. • Pay attention when measuring the NIBP of patient with bleeding disorders or hyper coagulation. The cuff inflation may cause petechia or circulatory failure by the blood clot. • Do not apply the cuff to the arm or thigh where vein is secured. The blood may backflow causing the chemical injection to cease. • Pay attention not to bend the cuff hose. • Check the condition of cuff-applied part on the patient during measurement so that the blood circulation will not be blocked over long period of time by the squashed or bent cuff hose. • Check the patient's condition constantly while measuring over long period of time with interval of 2.5 minutes or less. Also, periodically check the blood circulation while performing periodic measurement over long period of time. Congestion may occur at the measuring site. • The following factors may affect the NIBP value. - Body motion, arrhythmia, convulsion - Continuous noise such as cardiac massage - Periodic electromagnetic noise

⚠CAUTION	• When a PTG (SpO₂) sensor is applied to the toe or forehead, the Dyna Alert may not function depending on the patient's condition. • When using the Dyna Alert function, be aware of these risks and do not increase the NIBP interval time by relying only on the Dyna Alert function. • After the Dyna Alert NIBP measurement, the next Dyna Alert NIBP measurement cannot be performed for 2.5 minutes. • The Dyna Alert will not properly function for the following cases. • If peripheral circulatory insufficiency or very low BP is developed. • If highly-frequent arrhythmia is generated. • If an artificial heart lung machine is used. • If a large noise from body movement or electric surgery equipment is interfering. • If autonomic nerve or circulatory dynamics is largely affected by medication. • For the following situation, measurements will be terminated. When the measurement time has exceeded 160 seconds for adult and child, 80 seconds for neonate. When the inflation value has exceeded 300mmHg for adult, 210mmHg for child, and 150mmHg for neonate. • If used with the incorrect patient classification, it will not only cause erroneous measurement, but the inflating level for the adult may be applied to child or neonate causing dangerous situation to the patient. • The 1-minute interval measurement will always start from 00 second. Pressing the ⌐1min start⌐ key will start the measurement from the next 00 second. • The 1-minute interval measurement will automatically stop after 12 minutes. • If the mean BP display is set to OFF, the mean BP alarm will not be generated. Also the mean BP will not be displayed for the tabular trend or the NIBP list function if the display is set to OFF. ● BP Monitoring • Do not reuse disposable product for BP measurement. • When the main power is turned ON, the BP value will not be displayed until zero balance is performed. However, if the power is turned ON within 5 minutes after the power is turned OFF, the previous zero balance information will be maintained, and the BP value will be displayed. • Each time the blood pressure transducer or tubing is replaced, the zero balance procedure is required to ensure accurate measurements. • "Perform zero balance" message will not be displayed unless the three-way valves of all pressure transducers are opened to air. If the status is not displayed, or if "Open stop cock to air" message is displayed, check if the three-way valve of pressure transducers are opened to air. • "READY" message will not be displayed unless the three-way valve of all pressure transducers are opened to air. If the status is not displayed, or if "MEASURE" message is displayed, check if the three-way valve of pressure transducers are opened to air. • The zero balance procedure is required for the following case. • When starting the measurement. • When the position of the heart has changed due to body movement. • When the position of the transducer has changed. • When measuring for a long period of time and there is a possibility of measurement error due to change in ambient temperature, etc. • When the connector is connected / disconnected, or transducer is replaced. • When the power has been turned OFF for more than 5 minutes.

$\triangle$ C A U T I O N	• Note that the Systolic Pressure (SYS) = Peak Systolic Pressure (PSP) for the graphic trend, data base, and alarm setup. • When ECG is not measured, PDP cannot be calculated. • The undisplayed BP data (SYS/DIA/Mean) will not generate a BP alarm or be displayed in the tabular trend. Select the appropriate display type according to the monitoring purpose. ● CO_2 Monitoring (MGU-722) • All FilterLine® sampling products are for single patient use only. • Perform calibration after Initialization Time (max. 180 seconds has elapsed since the power is turned ON. • Do not disconnect the sampling tube during calibration. If disconnected, calibration will cease when the sampling tube is disconnected. • Conduct CO_2 calibration for the following case. If the CO_2 gas calibration is not performed at a specified interval, CO_2 measurement accuracy may be affected and also subsequent gas calibration may not be possible. ・For the following case, a message, "Calibrate the CO_2 unit (MGU-722)" or "The periodic calibration of the CO_2 unit (MGU-722) is approaching" will be displayed at power ON. Conduct CO_2 calibration. When the accumulated measurement time exceeds 1200 hours from first use. When 1 year has elapsed from the last calibration date. When the accumulated measurement time exceeds 4000 hours from the last calibration date. ・When $EtCO_2$ measurement is not stable or accuracy is degraded compared with other measuring device conduct CO_2 calibration. ● CO_2 Monitoring (MGU-721 with CAPNOSTAT® 5 CO_2 sensor) • The airway adapter should be attached with the thicker side facing to the patient. If attached oppositely, it may damage the CO_2 sensor or airway adapter. • The disposable airway adapter should be opened just before use. Do not sterilize it. • Do not reuse the disposable airway adapter. • Do not sterilize the airway adapter using autoclave methods. • When a measurement unit is changed, make sure to set the alarm condition for that unit. The alarm setup is necessary for each measurement unit. ● Alarm • The alarm priority is high for level 1 (life threatening alarm), medium for level 2 (cautionary alarm), and low for level 3 (treatment needed alarm). • Alarm messages will be displayed according to the priority. (Level 1 → Level 2 → Level 3 → Level 4) • For the same alarm level, the alarm message for the newer alarm will be displayed. • On the DS-7200, HR alarm and PR alarm cannot be set to ON at the same time. • The alarm message for the arrhythmia alarm will continue to be displayed for 30 seconds after the alarm is resolved. • While the "LEAD OFF" message is displayed, HR alarm and arrhythmia alarm will not function. Leaving this condition unresolved may result in missing a sudden change of the patient. Promptly check the electrodes when this message is displayed. • Even during "LEARN" status, alarm for HR, ASYSTOLE, VF, TACHY, BRADY will be generated. • Even during "Cannot analyze" alarm generation, alarm for HR, ASYSTOLE, VF, TACHY, BRADY will be generated. • The settings for the "HR Low Limit for VT" and "HR Low Limit for RUN" will be compared with the average HR of continuous VPC. Therefore, the displayed HR value at alarm generation may be lower than the settings if it is just after the VT detection, or if RUN with few continuous VPC is detected.

$\triangle$ CAUTION	- Regardless of ON/OFF setting of "Suspend Arrhy. Analysis during Interference" under Hospital Setup (Preset Menu), the "Cannot analyze" alarm will generate when analysis is suspended for more than 30 seconds. - The measurement range and alarm range differs for the following parameters. Be cautious not to set the alarm limit outside the measurement range. Otherwise, the alarm will not generate. ・PR for DS-7210M (Masimo® Model) Measurement Range: 25 to 240bpm (If 25bpm and below or 240bpm and above is measured, "xxx" will be displayed.) Alarm Range: 20 to 300bpm ・NIBP Measurement Range: 10 to 280mmHg Alarm Range: 10 to 300mmHg ・CO_2 for MGU-722 (Microstream® CO_2 Unit) Measurement Range: 0 to 99mmHg/0 to 13.3kPa Alarm Range: 1 to 115mmHg/0.1 to 15.0kPa - For the SpO_2 measurement, whether to use the SEC alarm function and its threshold selection should be based on the patient's clinical indication portent and medical evaluation. (For Nellcor® SpO_2 unit) - If the SpO_2 alarm and SEC alarm setup is set to OFF, the SEC alarm integral value will be set to 0. (For Nellcor® SpO_2 unit) - The alarm mute ON/OFF setup will remain effective even when the power is turned OFF. Be cautious not to miss any important alarm by leaving the alarm silenced. - Pay attention not to set the alarm volume too low to avoid missing any important alarms. ● System Configuration - When the waveform and numeric data display for each parameter is set to OFF, the alarm generation and tabular/graphic trend for the corresponded parameter will be also set to OFF. - If the display of waveform / numeric data labeled as BP1 or ART is set to OFF, the pulse rate derived from BP will not be displayed either. - When the waveform and numeric data display for SpO_2 is set to OFF, the pulse rate derived from SpO_2 will not be displayed either. - When the waveform and numeric data display for the CO_2 measurement unit (MGU-721 or 722) is set to OFF, the respiration rate measured by the CO_2 measurement unit will not be displayed either. - If the time/date is not correctly set, or changed during monitoring, malfunction may occur to NIBP measurement, periodic recording, trend, NIBP list data, and age calculation from the birth date. - If the time/date is changed, the time/date for the trend, NIBP list, recall data will also change. - If the time/date is changed during monitoring, the patient's age will not be recalculated. - Do not set the same remote control bed ID to more than one monitors of the same floor. Otherwise, it may cause to remote control more than one monitors at the same time. - After the remote control setup, check that the remote control unit is properly operating. ● Patient Admit / Discharge - If you start monitoring a new patient without performing a discharge procedure for the previous patient, new data will be added to the previous data which will result in inaccuracy. - The setup for alarm mode and display mode remains stored even when the power is turned OFF or when discharging procedure is performed. However, if the built-in backup battery is depleted when the power is turned ON, the alarm mode setting will be initialized to default setting. - Resuming monitoring will resume the alarm in suspension. - 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 | Admit as new patient. | key.

⚠CAUTION	● ST Measurement 　• For the lead which the electrode is detached, the reference waveform setup cannot be performed. Check if the electrode is correctly attached, and perform the setup again. ● CF Card 　• Use only the specified CF card. 　• Use only the CF card formatted with this device. 　• Restart the system after reading the setup data from the CF card. The setup data will become effective after the system is restarted. 　• Reading the patient data from the CF card will erase all previous patient data stored in the patient monitor. ● TCP/IP Network Connection 　• After setting the IP address, etc. for the laser printer, make sure to turn OFF and back ON the power of the printer. ● Maintenance 　• The maintenance procedure will be performed by our service representative. Users should not attempt this procedure as malfunction may result to the device. 　• 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. (Neither is it recommended that mild acidic or alkaline cleaning solution to be used.) 　• A special coating is applied to the surface of the touch panel. Do not wipe the surface with a cloth or gauze with coarse texture. Wipe the surface with a soft cleaning cloth provided as optional accessory or with an eyeglass cleaning cloth. 　• Clean the equipment frequently so stains can be removed easily. 　• To prevent injury, it is recommended to wear gloves when cleaning the equipment. 　• Do not allow liquids such as alcohol or cleaning solution enter the equipment or connectors. 　• Do not use organic solvents, thinner, toluene and benzene to avoid damaging the resin case. 　• Do not polish the housing with abrasive or chemical cleaner. 　• When sterilizing the entire room using a spray solution, pay close attention not to have liquids get into the equipment or connectors. 　• Use only neutral detergent to clean the housing. Do not use chemical cloth, scrub brush, abrasive, polishing powder, hot water, volatile solvent and chemicals (cleanser, thinner, toluene, benzine, benzol, and synthetic detergent for house and furniture), or sharp-edged tools. The surface resin coating may be damaged, resulting in discoloration, scratches, and other problems. 　• Do not open the housing. 　• If you accidentally wet the device, dry it completely and verify it operates safely before usage. 　• If the patient monitor was stored for some while, leave the monitor at the operating environment (10 to 40°C, 30 to 85%) before usage. 　• Replace the components periodically as specified.

Precautions about the Wired Network System (DS-LAN II/DS-LANIII)

⚠WARNING	● Do not connect unspecified device to a wired network. ● Do not mix devices with DS-LANII and DS-LANIII setting in the same wired network. The network may cease and proper monitoring may not be possible. ● Before setting the bed ID, make sure that the DS-LAN (DS-LANII/DS-LANIII) is correctly set on the Monitor Setup menu. If not correctly set, the network may cease which may lead to accidents such as not transmitting life threatening alarms to the central monitor.

⚠CAUTION	● When connecting to the DS-LAN network, perform "DS-LAN Setup" in the Monitor Setup menu and restart the system before connecting the LAN cable.
	● If performing wired network transmission, configure the display so that the numeric data corresponded to the waveform is displayed. If not, the displayed waveform or numeric data may not be transmitted.
	● The Bed ID is factory set to 000. If connected to the wired network with the ID unchanged, monitoring on the central monitor will not be possible.
	● When connected to the wired network, make sure that there are no other bedside monitors with the same Bed ID. If there are more than one bedside monitors with the same Bed ID, the duplicated bedside monitors cannot be monitored on the central monitor.
	● Make sure to set the bed ID in the following range.
	  • For DS-LANII network: 001 to 048
	  • For DS-LANIII network: 001 to 100
	● As the DS-7200 does not have the arrhythmia template display and 12-lead ST display function, these displays on the central monitor will not be corresponded.
	● If connected to a wired network, time/date will be the same with the central monitor. Even if the time/date is changed on the DS-7200 system, it will be corrected to the time/date of the central monitor.
	● On some central monitors depending on the model type or software version, the setups for "HR Low Limit for VT" and "HR Low Limit for Run" cannot be performed.
	● On a wired network, the alarm generated on the DS-7200 will be output to the network with a maximum delay of 1 second, and to the central monitor with a total delay of 2.5 seconds.
	● In case of DS-LANII network, if the HR/PR source is ⌐BP¬ (Or, if ⌐Auto¬ selects BP for HR/PR source), the ECG waveform will not be transmitted on the network. On the central monitor, PR_IBP value will be displayed instead of HR. However, on some central monitor depending on the model type, the HR value from ECG will be displayed on the NIBP list and ST measurement list. Refer to the operation manual for the respective central monitor.
	In case of DS-LANIII network, refer to the operation manual for the central monitor.
	● In case of DS-LANII network, if the RR/APNEA alarm source is other than ⌐Impedance¬ (Or, if ⌐Auto¬ selects a setting other than impedance for RR/APNEA alarm source), the respiration waveform will not be transmitted on the network. In addition, if the RR/APNEA alarm source is other than ⌐CO_2¬ (Or, if ⌐Auto¬ selects a setting other than CO_2 for RR/APNEA alarm source), the CO_2 waveform will not be transmitted on the network. In case of DS-LANIII network, refer to the operation manual for the central monitor.
	● Depending on the central monitor model type, the ST display will be distorted if the ECG lead (ECG1 or ECG 2) is changed on the DS-7200. Redrawing the ST display will return the display to normal.

⚠CAUTION	• On the central monitor, the respiration waveform and RR value based on the RR/APNEA alarm source selected on the DS-7200 will be displayed. The RR and APNEA monitored on the central monitor and the DS-7200 will be the same.
	• If the measurement unit of CO_2 concentration is "mmHg", and 99mmHg is selected for "CO_2 (mmHg) Upper Limit for LAN, Telemetry" on the monitor setup menu, the CO_2 value of 100mmHg or above will be transmitted as 99mmHg.
	• There are following restrictions when connecting the DS-7200 system to the DS-LANII network.
	  • Make sure that the "DS-LAN Setup" on all the bedside monitors and central monitors are set to DS-LANII before connecting the monitors to the network.
	  • When DS-5800N/NX/NX^{MB} is used as a central monitor, recall, graphic trend, and tabular trend will not be displayed. Also, Σ recording cannot be performed. For the ST display, overlap waveform will not be displayed on the DS-5800N/NX/NX^{MB} until 15 minutes have passed since the reference waveform is set on the DS-7200.
	  • If the measurement unit for BP (mmHg/kPa) is different between the bedside monitor and the central monitor, the corresponding waveform and numeric data will not be displayed on the central monitor.
	  • If a central monitor which does not support the "kPa" measurement unit is used, and the measurement unit on the bedside monitor is set to "kPa", BP waveform/numeric data, NIBP data, NIBP list, etc. in "kPa" unit will be treated as not measured data and will not be displayed on the central monitor. Also, the alarm limit setup from the central monitor cannot be performed.
	  • When the temperature unit is °F, the temperature data will not be transmitted. It will be treated as not measured data, and will not be displayed on the central monitor. Also, alarm limit setup on the central monitor cannot be performed.
	  • Arrhythmia alarm of TACHY, BRADY, COUPLET, PAUSE, TRIGEMINY will not be transmitted.
	  • Arrhythmia alarm of "SLOW_VT" will be transmitted as "VT".
	  • On a wired network, waveform, numeric data, alarm of TEMP3 will not be transmitted. Also, the displayable waveform, numeric data, alarm differs depending on the connected central monitor. Refer to the operation manual for the respective central monitor.
	  • For numeric data displayed as "×××", maximum or minimum value of measurable range will be transmitted.
	  • The numeric data displayed as "− − −" will be treated as not measured data.
	  • If the SpO_2 (PR_SpO_2) lower alarm limit is set, and "− − −" is displayed for the SpO_2 (PR_SpO_2) value due to a cause such as SpO_2 sensor off, etc. on the bedside monitor, it will be notified as SpO_2 (PR_SpO_2) lower alarm on some central monitors even if the alarm is not generated on the bedside monitor.
	  • If using a HUB for the DS-LANII network construction, make sure to use a repeater HUB recommended by Fukuda Denshi.

⚠CAUTION	● There are following restrictions when connecting the DS-7200 system to the DS-LANIII network. 　• In order to connect to the DS-LANIII network, the software version needs to be the version which supports the DS-LANIII. For details, refer to our service representative. 　• Make sure that the "DS-LAN Setup" on all the bedside monitors and central monitors are set to DS-LANIII before connecting the monitors to the 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. 　• If using a HUB for the DS-LANIII network construction, make sure to use a switching HUB recommended by Fukuda Denshi. 　• The displayable waveform, numeric data, alarm will differ depending on the central monitor model type. Please also refer to the operation manual of the central monitor. ● There are following restrictions when recording the DS-7200 data on the central monitor recorder. 　• The DS-7200 can not perform the recording with the AU-5500N recorder. 　• If the measurement unit of BP is kPa, the BP waveform, BP numeric data, and NIBP numeric data will be treated as not measured data. 　• If the measurement unit of temperature is °F, the temperature data will be treated as not measured data. 　• When a parameter is not measured, the waveform for that parameter will not be recorded, and measurement data will be recorded as "– – –" or blank. 　• The measurement data displayed as "×××" will be recorded as "– – –" on the central monitor recorder. 　• The "S" (QRS symbol) printed on the built-in recorder will be printed as "N" on the central recorder. 　• For the waveform recording and graphic trend recording, some parameters may not be able to be recorded depending on the scale. 　• When performing tabular trend recording or graphic trend recording on the central recorder, some numeric data may not be recorded depending on the parameter. Also, there are some graphic trend scales that cannot be recorded. 　• If the HR/PR source is BP (Or, if Auto selects BP for HR/PR source), ECG will not be recorded on the central recorder. PR_IBP value will be printed instead for the HR value. 　• If the RR/APNEA alarm source is other than Impedance (Or, if Auto selects other than impedance for RR/APNEA alarm source), respiration waveform will not be output on the central recorder. 　• If the RR/APNEA alarm source is other than CO_2 (Or, if Auto selects other than CO_2 for RR/APNEA alarm source), CO_2 waveform will not be output on the central recorder. 　• When graphic trend recording, tabular trend recording, or NIBP list recording is output on the central monitor recorder from the DS-7200, HR measurement value from ECG will be recorded for the HR value and ST trend.

Precautions about the Wireless Network System

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

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

⚠CAUTION	● On a wireless network, the alarm generated on the DS-7200 will be transmitted to the central monitor with 15 seconds delay. ● If the BP unit is kPa and temperature unit is °F, the measurement value will be converted to mmHg and °C respectively when transmitting to the central monitor. If kPa/°F is used as the unit on the central monitor, the measurement value will be reconverted to kPa/°F. ● If performing telemetry transmission, configure the display so that the numeric data corresponded to the waveform is displayed. If not, the displayed waveform or numeric data may not be transmitted. ● The setup of channel ID and group ID should be performed only by our service representative. Users should not perform this procedure as malfunction of the equipment may occur. ● BP waveform with a scale above the programmed scale can not be properly transmitted. When transmitting the BP waveform, check the displayed BP waveform scale. ● If the measurement unit of CO_2 concentration is "mmHg", and $\boxed{99\text{mmHg}}$ is selected for "CO_2 (mmHg) Upper Limit for LAN, Telemetry" on the monitor setup menu, the CO_2 value of 100mmHg or above will be transmitted as 99mmHg.

Precautions for Use of the Bidirectional Wireless Communications (TCON)

⚠ CAUTION	- When using the TCON system, pay attention to the following. - The medical institution (hereinafter referred to as "Institution") must execute investigation required to prevent interference including types of radio waves, frequencies, and antenna power if wireless equipment is already installed and being used in the facility. - Even if this device is installed within the range of radio communication, the communication may not be possible due to noise or multi-path phasing etc. Always consider this thoroughly before use. - Do not install this device in an area where it will be subject to splashing water. Water entering the equipment may cause the equipment to malfunction or be damaged. - In managing the TCON system, make sure to follow the precautions below. - The Institution should appoint a person (hereinafter referred as the "Overall Manager") to manage the wireless devices for the whole facility. - When installing the TCON, the Overall Manager has to receive an explanation of the precautions for use of the TCON from the manufacturer or sales representative. - The Overall Manager is responsible for the maintenance and storage of the equipment. - The Overall Manager should create a management log (hereinafter referred to as the "log"), which contains a list of the management status of the wireless channels for the whole facility. When assigning or changing wireless channels, register it in the log, and give proper instructions to the TCON user. - The user needs to verify the transmitting/receiving operation before use. - If interference or breakdown occurs in the communication, the TCON user is required to stop using the TCON and to inform the Overall Manager of the problem. The Overall Manager is to deal with the problem properly and/or contacts the nearest Fukuda Denshi representative for service. - Precautions for operations The Bidirectional Wireless Communications Module (TCON) uses radio waves to transmit data. Therefore, necessary precautions need to be taken for the characteristics and difficulties of using the device that emits radio waves. The TCON user should fully understand these precautions beforehand, and use the TCON device safely. 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. 1. The patient's data may become mixed with a different patient's data due to interference. • When there are multiple TCON communication devices set to the same TCON ID and channel (group). 2. When symptoms such as being unable to communicate, unstable communication, or poor reception may occur. • When the radio communication is bad because there are metal, concrete, or other such obstacles between the Bidirectional Wireless Communications Modules (TCON). • When a different wireless device is using the same frequency (channel). • When there are other TCON devices nearby using different channels (groups). • When a cell telephone or other wireless device is being used nearby. • When citizens broadcast bands such as amateur radio or truck radios are used in the vicinity of the TCON operating area.

⚠ CAUTION	• 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 TCON group is set with a TCON channel frequency that is too close to the channel frequency set for the current TCON group.
	● 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.
	● For the TCON ON/OFF setup, if the "OFF" is selected, the message such as "Check TCON Comm." will not be displayed.
	● Check that the TCON radio wave strength between the central monitor and bedside monitor is sufficient. Make sure that " 📶 " mark is displayed.
	● Check that the TCON Channel (Group) is the same for the bedside monitor and the central monitor in the same TCON group.
	● Do not move the TCON device during operation. Otherwise, symptoms such as being unable to communicate, unstable communication, or poor reception may occur.
	● There are following restrictions when connecting the DS-7200 system to the TCON Network.
	  • If the measurement unit for temperature is "°F", the central monitor can not receive the measurement data for temperature. In addition, the alarm settings for temperature can not be operated from the central monitor.
	  • If the measurement unit for BP is "kPa", the central monitor can not receive the measurement data for NIBP, BP1, and BP2. In addition, the alarm settings for NIBP, BP1, and BP2 can not be operated from the central monitor.
	● The NIBP measurement cannot be started from the central monitor via TCON system if the NIBP measurement interval is set to $\boxed{2 \text{ min}}$ / $\boxed{2.5 \text{ min}}$ / $\boxed{3 \text{ min}}$ / $\boxed{5 \text{ min}}$ or during the 1-minute measurement. However, it can be stopped.
	● If the measurement unit of CO_2 concentration is "mmHg", the CO_2 value of 100mmHg or above will be transmitted as 99mmHg even within measurement range.

Precautions about the Ventilator Monitoring

⚠ WARNING	● The ventilator alarm on this monitor should be used as supplementary function. Check the patient's condition, ventilator alarm sound and message occasionally. ● The ventilator alarm sound is set to OFF at factory default setting. The alarm sound can be turned ON on the volume setup menu. ● If the DS-7200 system does not generate an alarm even though the ventilator is generating an alarm, or if any other malfunction occurs, immediately check the ventilator, DS-7200 system, cable, and replace the cable if necessary. If the malfunction persists, stop using the device. ● After connecting the ventilator and the DS-7200, ensure that "Vent. Online" message is displayed for the connection status. Otherwise, the DS-7200 will not detect the ventilator alarm. ● The alarm generation on the DS-7200 system is not assured if the alarm other than specified generates at the ventilator. ◗See For details of the specified alarms, refer to ⚠WARNING on "2. Basic Operation Ventilator Alarm Input". ● The Evita2dura / Evita4 / EvitaXL / Savina acquires alarm information from the serial port. The ventilator alarm that cannot be acquired from the serial port is not guaranteed. For corresponding alarm, refer to the service representative of the ventilator manufacturer. ● The DS-7200 system will not correspond to the following alarms generated on the Evita 4 / Evita XL / Evita 2 dura. • O_2 monitoring disabled alarm, CO_2 alarm disabled alarm, Oximeter alarm disabled alarm, Neo. volume measurement inoperable alarm, Minute volume alarm disabled alarm, Minute volume alarm low off alarm, Tidal volume alarm high off alarm, Apnea alarm off alarm, Nebulizer active alarm ● There is a communication delay of 3 seconds between the DS-7200 system and the Evita ventilator. Therefore, if the alarm generated at the ventilator is resolved within 3 seconds, the ventilator alarm may not be generated at the DS-7200 system. ● The DS-7200 system will not correspond to the following alarms generated on the Savina. • O_2 monitoring disabled alarm, Minute volume alarm disabled alarm, Minute volume alarm low off alarm, Tidal volume alarm high off alarm, Apnea alarm off alarm, Nebulizer active alarm ● There is a communication delay of 3 seconds between the DS-7200 system and the Savina ventilator. Therefore, if the alarm generated at the ventilator is resolved within 3 seconds, the ventilator alarm may not be generated at the DS-7200 system.

⚠ CAUTION	• The ventilator operation should be performed by well-trained and authorized personnel.
	• For connecting the DS-7200 system and ventilator, use only the specified connection cable.
	• Verify that the DS-7200 system and the ventilator are properly connected.
	• When connecting the cable, verify that the main power of the DS-7200 system and the ventilator is OFF.
	• For the SV-900, PB, Evita, and Savina ventilator alarm factor cannot be transmitted to the central monitor.
	• Depending on the central monitor type and software version, ventilator alarm factor may not be displayed. For details, refer to our service representative.
	• Check occasionally the communication status of the DS-7200 and the ventilator.
	• Verify that the ventilator alarm is not generated, and the "Vent. Online" message is displayed.
	• The "Check external alarm" will be displayed until the proper communication with the ventilator is resumed. When the communication is resumed, the screen will automatically return to the home display.
	• When disconnecting the ventilator and the DS-7200, make sure to select ⏻ OFF on the "Check external alarm" display which appears when the power of the ventilator is turned OFF, or when the cable is disconnected.
	• When connecting the PURITAN-BENNETT ventilator, follow the precautions below.
	  • The serial port (RS-232C) of the ventilator should be set as follows. Refer to the service representative of the ventilator manufacturer.
	    Baud Rate : 9600bps
	    Data Bit : 8bit
	    Parity Bit : None
	    (Stop Bit) : (1bit)
	  • The DS-7200 system detects the "ventilator alarm" when the nurse call port on the ventilator outputs the alarm signal. For details of ventilator setup and alarm signal output condition from the nurse call port, refer to the service representative of the ventilator manufacturer.
	• When connecting the Evita2dura / Evita4 / Evita XL / Savina ventilator, the serial port (RS-232C) setup of the ventilator should be as follows. Refer to the service representative of the ventilator manufacturer.
	  • For Evita 2 dura / Evita 4 / Evita XL
	    Protocol : Medibus
	    Baud Rate : 19200bps
	    Data Bit : 8bit
	    Parity Bit : Even
	    Stop Bit : 1bit
	  • For Savina
	    Protocol : Medibus
	    Baud Rate : 9600bps
	    Data Bit : 8bit
	    Parity Bit : None
	    Stop Bit : 1bit
	• For PURITAN-BENNETT ventilator, AWP and AWF waveform cannot be displayed or recorded. Only the numeric data will be displayed.
	• For SV-300 and Servo-i/s, P-V loop and F-V loop cannot be displayed or printed. In addition, Insp Resistance, Exp Resistance, Compliance value cannot be displayed or printed on the ventilator numeric data display.
	• For SV-900, P-V loop, F-V loop and numeric data cannot be displayed or printed. Only the alarms will be generated.
	• For PURITAN-BENNETT ventilator, P-V loop and F-V loop cannot be displayed or recorded. Only the numeric data will be displayed.

Precautions for Use of SpO$_2$ Sensor

	Burn Risk in Using SpO$_2$ Sensor
△DANGER	In SpO$_2$ monitoring, always use the sensor/relay cable specified by Fukuda Denshi. If any other sensor/relay cable is used, a high temperature rise of the sensor may place the patient in danger of burns. If there are any questions regarding the sensor/relay cable use for SpO$_2$ measurements of this device, please contact Fukuda Denshi service representative.

Precautions for Masimo® Model: DS-7210M

	No Implied License
△CAUTION	Possession or purchase of this device does not convey any express or implied license to use the device with unauthorized sensors or cables which would, alone, or in combination with this device, fall within the scope of one or more of the patents relating to this device.

Precautions for Use of NIBP Cuff

△CAUTION	This product contains natural rubber latex which may cause allergic reactions. (FDA: Medical Alert on Latex Products, "Allergic Reactions to Latex-Containing Medical Devices", Food & Drug Administration, 9200 Corporate Blvd., Rockville, MD 20850, 1991.)

Disposing of Equipment, Accessories, or Components

△CAUTION	When disposing of the equipment, accessories, or components, use an industrial waste distributor. Do not dispose of as ordinary waste.

Precautions about Transportation

For transporting the DS-7200 system, pack with specified packing materials.

> Reference Refer to "11. Technical Information   Specification / Performance" for environmental condition during transportation.

Precautions about RTC or Data Backup

△CAUTION	● The DS-7200 system is equipped with a built-in clock. When the power of the DS-7200 system is turned off, this clock is backed up by a lithium primary battery. If incorrect time is displayed when turning on the power, a low battery may be the cause. In such case, contact Fukuda Denshi service representative for replacing the battery. ● To protect the data during voltage dip, short interruptions and voltage variations on power supply input lines or during short duration of power turned OFF, this monitor performs 5-minute (approx.) data backup using the secondary battery. The data may not be protected if the power is turned off within 30 minutes from power on.

Precautions for Use of Lithium-Ion Battery Pack

⚠DANGER	• This battery pack is intended for exclusive use with the DS-7200 system (or other specified equipment). Do not use with other equipment. Otherwise, the performance and life cycle of the battery pack deteriorates, and may cause leakage, heating, fuming, ignition, and explosion of the battery. • Do not disassemble or remodel the battery pack. If the security apparatus or protector inside the battery pack gets damaged, it may cause leakage, heating, fuming, ignition, and explosion of the battery. • Do not use the battery pack if leaked or transformed. If the security apparatus inside the battery pack is damaged, it may cause leakage, heating, fuming, ignition, and explosion of the battery. • When installing the battery to the device, ensure the connector direction is correct. If installed in opposite direction, it may cause leakage, heating, fuming, ignition, and explosion. • If the leaked solution of the battery gets into the eyes, do not rub the eyes. Wash thoroughly with clean water and immediately receive medical treatment from the doctor. If not treated soon, it may cause serious injury.

⚠WARNING	• If the leaked solution of the battery gets on to the skin or clothes, immediately wash down with rinse water. If not treated soon, it may cause serious injury. • If the charging operation does not complete within specified time, immediately remove the battery pack from the monitor and unplug the power cable. Otherwise, it may cause leakage or heating of the battery. • Do not throw the battery pack into fire or apply heat. The insulator may melt, gas exhaust vent or security apparatus may get damaged, or electrolyte may ignite causing leakage, heating, fuming, ignition, and explosion of the battery. • Do not connect the (+) and (–) terminals of the battery with a wire or any other metal. Also, do not carry or store the battery with any metal such as necklace, hairpins, etc. The battery may short causing excessive current flow which may result in leakage, heating, fuming, ignition, and explosion of the battery, or heating of the metal (wire, necklace, hairpin, etc.) • Do not directly solder on to the battery pack. The heat may melt the insulator or damage the security apparatus which may result in leakage, heating, fuming, ignition, and explosion of the battery. • Do not put the battery pack in microwave oven or a pressure cooker. If heated suddenly or if sealed condition breaks, it may result in leakage, heating, fuming, ignition, and explosion of the battery. • Do not drive a nail in, hit with a hammer, step on the battery pack, or peel off or scratch the exterior tube. The battery may explode and transform causing short-circuit which may result in leakage, heating, fuming, ignition, and explosion of the battery.

⚠WARNING	● Do not apply strong impact or throw the battery pack. This may result in leakage, heating, fuming, breakage, ignition, and explosion of the battery. Also, if the security apparatus incorporated in the battery gets damaged, the battery charges with abnormal current and voltage, which results in leakage, heating, fuming, ignition, and explosion. ● Do not get the battery pack wet with water, sea water or chemicals. If the security apparatus incorporated in the battery gets damaged, it may result in leakage, heating, fuming, ignition, and explosion of the battery pack. ● Do not connect the battery pack directly to power outlet or cigarette heater socket in a car. A high voltage application will cause excessive current flow and abnormal chemical reaction inside the battery. This may result in leakage, heating, fuming, ignition, and explosion of the battery. ● Do not use or leave the battery in a high temperature (80°C or over) such as near the fire or heater. If the resin separator gets damaged by heat, the battery pack may become unusable, or may short causing leakage, heating, fuming, ignition, and explosion. ● If the battery is leaking or generating an abnormal odor, immediately remove the battery away from the fire. The leaked electrolyte may cause heating, fuming, ignition, and explosion.

⚠CAUTION	● Do not peel off or scratch the exterior tube. ● Do not use or leave the battery in high temperature. It may result in leakage or deterioration of the performance / life cycle of the battery. ● Immediately stop using the battery if any abnormality is found during use. ● Do not use / store the battery in reach of infants. ● If not using the device for a long period of time, turn OFF the power of the monitor and unplug the power cable. Otherwise, it may result in leakage of the battery pack. ● When disposing of the Lithium-Ion Battery Pack, use an industrial waste distributor. Do not dispose of as ordinary waste. ● Users should not attempt to install or replace the battery pack. For installation and replacement of the battery pack, contact our service representative.

To Prepare for Emergency Use

1. Accessories / Optional Accessories
   (1) The ECG electrodes are consumable products. Always prepare extra supplies of electrodes.
   (2) Verify that there is no wire break on the patient cable. Check the operation once a week.

2. Battery Pack
   (1) The battery self-discharges even when not in use. If there is any possibility to use the battery in emergency, the power cable should be always connected to the power receptacle. To fully charge the empty battery, it takes approximately 3 hours when the monitor is not operating, and approximately 10 hours when the monitor is operating.

Reference	Refer to "2. Basic Operation To Use with the Battery Pack"

   (2) The performance of the battery deteriorates with repeated use. To maintain the initial performance, replace the battery at least once a year. It is recommended to indicate the start usage date on the battery so that the replacing date can be easily recognized.

Electromagnetic Compatibility

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

Precautions for Safe Operation under Electromagnetic Influence

⚠ C A U T I O N	If any sorts of electromagnetic wave, magnetic field, or static electricity exist around the device, noise interference or malfunction of the device may occur. If any unintended malfunction or noise occurs during monitoring, check the magnetic influence and take appropriate countermeasures. The following are examples of the common cause and countermeasures. ● 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. ● 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. ● Lightning • A lightning nearby may induce excessive voltage to the equipment. If any danger is suspected, use the uninterruptible power supply system. ● High frequency noise interference from other device through the power outlet • Check where the noise is originated and remove it using filtering device, etc. • Stop using the device that is originating the noise. • Use other power outlet.

EMC Guidance

This equipment complies with IEC60601-1-2 (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. Therefore, 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 technician.

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-7200 system is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-7200 system should assure that it is used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment - Guidance
RF Emissions CISPR 11	Group 1	The DS-7200 system uses RF energy only for its internal functioning of the equipment itself. 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	This DS-7200 system is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic Emissions IEC 61000-3-2	Not applicable	
Voltage Fluctuations/ Flicker Emissions IEC 61000-3-3	Not applicable	

●Compliance to the Electromagnetic Immunity (1)

The DS-7200 system is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-7200 system should assure that it is used in such an environment.

Immunity Test	IEC60601-1-2 Test Level	Compliance Level	Electromagnetic Environment - Guidance
Electrostatic Discharge (ESD) IEC 61000-4-2	$\pm$6kV contact $\pm$8kV air	$\pm$6kV contact $\pm$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	$\pm$2kV for power supply lines $\pm$1kV for input/output lines	$\pm$2kV for power supply lines $\pm$1kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	$\pm$1kV: differential mode $\pm$2kV: common mode	$\pm$1kV: differential mode $\pm$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 cycle 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 5sec.	<5% U_T (>95% dip in U_T) for 0.5 cycle 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 5sec.	Mains power quality should be that of a typical commercial or hospital environment. If the user of the DS-7200 system requires continued operation during power mains interruptions, it is recommended that the DS-7200 system is equipped with an internal battery (option) or is powered from an uninterruptible 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.

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

●Compliance to the Electromagnetic Immunity (2)

The DS-7200 system is intended for use in the electromagnetic environment specified below. The customer or the user of the DS-7200 system should assure that it is used in such an environment.

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-7200 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	$d = 1.2\sqrt{P}$ 80MHz to 800MHz $d = 2.3\sqrt{P}$ 800MHz to 2.5GHz Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[a], should be less than the compliance level in each frequency range[b]. Interference may occur in the vicinity of equipment marked with the following symbol:

Note 1 : At 80Mhz and 800MHz, 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.

[a] 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 cannot 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-7200 system is used exceeds the applicable RF compliance level above, the DS-7200 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-7200 system.

[b] Over the frequency range 150kHz to 80MHz, field strength should be less than 3V/m.

●Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the DS-7200 System

The DS-7200 system is intended for use in an environment in which radiated RF disturbances are controlled. The customer or the user of the DS-7200 system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the DS-7200 system as recommended below, according to the maximum output power of the communications equipment.

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.

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.

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Contents

Preface

1. General Description

2. Basic Operation

3. Vital Application

4. Monitoring Setup

5. Admit / Discharge of a Patient

6. Parameter Setup

7. Function

8. System Configuration

10. Maintenance

11. Technical Information

12. Accessories

Chapter 4
Monitoring Setup

This chapter describes the setup procedure according to the monitoring purpose.

The monitoring display can be configured according to the monitoring purpose. There are 5 types of basic display mode, which are Standard, 12-lead, Extended 1, Extended 2, and Enlarged. For the Standard mode, graphic trend, ventilator, tabular trend, NIBP list, OCRG, block cascade can be simultaneously displayed.

<Standard>
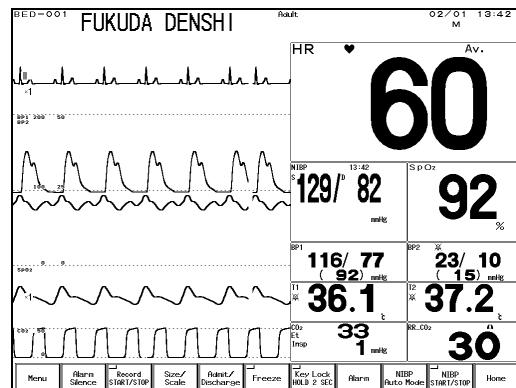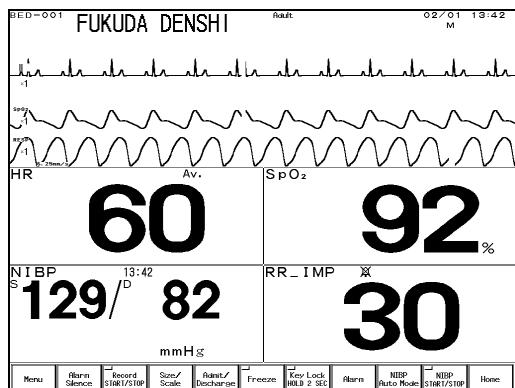
<12-lead>

<Extended 1>

<Extended 2>

<Enlarged>

<Block Cascade>
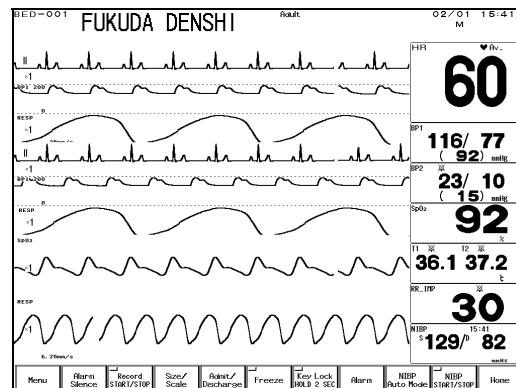
Also, 5 patterns of configured display can be programmed using the display mode setup function. By preprogramming the configuration to each display mode, the display configuration setups at admittance of patient can be simplified by just selecting one of the display modes.
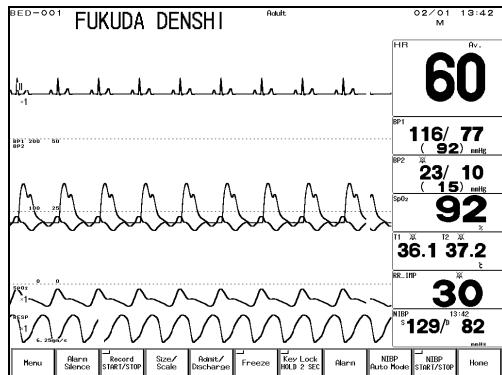
Reference   For display mode setup procedure, refer to "8. System Configuration   Display Mode To Program the Display Mode"
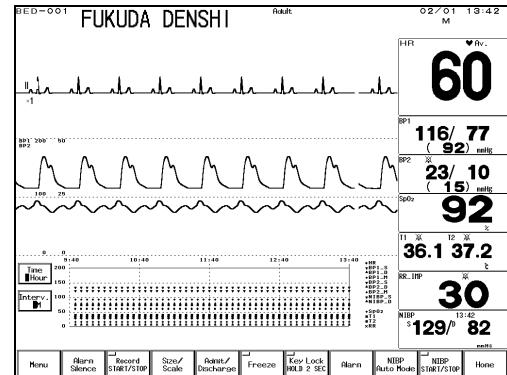
To Configure the Display   Standard Mode
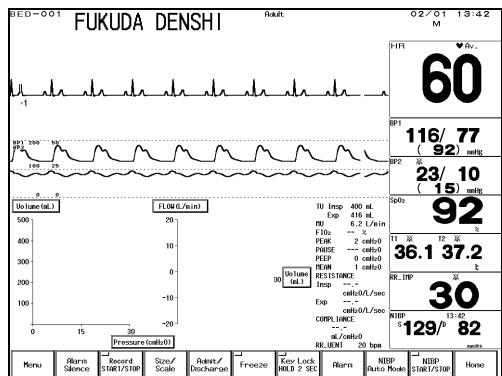
For the standard mode, maximum of 10 waveforms and 8 numeric data can be displayed.
On the waveform display area, graphic trend, ventilator, tabular trend, NIBP list, OCRG can be also displayed. If block cascade is selected, long duration waveform can be displayed.
The duration of waveform display is approximately 7.9 seconds.

<Standard>

<Standard (Graphic Trend)>

<Standard (Ventilator)>

<Standard (Tabular Trend)>

<Standard (NIBP List)>

<Standard (OCRG)>

4

Display Configuration
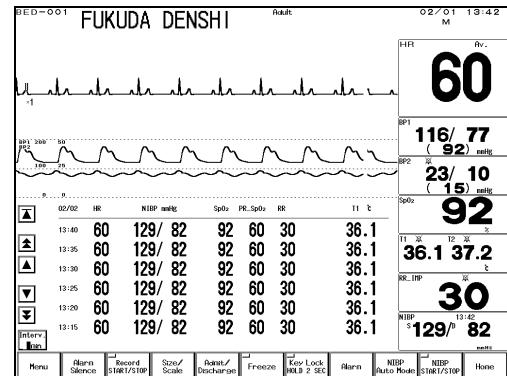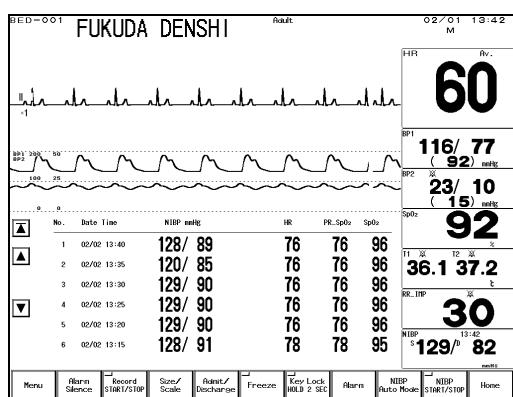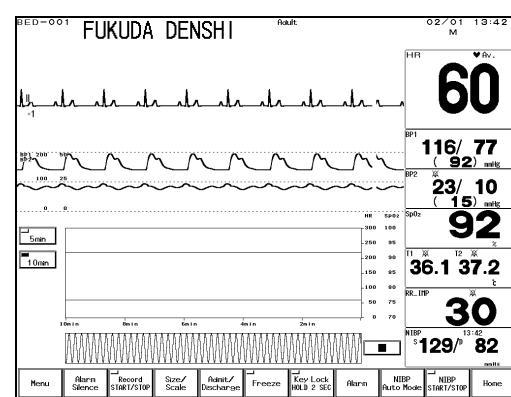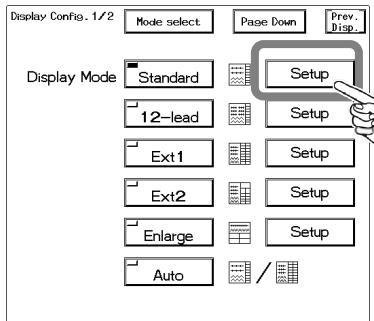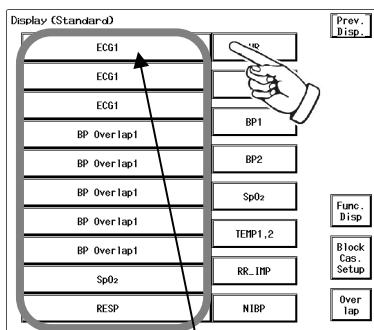
1 **Press the** ⃞ **Menu** **→** ⃞ **Display Config.** **keys.**

Press the ⃞ Setup key.

Display Config. 1/2	Mode select	Page Down	Prev. Disp.
Display Mode	Standard	▦	Setup
	12-lead	▦	Setup
	Ext1	▦	Setup
	Ext2	▦	Setup
	Enlarge	▦	Setup
	Auto	▦ / ▦	

2 **Select the waveform to display.**

Pressing one of the waveform display location will display the waveform selection window. Select the parameter.

Selecting the parameter on the waveform selection window will sequentially assign the parameter from the top. To change the selection, pressing the waveform display location key will allow reselecting the parameter for that location.

<Waveform Display Location Key>

<Waveform Selection Window>
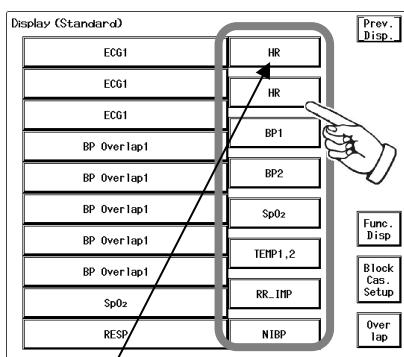
If the same parameter is repeatedly selected, the waveform display area for that parameter will be enlarged.

ECG1
ECG1
ECG1
ECG1
ECG1
BP Overlap1

3 Select the numeric data to display.

Pressing one of the numeric data display location will display the numeric data selection window. Select the parameter.

Selecting the parameter on the numeric data selection window will sequentially assign the parameter from the top. To change the selection, pressing the numeric data display location key will allow reselecting the parameter for that location.

<Numeric Data Display Location Key>

<Numeric Data Selection Window>
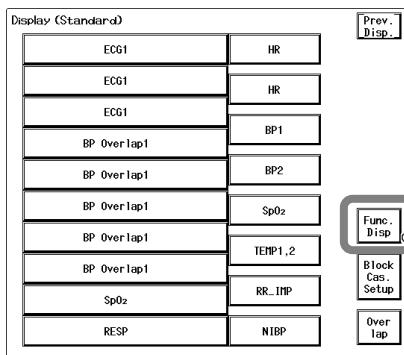
The numeric data display layout can be changed. By repeatedly selecting the same parameter, the numeric data display area for that parameter will be enlarged.
The parameter can be repeatedly selected for up to 3 times.

> *Reference*　For details of the data which will be displayed by selecting each key, refer to "The Corresponding Key for Each Numeric Data Box" in this chapter.

4 Select the function display.

Press the ⟨ Func. Disp ⟩ key and display the function display selection window.
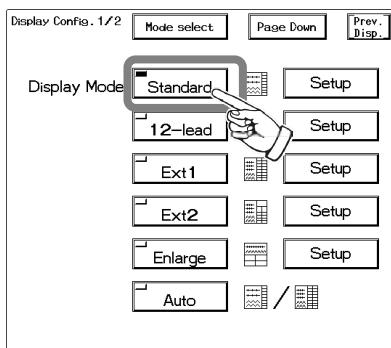
Select the function display from $\boxed{\text{Trend}}$, $\boxed{\text{List}}$, $\boxed{\text{NIBP List}}$, $\boxed{\text{OCRG}}$, $\boxed{\text{VENT.}}$.
3 rows / 6 rows indicates the size to display the graphic trend and OCRG.

Function Display

Trend(3rows)	Trend(5rows)
List(3rows)	List(5rows)
NIBP List (3rows)	NIBP List (5rows)
OCRG(3rows)	OCRG(5rows)
VENT.(5rows)	

*The display area is fixed.
(lowermost part of waveform area)

Close

<Function Display Tool>

5 **Select "Standard" for the display mode.**

Display Config.1/2 | Mode select | Page Down | Prev. Disp.

Display Mode
Standard — Setup
12-lead — Setup
Ext1 — Setup
Ext2 — Setup
Enlarge — Setup
Auto

Press the $\boxed{\text{Prev. Disp.}}$ key to return to the display configuration menu.
Then, press the $\boxed{\text{Standard}}$ key for the display mode.

⚠CAUTION	If performing telemetry or wired network transmission, configure the display so that the numeric data corresponding to the waveform is displayed. If not, the displayed waveform or numeric data may not be transmitted.

NOTE	● After configuring the display, press the $\boxed{\text{Home}}$ key to verify the programmed display configuration. ● To maintain the configured display even after the power is turned OFF or after a discharge procedure, save the configuration to one of the display modes, or select $\boxed{\text{Backup}}$ for "Display Config." on the "Backup at Discharge" menu (Monitor Setup). For display mode setup procedure, refer to "8. System Configuration Display Mode".

The 12-lead mode displays 12-lead ECG waveforms and other selected waveforms (respiration, SpO_2, etc.). ECG waveforms are displayed in segments at the center of the waveform display area.
The number of waveforms and numeric data that can be displayed are as follows.

Waveforms (Display Duration)	ECG 12-lead (3.9 sec.) + Other waveforms: max. 2 (approx. 7.9 sec.) Total: Max. 14 waveforms
Numeric Data	Max. 8 numeric data

1 **Press the** | **Menu** | **→** | **Display Config.** | **keys and display the display configuration menu.**
Then press the | **Setup** | **key for the 12-lead mode.**

The display configuration menu will be displayed.

<Display Configuration Menu>

2 **Select the waveform and numeric data to display.**

Pressing the waveform display location key will display the waveform parameter selection window. Select the parameter.

<Waveform Display Location Key>

4

Display Configuration

Pressing one of the numeric data display location will display the numeric data selection window. Select the parameter.

The numeric data display layout can be changed. By repeatedly selecting the same parameter, the numeric data display area for that parameter will be enlarged.

The parameter can be repeatedly selected for up to 3 times.

HR
HR
HR
BP1

<Numeric Data Display Location Key>

> **Reference** For details of the data which will be displayed by selecting each key, refer to "The Corresponding Key for Each Numeric Data Box" in this chapter.

3 Select 12-lead for the display mode.

Press the [Prev. Disp.] key to display the display configuration menu.

Then, press the [12-lead] key for the display mode.

⚠ CAUTION | If performing telemetry or wired network transmission, display the numeric data corresponding to the waveform. If not, the displayed waveform or numeric data may not be transmitted.

NOTE |
● After configuring the display, press the [Home] key to verify the programmed display configuration.
● To maintain the configured display even after the power is turned OFF or after a discharge procedure, save the configuration to one of the display modes, or select [Backup] for "Display Config." on the "Backup at Discharge" menu (Monitor Setup).
For display mode setup procedure, refer to "8. System Configuration Display Mode".
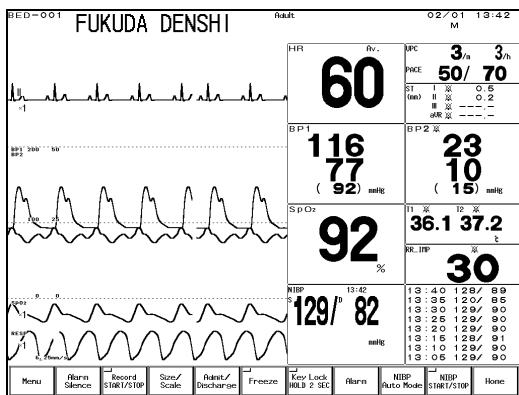
> **Reference** The 12-lead waveform can be recorded on the built-in recorder.
> For setup procedure of 12-lead waveform recording format, refer to "4. Monitoring Setup Recording Setup Recorder Setup"

For The Extended 1 mode, Maximum of 10 waveforms and 16 numeric data can be displayed.
The waveform display duration is about 5.5 seconds.
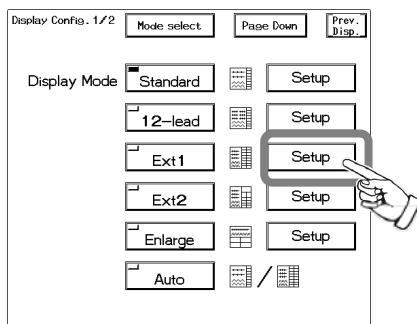
4

Display Configuration

1 **Press the** **Menu** → **Display Config.** **keys and press the** **Setup** **key for the Ext1 mode.**
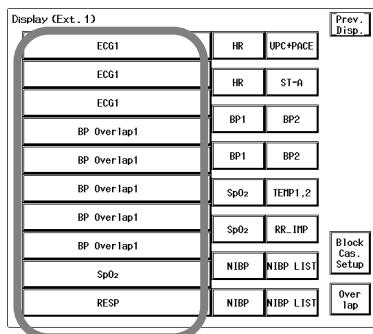
The display configuration menu will be displayed.
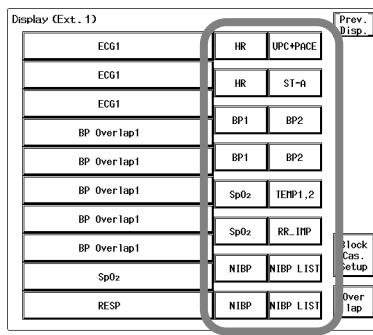
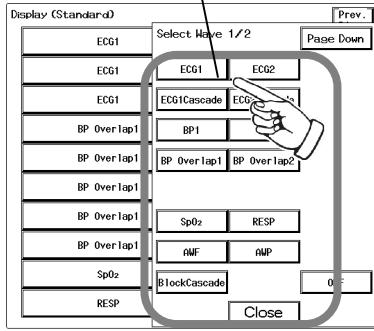<Display Configuration Menu>

2 **Select the waveform to display.**

Pressing the waveform display location key will display the
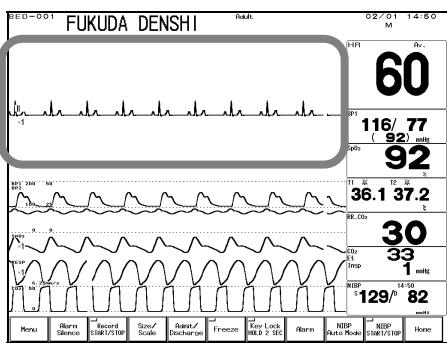waveform parameter selection window. Select the parameter.
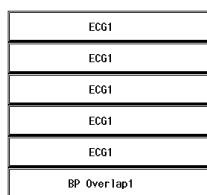
<Waveform Display Location Key>

3 **Select the numeric data to display.**
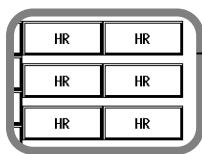
Pressing one of the numeric data display location will display the
numeric data selection window. Select the parameter.

<Numeric Data Display Location Key>
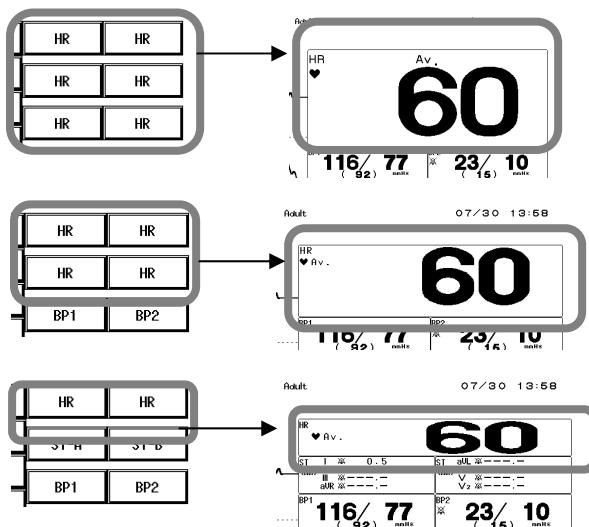
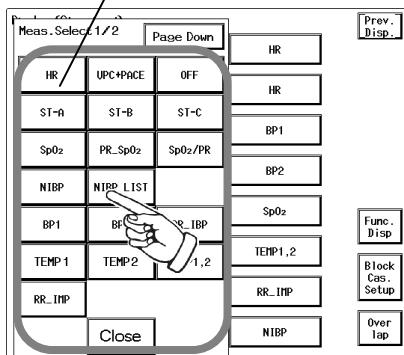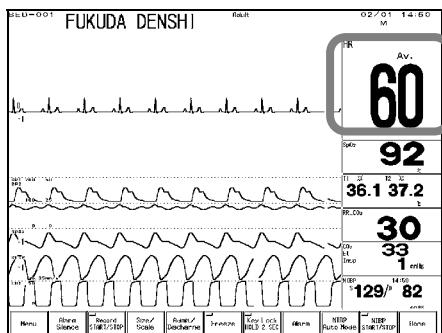By repeatedly selecting the same parameter, the numeric data display area for that parameter will be enlarged. The same parameter can be repeatedly assigned for up to 3 rows and 2 columns.
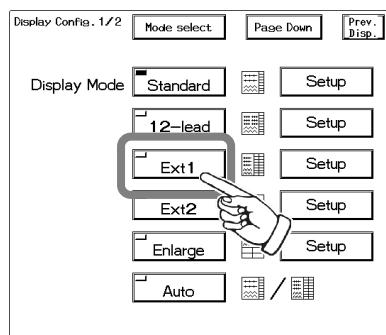
<Parameter Selection>   <Numeric Data Box Display>

4 **Select Extended 1 mode for the display mode.**

Press the ｜ Prev. Disp. ｜ key to return to the display configuration menu.
Then, press the ｜ Ext1 ｜ key for the display mode.

⚠CAUTION	If performing wired network transmission, display the numeric data corresponding to the waveform. If not, the displayed waveform or numeric data may not be transmitted.
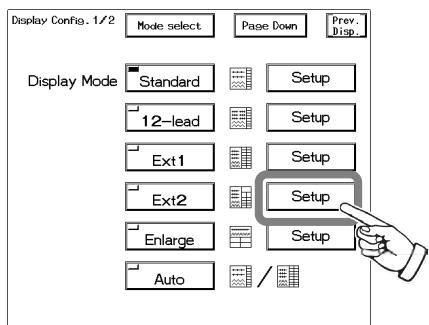
NOTE	● After configuring the display, press the ｜ Home ｜ key to verify the programmed display configuration. ● To maintain the configured display even after the power is turned OFF or after the discharge procedure, save the configuration to one of the display modes, or select ｜ Backup ｜ for "Display Config." on the "Backup at Discharge" menu (Monitor Setup). For display mode setup procedure, refer to "8. System Configuration　Display Mode".

For the Extended 2 mode, Maximum of 10 waveforms and 9 numeric data can be displayed.
The waveform display duration is about 5.5 seconds.

1 Press the ⎡ **Menu** ⎤ → ⎡ **Display Config.** ⎤ keys, and press the ⎡ **Setup** ⎤ key for the Ext2 mode.
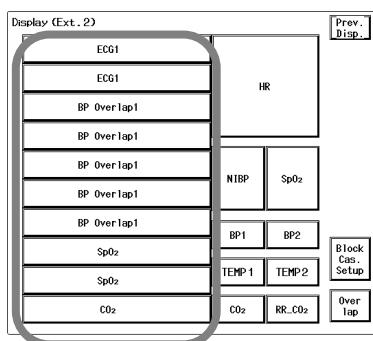
The display configuration menu will be displayed.
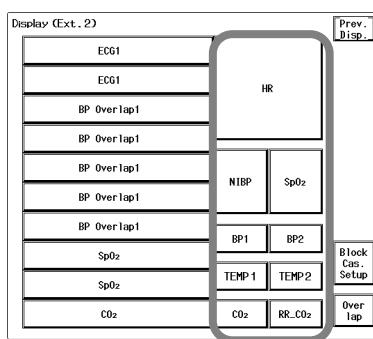
<Display Configuration Menu>

2 **Select the waveform and numeric data to display.**

Pressing the waveform display location key will display the
waveform parameter selection window. Select the parameter.

<Waveform Display Location Key>

Pressing one of the numeric data display location will display the
numeric data selection window. Select the parameter.
The numeric data display layout is fixed.
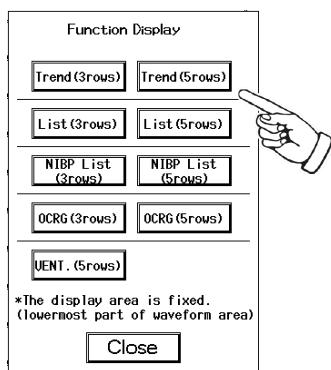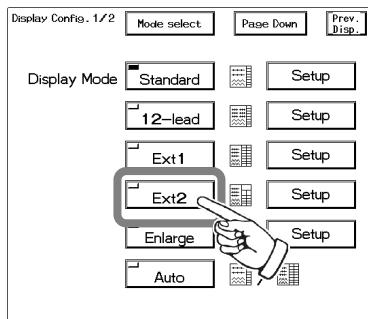
<Numeric Data Display Location Key>

Reference For details of the data which will be displayed by selecting each key, refer to "The Corresponding
Key for Each Numeric Data Box" in this chapter.

4

Display Configuration

3 **Select Extended 2 mode for the display mode.**

Press the ⎡ Prev. Disp. ⎤ key to display the display configuration menu.
Then, press the ⎡ Ext2 ⎤ key for the display mode.

⚠ CAUTION | If performing telemetry or wired network transmission, display the numeric data corresponding to the waveform. If not, the displayed waveform or numeric data may not be transmitted.
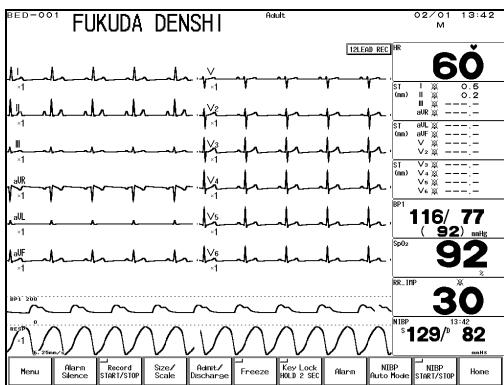

NOTE
- After configuring the display, press the ⎡ Home ⎤ key and verify the programmed display configuration.
- To maintain the configured display even after the power is turned OFF or after the discharge procedure, store the configuration to one of the display modes, or select ⎡ Backup ⎤ for "Display Config." on the "Backup at Discharge" menu (Monitor Setup).
  For display mode setup procedure, refer to "8. System Configuration Display Mode".

To Configure the Display   Enlarge Mode

The "Enlarge Mode" displays the numeric data in enlarged format. Maximum of 4 waveforms and 4 numeric data can be displayed. The waveform display duration is about 10.2 seconds.
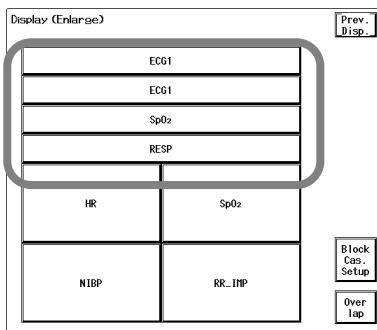
1 **Press the ⎡ Menu ⎤ → ⎡ Display Config. ⎤ keys and press the ⎡ Setup ⎤ key for the Enlarge mode.**

The display configuration menu will be displayed.
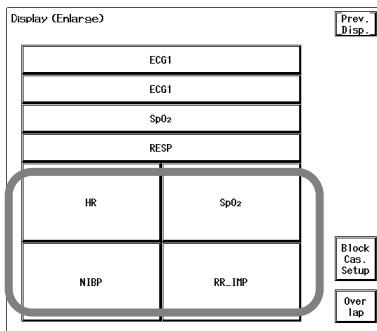
<Display Configuration Menu>

2 Select the waveform to display.

Pressing the waveform display location key will display the waveform parameter selection window. Select the parameter.

<Waveform Display Location Key>

3 Select the numeric data to display.

Pressing one of the numeric data display location will display the numeric data selection window. Select the parameter.

<Numeric Data Display Location Key>

⚠CAUTION	If performing telemetry or wired network transmission, display the numeric data corresponded to the waveform. If not, the displayed waveform or numeric data may not be transmitted.

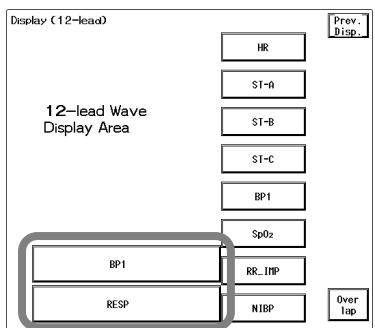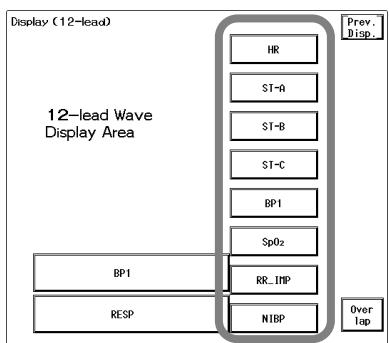| NOTE	● After configuring the display, press the ⎣Home⎤ key and verify the programmed display configuration. ● To maintain the configured display even after the power is turned OFF or after the discharge procedure, store the configuration to one of the display modes, or select ⎣Backup⎤ for "Display Config." on the "Backup at Discharge" menu (Monitor Setup). For display mode setup procedure, refer to "8. System Configuration　Display Mode".

For the standard, extended 1, extended 2, and enlarge mode, block cascade waveform can be displayed.
When the display configuration is standard mode with 2 waveforms block cascade, the maximum duration of waveform display is about 39.5 seconds (5 blocks × 7.9 sec.).
When the display configuration is extended mode with 2 waveforms block cascade, the maximum duration of waveform display is about 27.5 seconds (5 blocks × 5.5 sec.).
When the display configuration is enlarge mode with 2 waveforms block cascade, the maximum duration of waveform display is about 20.4 seconds (2 blocks × 10.2 sec.).
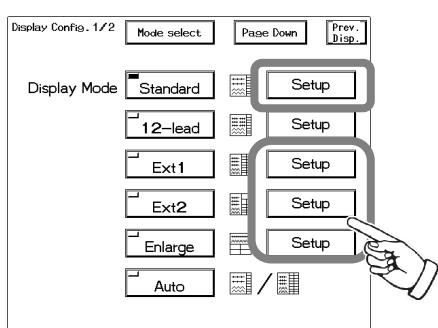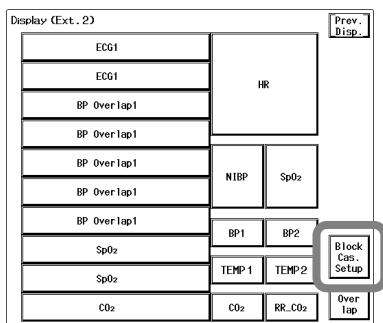
1 Press the | Menu | → | Display Config. | keys and press the | Setup | key for the display mode to set the block cascade.
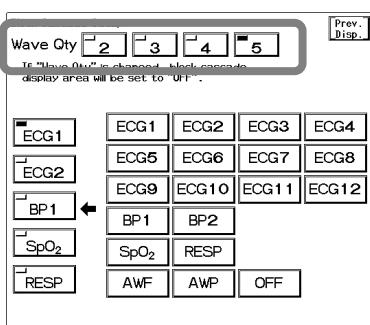
The display configuration menu will be displayed.

<Display Configuration Menu>

2 Set the block cascade.
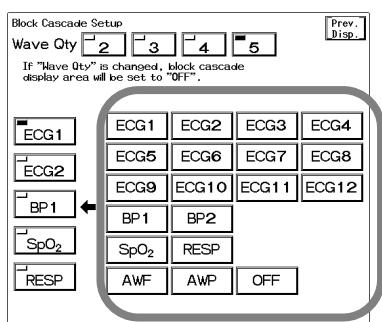
Pressing the | Block Cas. Setup | key will display the block cascade setup menu. Select the waveform quantity and parameter for the block cascade display.
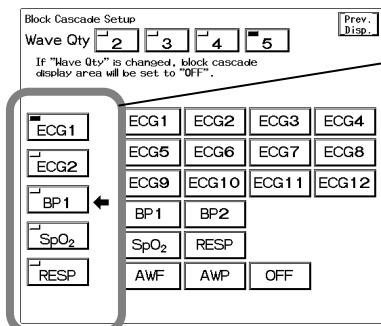
Select the waveform quantity for the block cascade from | 2 |, | 3 |, | 4 |, | 5 |, | 6 |.

<Block Cascade Setup Menu>

Select the parameter for the block cascade display.
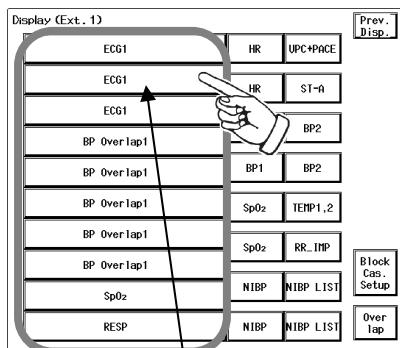
Parameter Selection

To change the selection, press the waveform display location key, and then the parameter selection key.

After the selection, press the | Prev. Disp. | key.

Waveform Display Location
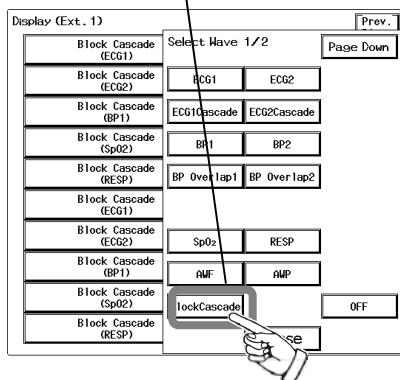
3 **Select block cascade for the displaying waveform.**

Pressing the waveform location key will display the waveform parameter selection window. Select | Block Cascade |. Pressing the block cascade key will set the block cascade for the set quantity.
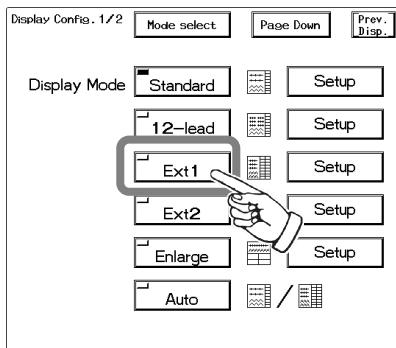
<Waveform Display Location Key>

<Waveform Parameter Selection Window>

4 **Select the display mode which the block cascade was set.**

Press the ⌈ Prev. Disp. ⌉ key to access the display configuration menu.
Then, select the display mode which the block cascade was set.

⚠ CAUTION	If performing wired network transmission, display the numeric data corresponding to the waveform. If not, the displayed waveform or numeric data may not be transmitted.
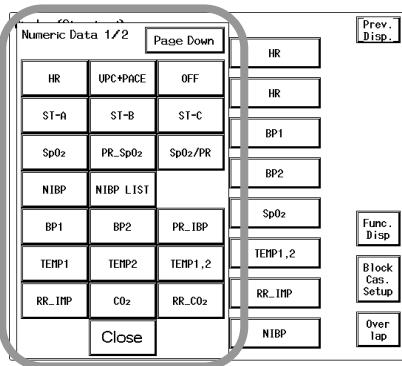
NOTE	● After configuring the display, press the ⌈ Home ⌉ key and verify the programmed display configuration. ● The block cascade setup is common for all display mode.

The Corresponding Key for Each Numeric Data Box

The numeric data to be displayed can be selected on the numeric data selection window on the display configuration setup menu. Refer to the following for the corresponding key for each numeric data box.

<Display Configuration Setup Menu
Numeric Data (1st Page)>

Reference	For details of the displayed data for each numeric data box, refer to "Display Configuration Description of the Display ●Numeric Data Box Display (for each parameter)".

【Numeric Data / 1st Page】

Key	Description
HR	Heart Rate
VPC+PACE	VPC, Pace Beat
ST-A ST-B ST-C	ST Level
SpO₂	SpO$_2$ Value
PR_SpO₂	Pulse Rate (SpO$_2$)
SpO₂+PR	SpO$_2$ Value and Pulse Rate
NIBP	NIBP Value
NIBP LIST	NIBP List
BP1 BP2	BP Value
PR_IBP	Pulse Rate (BP)
TEMP1 TEMP2 TEMP1,2	TEMP Value
RR_IMP	Respiration Rate (Impedance)
CO₂	EtCO$_2$ Value / InspCO$_2$ Value
RR_CO₂	Respiration Rate (CO$_2$)

【Numeric Data / 2nd Page】

Numeric Data 2/2			**Page Up**
VENT	RR_VENT		
SvO₂+CO	BIS		
HEMO SU SUR RUW RUSW		HEMO-I SUI SURI RUWI RUSWI	
Cursor Ref.	Cursor		STOP WATCH
BP3			
TEMP3			Tb
	Close		

| VENT | Ventilator Data |

| RR_VENT | Respiration Rate (Ventilator) |

| SvO₂+CO | Oximeter Data |

* Displayed data will differ depending on the used oximeter.

| BIS | BIS Value |

| HEMO SU SUR RUW RUSW | HEMO-I SUI SURI RUWI RUSWI |

Hemodynamic (Based on Vigilance data)

| Cursor Ref. | Reference Cursor |

| Cursor | Measurement Cursor |

| STOP WATCH | Stop Watch |

| BP3 | BP4 | BP5 | BP Value |

| TEMP3 | TEMP Value |

| Tb | Blood Temperature (When CO is measured) |

TU Insp **400** Exp **416** MV **6.2** PEAK 2 PEEP 0 MEAN 1	
RR_VENT **20**	
SvO₂ 8 3 % CO AVG 5.3 L/min CI AVG 2.8 L/min/m² BSA 1.98	
BIS **58** SQI 87% EMG 0dB SR 0%	
SU 6 5 SUR 1 3 6 3 RUW 0.5 4 RUSW 8.1	
SUI 3 8 SURI 2 3 0 4 RUWI 0.3 2 RUSWI 4.2	
Cursor(Ref.:BP1) **0** mmHg	
Cursor(BP1) Ref. 0 **100** mmHg	
TIMER1 **00:00:00** TIMER2 **00:00:00**	
BP3 **34/ 21** (**26**) mmHg	
T3 **38.3** ℃	
Tb **44.9** ℃	
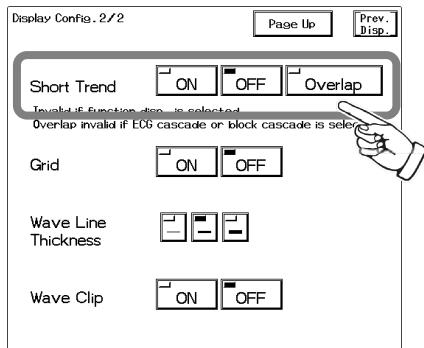
To Display the Short Trend

The short trend can be selected to be displayed on the home display.

1 **Press the** Menu → Display Config. → Page Down **keys.**
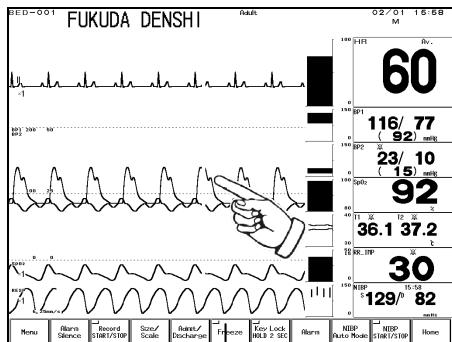
The display configuration menu will be displayed.

Short Trend Selection
ON will display the short trend on the home display.
OFF will not display the short trend on the home display.
Overlap will display the waveform and short trend overlapped.

<Display Configuration Menu>
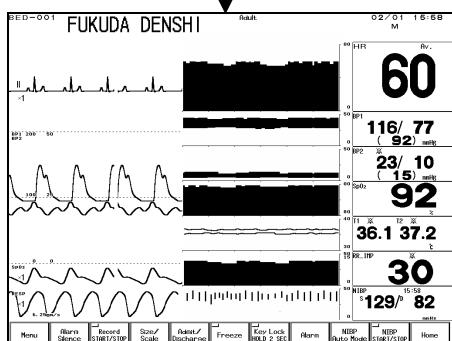
2 **Select the display type for the short trend.**

The short trend can be displayed in 5 minutes increments from 0 minute to 30 minutes.
Pressing the waveform display area will change the short trend display duration according to the pressed location.
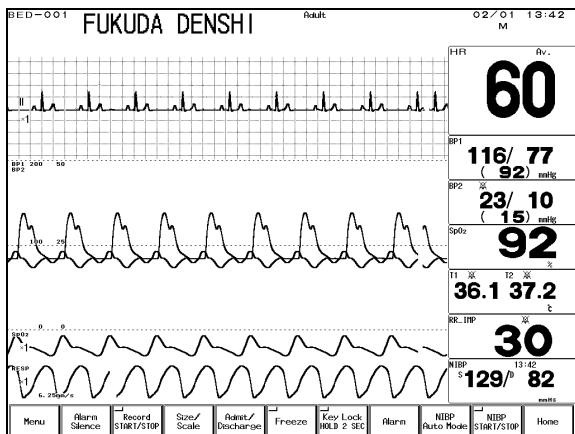
NOTE	The short trend can be displayed only for the standard display mode. However, if graphic trend, ventilator, OCRG, tabular trend, or NIBP list is displayed, short trend cannot be displayed.
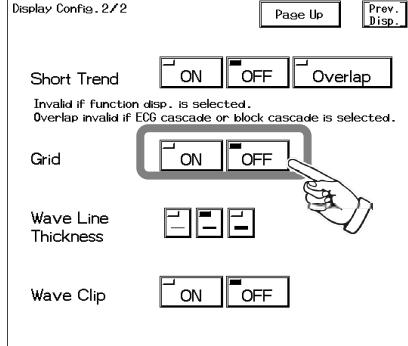
Waveform Grid Display

The ECG waveform can be selected to be displayed on the grid.

1 Press the ｜ Menu ｜ → ｜ Display Config. ｜ → ｜ Page Down ｜ keys.

The display configuration menu will be displayed.
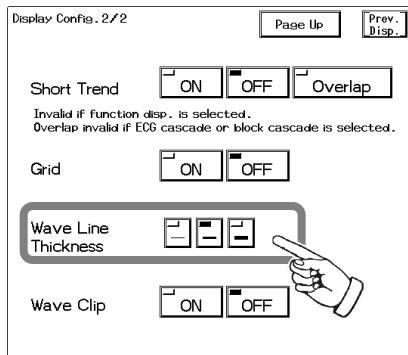
Grid Selection
｜ ON ｜ will display the grids on the home display.
｜ OFF ｜ will not display the grids on the home display.

<Display Configuration Menu>

Wave Line Thickness

The thickness of the displayed waveforms can be selected from 3 levels.

1 Press the ｜ Menu ｜ → ｜ Display Config. ｜ → ｜ Page Down ｜ keys.
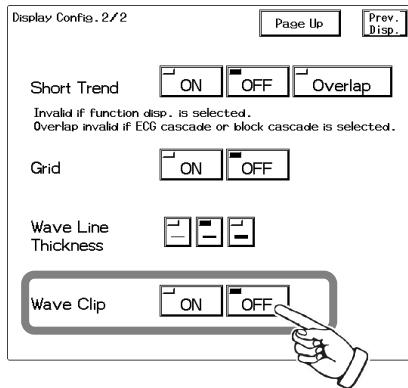
Select the wave line thickness from 3 levels.

Waveform Clipping

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

1 **Press the** | **Menu** | → | **Display Config.** | → | **Page Down** | **keys.**

| ON | will display the exceeded part of the waveform in straight line.

| OFF | will display the whole part of waveform even if it exceeds the display area. However, the exceeded part may not be displayed depending on the sweep speed of the waveform displayed above or below the gas waveform.

Display Config. 2/2 [Page Up] [Prev. Disp.]

Short Trend [ON] [OFF] [Overlap]
Invalid if function disp. is selected.
Overlap invalid if ECG cascade or block cascade is selected.

Grid [ON] [OFF]

Wave Line Thickness

Wave Clip [ON] [OFF]

4

Display Configuration

4—21

The home display layout can be automatically configured by setting the display mode to $\boxed{\text{Auto}}$, or pressing the $\boxed{\text{Optimize Display}}$ key preprogrammed as user key.
The display will be automatically configured to either "Standard" mode or "Extended 1" mode depending on the quantity of the measured parameters.

NOTE	● The parameter that is not measured will not be displayed. ● The low priority parameter may not be displayed. ● Some parameters (ST, etc.) are not included in the optimization setup selection. To display these parameters on the home display, set the display configuration manually.
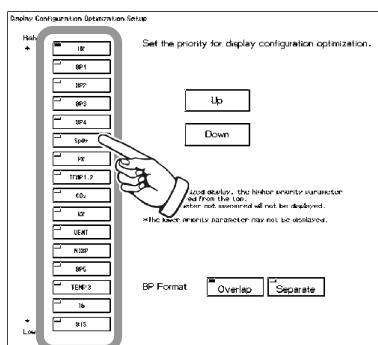
●Set the Display Priority

Set the order of priority to display the parameters for optimized display configuration.
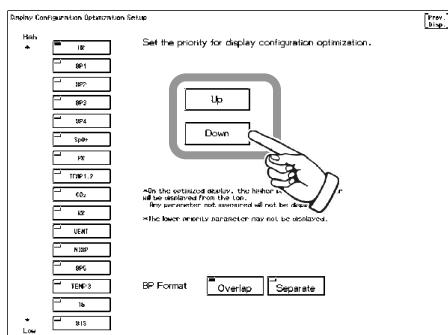
1 **Press the** $\boxed{\text{Menu}}$ → $\boxed{\text{System Configuration}}$ → $\boxed{\text{Pre-Set}}$ → $\boxed{\text{Monitor Setup}}$ → $\boxed{\text{Display Optim. Setup}}$ **keys.**

The display configuration optimization setup menu will be displayed.

2 **Set the order of priority for displaying the parameters.**

Select the parameter to change the order of priority.

Use the $\boxed{\text{Up}}$ or $\boxed{\text{Down}}$ keys to change the order of priority for that parameter.

NOTE	PR includes PR_SpO$_2$ and PR_IBP.

3 **Select whether to overlap or separate the BP waveform display.**
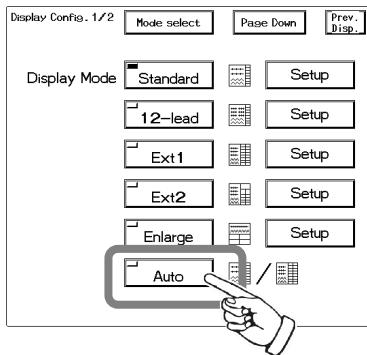
BP Format $\boxed{\text{Overlap}}$ $\boxed{\text{Separate}}$

●Optimize the Display

By selecting ⎣ Auto ⎦ for the display mode or by pressing the ⎣ Optimize Display ⎦ key preprogrammed as user key, the home display will be automatically configured by arranging the currently measured parameters according to the display priority set on the display optimization setup menu.
The display mode will be either "Standard" mode or "Ext. 1" mode depending on the number of parameters.

1 To optimize the display using the auto mode function, press the ⎣ Menu ⎦ → ⎣ Display Config. ⎦ keys and display the display configuration menu.
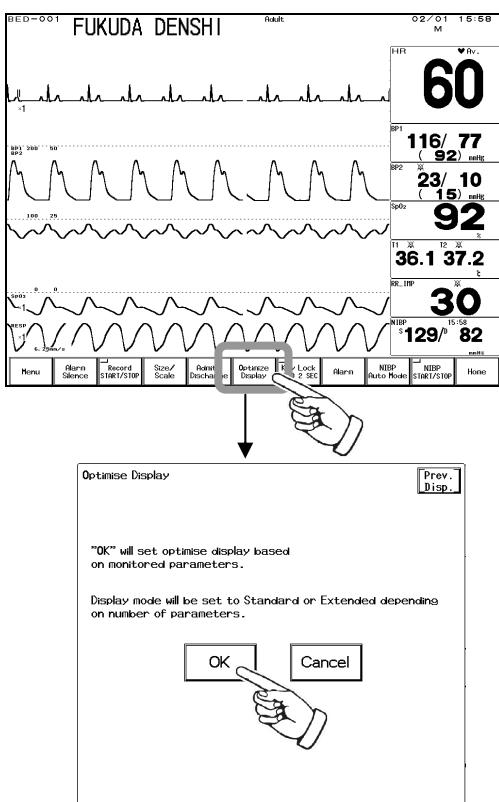
Select ⎣ Auto ⎦ for the display mode, and return to the home display.

The home display will be automatically configured by arranging the currently measured parameters according to the display priority set on the display optimization setup menu.
Each time the probe or sensor is plugged/unplugged, the home display will be reconfigured.

<Display Configuration Menu>

2 Another way to optimize the display is to press the ⎣ Optimize Display ⎦ key preprogrammed as user key.
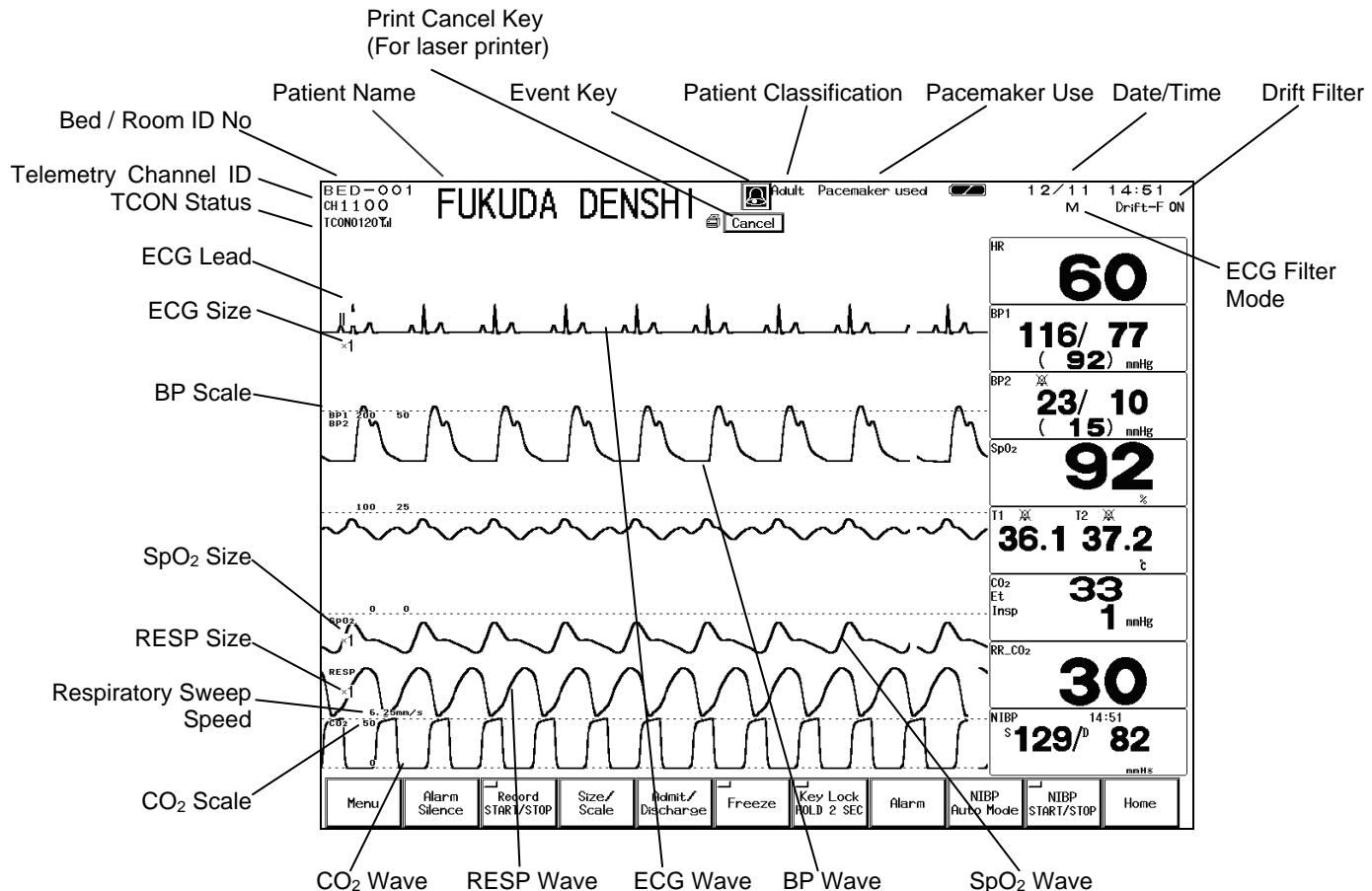
The confirmation message will be displayed. Pressing the ⎣ OK ⎦ key will optimize the display.

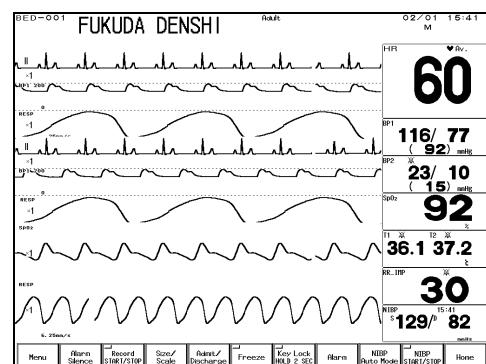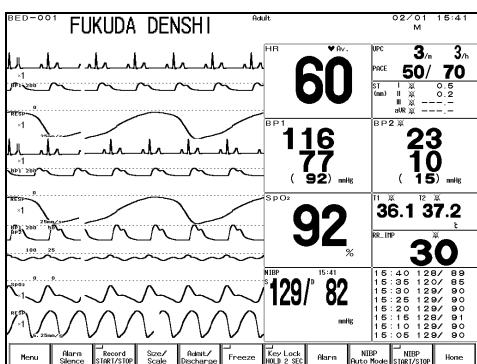| NOTE	● The optimized display configuration will be overwritten to the current display configuration (Standard / Ext. 1).
	● To maintain the configured display even after the power is turned OFF or after the discharge procedure, store the configuration to one of the display modes, or select ⎣ Backup ⎦ for "Display Config." on the "Backup at Discharge" menu (Monitor Setup). For display mode setup procedure, refer to "8. System Configuration Display Mode".

Description of the Display

This section explains the displayed item on the home display.

●Waveform Display Area

Bed / Room ID No.

Displays the 4-digit Bed ID and 3-digit (000 to 999) Room ID.

Telemetry Channel ID

Displays the channel ID of the built-in telemeter.

TCON Status (For Bidirectional Wireless Communications Module, HTC-702)

Displays the TCON communication condition, TCON ID, and TCON group (channel).

> *Reference* For more details, refer to "Description of Bidirectional Wireless Communications (TCON) Display" in this section.

Battery Mark

Displays the battery condition in 3 levels when the monitor is operated by battery.

Battery Pack	*Battery Condition*	*Indication of Operation Time*	
		Normal Mode	*Power Saving Mode*
(Full icon)	Full	About 3 to 2 hours	About 4 to 2 hours
(Half icon)	The remaining battery is less than half.	About 2 hours to 20 minutes	About 2 hours to 20 minutes
(Empty icon)	The battery is almost empty. Connect to the AC power source immediately.	About 20 minutes or less	About 20 minutes or less

> *Reference* For power saving mode, refer to "8. System Configuration Monitor Setup ●Battery Operation".

⚠ CAUTION	The above operation time indicates the time with a new battery pack performing ECG measurement, NIBP periodic measurement (5-minute interval). Note that the battery pack degrades with continuous use and shortens the usable time.

Date/Time

Displays the current date (month, day) and time (hour, minute).

Patient Name / Patient Classification

Displays the patient name and patient classification (adult / child / neonate) selected on the admit menu.

Pacemaker Use

When "Used" is selected for "Pacemaker" on the admit menu, "Pacemaker used" will be displayed.

Drift Filter

When drift filter is set to ON, "Drift-F ON" will be displayed.
Depending on the setup, enlarged clock can be displayed instead of drift filter message.

03/27 M **11:34** ← Enlarged clock display

Reference	For procedure to select the drift filter or enlarged clock display, refer to "8. System Configuration　Monitor Setup"

ECG Filter Mode

Displays the selected ECG filter mode. (M: Monitor mode, E: ESIS mode, D: Diagnosis mode)

Respiratory Sweep Speed

Displays the sweep speed for the impedance respiration waveform, CO_2 waveform, AWP, AWF waveform.

Event Key

This touch key will be displayed at alarm occurrence. Even when the alarm is resolved, this key will remained to be displayed until it is pressed. Pressing this key will silence the alarm and display the recall display. The event key display can be selected ON or OFF.
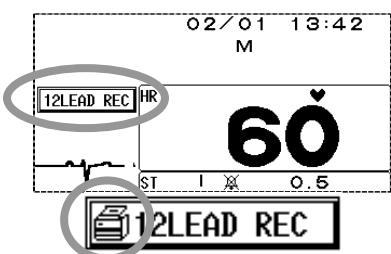
Reference	For ON/OFF of Event Key, refer to "8. System Configuration　Monitor Setup".

Print Cancel Key 🖨 ‖ Cancel ‖ (For laser printer)

Pressing this ‖ Cancel ‖ key will cancel printing on the laser printer.

Reference	To use the laser printer, TCP/IP network setting is necessary. For procedure, refer to "9. Installation　TCP/IP Network Connection".

‖ 12LEAD REC ‖ key

```
      02/01  13:42
            M
12LEAD REC HR
        60  ♥
     ST   I  ☒  0.5
🖨 12LEAD REC
```
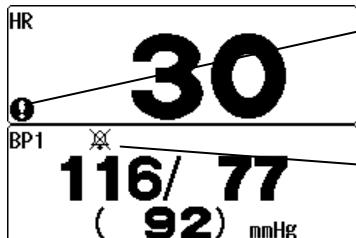
This key will be displayed when the display mode is "12-lead". Pressing the key will record the 12-lead waveform on the built-in recorder or laser printer.

If laser printer is set for output recorder, laser printer icon will be displayed inside the ‖ 12LEAD REC ‖ key.

Reference	For setup procedure of 12-lead waveform output recorder and recording format, refer to "4. Monitoring Setup　Recording Setup　12-lead Waveform Recording"

●Numeric Data Box Display (for all parameters)

Message Icon
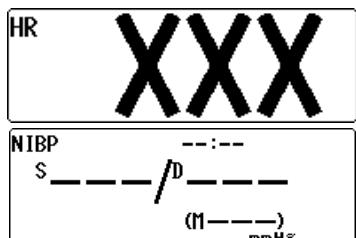
When the parameter box size is too small to display the message inside, a message icon will be displayed instead to indicate that message is present.

Alarm OFF Mark

Displayed when the alarm is set OFF.

Reference For procedure to select ON/OFF of message icon display, refer to "8. System Configuration Monitor Setup".

Out of Measurement Range (XXX)

The measurement is out of range.
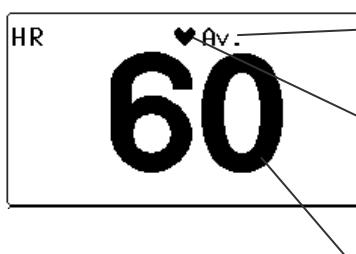
Measurement Error (– – –)

- When the NIBP measurement ended erroneously. The time of measurement will be displayed.
- When the measurement is ceased manually, the time of measurement will be displayed as "– – –"

●Numeric Data Box Display (for each parameter)

Reference For the corresponding numeric data selection key (display configuration setup menu) for each of the following numeric data box, refer to "Corresponding Key for Each Numeric Data Box" in this chapter.

HR Average (Instant / Average)

Displays the averaging method of HR. ("HR Average" on ECG configuration menu)
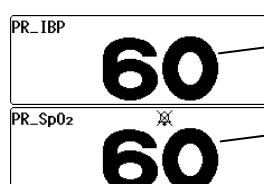
HR / PR Synchronization Mark

Synchronizing to the set HR/PR alarm source, a mark will be displayed. If $\boxed{SpO_2}$ is selected for "Pulse Tone" (ECG config.), the mark will be displayed inside the PR_SpO_2 numeric data box regardless of the HR/PR alarm source setup.

HR / PR Parameter
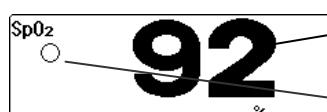
Displays HR / PR value.

When the value exceeds the measurable range, "×××" will be displayed.

PR Value (BP)

PR Value (SpO_2)
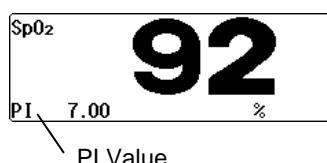
SpO$_2$ Value

Displays the arterial oxygen saturation measurement value.
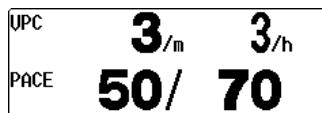
SEC Alarm Indicator (For DS-7210)

Displayed when the SEC alarm is set.

PI Value (For DS-7210M)

If PI (Perfusion Index) display is set to ON, PI value will be displayed.

PI Value

VPC Value (1 minute, 1 hour)

Displays the VPC rate for the last 1 minute and last 1 hour.
"– – –" will be displayed during arrhythmia learning.

Pace Beats (1 minute) / Total Beats (1 minute)

Pace beats and total beats for the last 1 minute will be displayed.
"– – –" will be displayed during arrhythmia learning.
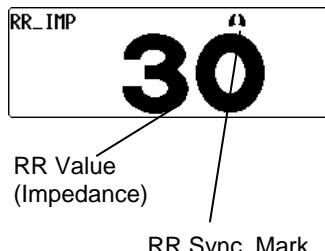
ST Level

ST levels will be displayed. "– – –" will be displayed for the following case.
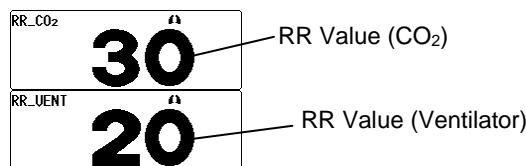
・during arrhythmia learning.
・during lead-off condition.
・when "N" or "S" is not detected for QRS within 30 seconds.
・when reference waveform is not set for ST measurement.

> *Reference* The leads displayed inside the ST level box can be changed.
> For procedure, refer to "●Set the Leads for ST Data Box" of this section.

RR Value
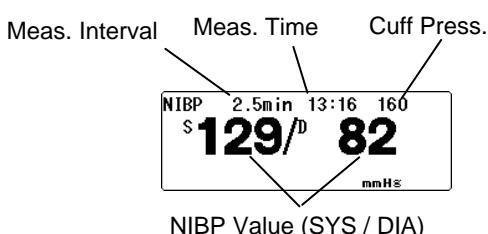
Displays the impedance RR / CO_2 RR measurement value corresponded to the respiration synchronization source. When the measurable range is exceeded, "×××" will be displayed. When the ECG relay cable for electrosurgical knife is used, or when impedance measurement is set to OFF, impedance RR will not be displayed.

RR Value (Impedance)

RR Sync. Mark

RR Value (CO_2)

RR Value (Ventilator)

RR Synchronization Mark

Synchronizing to the set RR/APNEA alarm source, a mark will be displayed inside the parameter box.

NOTE	The RR synchronization mark will not be displayed when ventilator is the RR/APNEA alarm source, and when the measurement is performed by PURITAN-BENNETT ventilator.

Meas. Interval   Meas. Time   Cuff Press.

NIBP Value (SYS / DIA)

NIBP Measurement Interval

The NIBP measurement interval will be displayed. If the automatic mode is set to OFF, it will be left blank.

If | Backup (Resume auto mode by manual measurement.) | is selected for "NIBP Auto Mode" on the "Backup at Discharge" menu (Monitor Setup), the NIBP measurement will become in standby condition when a patient is discharged. (When measurement interval is set.) In this case, periodic measurement will resume when the measurement is performed manually, or when the measurement interval is changed.

NIBP Measurement Time
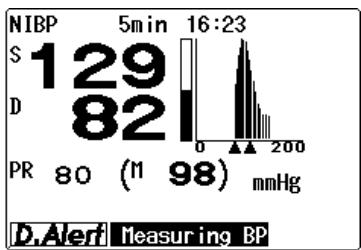
Displays the start time of NIBP measurement.

NIBP Cuff Pressure

Displays the cuff pressure during NIBP measurement.

NIBP Value

Displays the NIBP measurement value (SYS / DIA / Mean).
The mean NIBP display can be set to ON or OFF on the NIBP configuration menu. The value will be displayed as "– – –" when the preprogrammed NIBP erase time has elapsed.

```
NIBP    5min  16:23
S
 129
D
  82
PR  80  (M  98)  mmHg
0       ▲▲  200
D.Alert Measuring BP
```
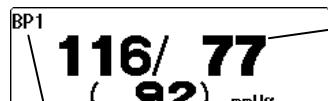
Oscillograph

The oscillograph can be displayed inside the NIBP numeric data box if the size is 2 boxes or larger and "Oscillograph" is set to ON in the NIBP setup menu.

Dyna Alert Status

If Dyna Alert function is set to ON, the Dyna Alert function status will be displayed.
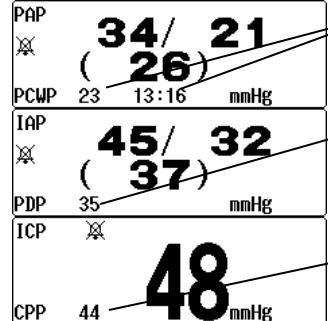
```
13:15  128/  89
13:10  120/  85
13:05  129/  90
13:00  129/  90
```

NIBP List

The latest 4/8/12 data of NIBP list will be displayed. The number of displaying data depends on the size of parameter box.

```
BP1
 116/ 77
 ( 92)  mmHg
```

BP Label

BP Value

SYS/DIA/Mean BP value will be displayed.
On the BP configuration menu, ON/OFF of mean BP display can be selected. If the measurable range is exceeded, "×××" will be displayed. If transducer is not connected or BP zero balance is not performed, "– – –" will be displayed.

BP Label

The BP label setup for the blood pressure will be displayed.

```
PAP   34/ 21
⊠    ( 26)
PCWP  23  13:16  mmHg
IAP   45/ 32
⊠    ( 37)
PDP   35       mmHg
ICP   ⊠
           48
CPP   44    mmHg
```

PCWP Value, PCWP Measured Time

When the BP label is PAP, PCWP (Pulmonary Capillary Wedge Pressure) and measured time can be displayed.
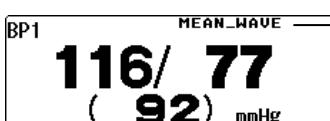
PDP Value

When the BP label is IAP, PDP (Peak Diastolic Pressure) of IABP can be displayed.
Systolic Pressure (SYS) = Peak Systolic Pressure (PSP).
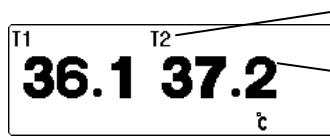
CPP Value

When the BP label is ICP, and artery pressure is labeled as ART, CPP (Cerebral Perfusion Pressure) can be measured. CPP = Mean Value of Arterial Pressure – Mean Value of Intracranial Pressure
If the CPP value is less than 0, ICP or ART is not measured, or zero balance has not been performed for ICP or ART, the value will be displayed as "– – –". Also, alarm cannot be set for CPP.

```
BP1        MEAN_WAVE
 116/ 77
 ( 92)  mmHg
```

MEAN_WAVE

Displayed when mean waveform is set ON (BP configuration menu.).

```
T1        T2
36.1 37.2
            ℃
```
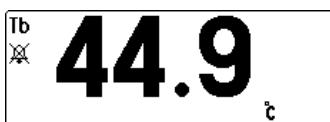
TEMP Label

The label set for the temperature will be displayed.
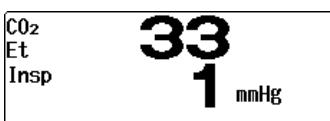
TEMP Value

Displays the temperature measurement value. The 400 series temperature probe can be used. When the measurable range is exceeded, "×××" will be displayed. When the 700 series is used, "– – –" will be displayed for the measurement value.

```
Tb
⊠  44.9
        ℃
```

Blood Temperature

By using the thermodilution catheter for the CO measurement, blood temperature can be displayed. When the measurable range is exceeded, "×××" will be displayed.

```
CO2   33
Et
Insp   1  mmHg
```

EtCO$_2$ Value / InspCO$_2$ Value

Displays the end-tidal CO_2 concentration and inspiratory CO_2 concentration measurement value.
The measurement unit can be selected from mmHg / kPa / % on the CO_2 configuration menu.

TV Insp	**400**	Exp	**416**

MV	**6.2**

PEAK	2	PEEP	0	MEAN	1

Ventilator Measurement

When ventilator is connected, the ventilator measurement data will be displayed.

SvO2	83 %
CO AVG	5.3 L/min
CI AVG	2.8 L/min/m²
BSA	1.98

Oximeter Data

When oximeter (Vigilance / Vigilance CEDV / Vigilance II / Vigileo / OXIMETRIX3 / Q-vue / Q2 Computer) is connected, the oximeter data (SvO_2, CO, etc.) will be displayed.
The displayed data will differ depending on the used oximeter.

Oximeter	*Displayed Data*				
Vigilance (CCO mode / STAT OFF / Index OFF)	SvO_2 ($ScvO_2$)	CCO	EDV	BT	—
Vigilance (CCO mode / STAT ON / Index OFF)	SvO_2 ($ScvO_2$)	CCO STAT	EDV STAT	BT	—
Vigilance (CCO mode / STAT OFF / Index ON)	SvO_2 ($ScvO_2$)	CCI	EDVI	BT	—
Vigilance (CCO mode / STAT ON / Index ON)	SvO_2 ($ScvO_2$)	CCI STAT	EDVI STAT	BT	—
Vigilance (ICO mode)	SvO_2 ($ScvO_2$)	CO AVG	CI AVG	—	—
Oximetrix3	SvO_2	CO AVG	CI AVG	—	—
Q-vue (CCO mode)	—	CCO	CCI	BT	—
Q-vue (CCO not measured)	—	CO AVG	—	—	—
Oximetrix3 + Q-vue (CCO mode)	SvO_2	CCO	CCI	BT	—
Oximetrix3 + Q-vue (CCO not measured)	SvO_2	CO AVG	—	—	—
Q2 Computer (CCO mode)	SvO_2	CCO	CCI	BT	—
Q2 Computer (CCO not measured)	SvO_2	CO AVG	CI AVG	—	BSA

4

Display Configuration

```
SU        6 5
SUR     1 3 6 3
RUW       0.54
RUSW       8.1

SUI       3 8
SURI    2 3 0 4
RUWI      0.32
RUSWI      4.2
```

Hemodynamic Data (Vigilance)

Based on the CCO data measured by the Vigilance (or Vigilance CEDV / VigilanceII / Vigileo), the following hemodynamic data are calculated and displayed every second based on the following condition.

・Measured on CCO mode of Vigilance. (not displayed for ICO mode)

・SvO_2 parameter key (oximeter numeric data box) is displayed.

・BP label is set as ART, PAP, CVP.

  (If the unit is "kPa", the data is converted to "mmHg" for calculation.)

Parameter	Description	Equation
SV	Stroke Volume (mL/beat)	$\dfrac{CCO \times 1000}{HR}$
SVR	Systemic Vascular Resistance (dynes·sec·cm^{-5})	$\dfrac{(MAP - CVP) \times 79.90}{CCO}$
RVW	Right Ventricular Work (kg·m)	$CCO \times (MPAP - CVP) \times 0.0136$
RVSW	Right Ventricular Stroke Work (g·m)	$SV \times (MPAP - CVP) \times 0.0136$
SVI	Stroke Volume Index (mL/beat/m^2)	$\dfrac{SV}{BSA}$
SVRI	Systemic Vascular Resistance Index (dynes·sec·cm^{-5}·m^2)	$SVR \times BSA$
RVWI	Right Ventricular Work Index (kg·m/m^2)	$\dfrac{RVW}{BSA}$
RVSWI	Right Ventricular Stroke Work Index (g·m/m^2)	$\dfrac{RVSW}{BSA}$

NOTE	The hemodynamic data based on Vigilance data will not be displayed on the Vigilance / Vigileo list. Only the data directly acquired from the Vigilance will be displayed on the Vigilance / Vigileo list. For SVR, SVRI, the displaying value can be selected from $\boxed{\text{Vigilance}}$ or $\boxed{\text{DS-7200}}$ on "Vigilance/Vigileo SVR, SVRI calculation" (Page 4/4 of Monitor Setup)

```
            H   M   S
TIMER1   00:00:00
TIMER2   00:00:00
```

Stopwatch Key

Functions as stopwatch.

```
BIS
    58    SQI  87%
          EMG  0dB
          SR   0%
```
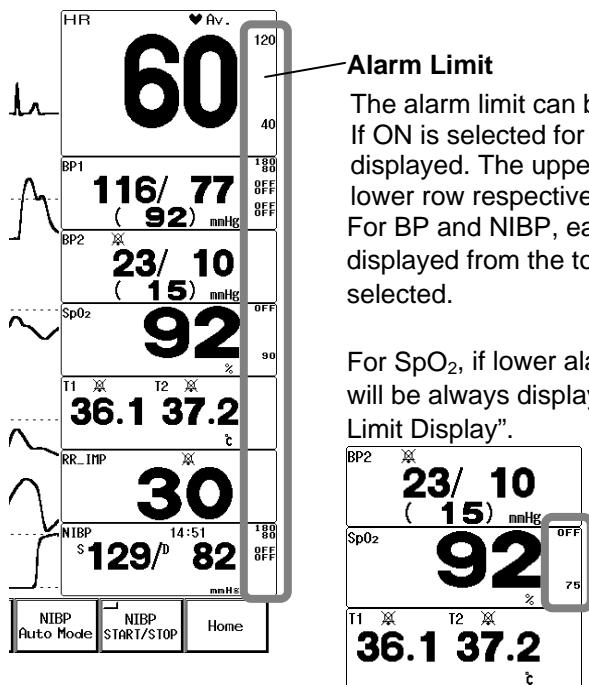
BIS Data

When the A-2000 BIS Monitor is connected, BIS data (BIS, SQI, EMG, SR) will be displayed.
If SQI value is below 50%, the background color will turn gray.
If SQI value is below 15%, BIS value and SR value will disappear.

●Alarm Limit Display
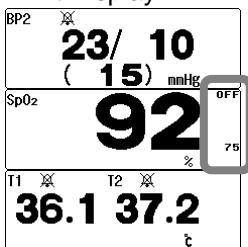
Alarm Limit

The alarm limit can be displayed beside each measurement value. If ON is selected for the individual alarm, the alarm limit will be displayed. The upper and lower limit will be displayed at upper and lower row respectively.

For BP and NIBP, each alarm limit of SYS, DIA, mean BP will be displayed from the top. ON/OFF of alarm limit display can be selected.
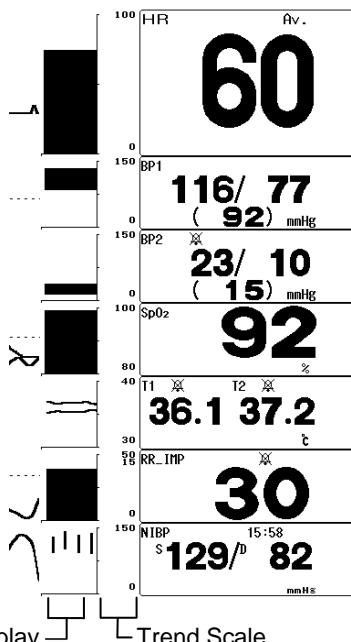
For SpO$_2$, if lower alarm limit is set to 85% or below, the alarm limit will be always displayed regardless of the ON/OFF setting of "Alarm Limit Display".

Reference	Refer to "4. Monitoring Setup Alarm Setup" for ON/OFF of alarm limit display.

●Short Trend Display

Short Trend Display ⌐   ⌐ Trend Scale

Short Trend Display

Short trend can be displayed beside the measurement data. Pressing the waveform display area will change the displayed trend time to the pressed position.
The trend display is in 5-minute increment from 0 minute to 30 minutes.

Trend Scale

The short trend scale will be displayed between the short trend and measurement data.
The displayed scale will be in accordance with the scale set on the graphic trend menu.

●Cursor Display

By configuring the ⬚ Cursor ⬚ and ⬚ Cursor Ref ⬚ to the numeric data display area, measurement cursor (white) and reference cursor (yellow) can be displayed on the selected waveform (ECG or BP) to verify the waveform amplitude.

The cursor position can be moved up or down using the ⬚⬚⬚⬚ keys.

Reference Cursor: Yellow   Measurement Cursor: White

Ref. Cursor Box

Meas. Cursor Box

Pressing the cursor box will display the cursor setup menu.

Reference Cursor Box (Ref.: Reference Waveform)
Displays the reference value for measurement.
(The measurement unit set on the monitor setup menu will be displayed.)
The displayed reference value will change when the cursor is moved up or down using the ⬚⬚⬚⬚ keys.

Measurement Cursor Box
Displays the measurement value (difference between the reference value).
The displayed measurement value will change when the cursor is moved up or down using the ⬚⬚⬚⬚ keys.

Select ON/OFF of level cursor display, and select one waveform to display the level cursor.

Pressing the ⬚ Initialize cursor pos. ⬚ key for more than 1 second will initialize the cursor position to the following position.

Ref. Cursor: 0mV (0mm) position for ECG
                 0mmHg (0kPa / 0cmH$_2$O) position for BP

Meas. Cursor: 0mV (0mm) position for ECG
                 1/2 scale position for BP
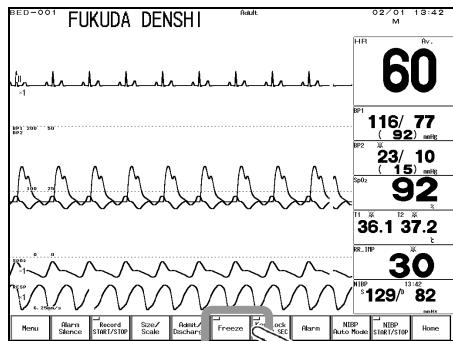
NOTE	● The cursor will not be displayed if the cursor value exceeds the display range. If the cursor is not displayed although the cursor display is set to ON, initialize the cursor position. ● The displayed scale in the cursor box may not accurately represent the BP cursor position. This is because the BP waveform resolution differs according to the waveform display area size. For example, if the cursor is positioned at 10kPa, 9.9kPa may be displayed in the cursor box.

●**Freeze Mode Cursor Display**
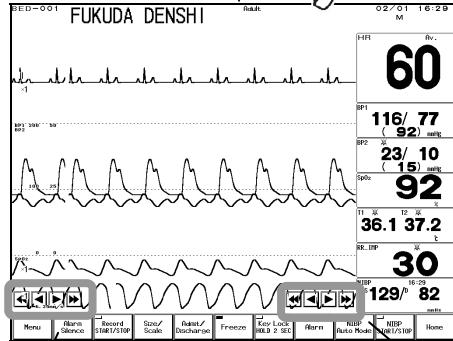
By selecting ON for "Freeze Mode Cursor Display" of the monitor setup menu, a vertical cursor (BP data cursor and interval measurement cursor) can be displayed on the home display when the
[Freeze] (user key) is pressed.
The cursor can be moved freely and display the BP value at any cursor position. It can be also used to measure the time interval between each cursor.

1 **Press the [Freeze] key preprogrammed as user key.**

The waveform will freeze and the cursor arrow key will be displayed.

Pressing the arrow key will display each cursor.
・White: BP data cursor
・Yellow: Time interval cursor
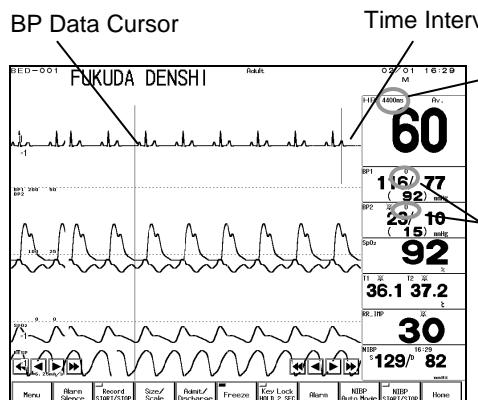
Arrow key for BP data cursor

Arrow key for time interval cursor

BP Data Cursor

Time Interval Cursor
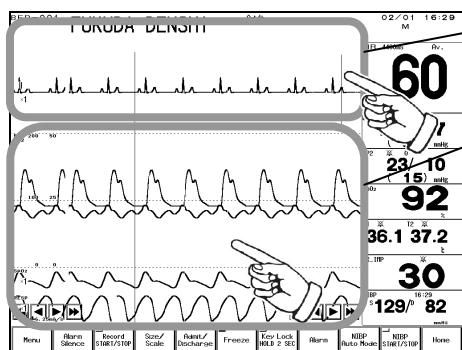
In the HR data box, time interval (unit: ms) between the BP data cursor and time interval cursor will be displayed.

In the BP data box, BP value at cursor position will be displayed.

2 **The cursors can be moved freely using the [◀◀][◀][▶][▶▶] keys.**

The cursors can be also moved by directly pressing the waveform area.
The time interval and BP value will be updated each time the cursor is moved.

Press this area to move the time interval cursor.
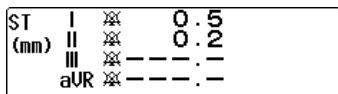
Press this area to move the BP data cursor.

3 To erase the cursors, press the ⎢ **Freeze** ⎢ (user key) key.
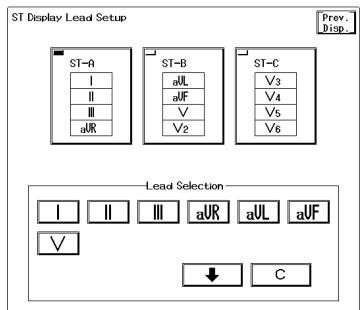
NOTE	● The freeze mode cursor cannot pass over the erase bar (black bar erasing the old waveform). ● The freeze mode will not be automatically cancelled with the freeze mode cursor displayed. ● The freeze mode will be automatically cancelled if freeze mode cursor is not displayed for 30 seconds. ● The display width of short trend cannot be changed with the freeze mode cursor displayed. ● An error exists between the displayed waveform and cursor position. (For the sweep speed of 25mm/s; an error of 1dot[max.12msec] to the right of the cursor position)

●Lead Selection for ST Data Box

The ST value for 4 leads can be displayed in the ST data box. 3 groups (A, B, C) of lead combination can be programmed.
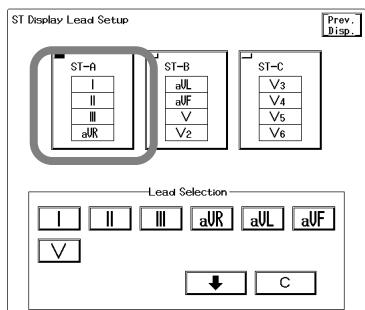
1 Press the ⎢ **Menu** ⎢ → ⎢ **System Configuration** ⎢ → ⎢ **ST Disp. Lead Setup** ⎢ keys.
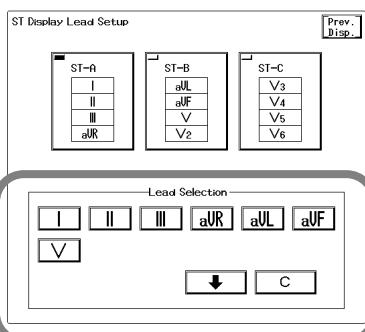
The ST Display Lead Setup menu will be displayed.
Set the displaying lead for each group.

2 Select the group to perform the setup and select the lead for that group.

Select the group from ⎢ ST-A ⎢, ⎢ ST-B ⎢, ⎢ ST-C ⎢.

Select the lead to be displayed. Pressing the lead key will sequentially set the lead to the selected group from the top.

Description of Alarm Message and Alarm Sound

This section explains about the message displayed on the home display.
There are vital alarm message and equipment status alarm message which will be displayed at the top of the home display.
The alarms are classified in level 1, level 2, level 3, level 4, and the alarm message will be displayed according to the priority of level 1>level 2>level 3>level 4. The color of the displayed messages are red for level 1, yellow for level 2, blue for level 3, and white for level 4.
The alarm tone will be different depending on the alarm system setting (IEC/FUKUDA DENSHI).

> *Reference*　The alarm system setting (IEC/FUKUDA DENSHI) can be performed on the "Monitor Setup" menu. For procedure, refer to "8. System Configuration　Monitor Setup　●Alarm System" (Default: IEC)

[FUKUDA DENSHI]

Alarm Level	Description	Tone	Displayed Color
Level 1	Life Threatening Alarm	(1) Continuous tone with alternate high and low pitch sound (2) Continuous rapid tone	Red
Level 2	Cautionary Alarm	(1) 5 seconds interval alternate high and low pitch sound (2) 5 seconds interval rapid tone	Yellow
Level 3	Treatment Needed Alarm	(1) Single beep tone or 15 seconds interval alternate high and low pitch sound (2) Single rapid tone or 15 seconds interval rapid tone　(*)	Blue
Level 4	Notification Alarm	Display Only	White

(1)　When the tone setting is set between the 1st and 4th level from the lowest level
(2)　When the tone setting is set to the 5th level or above from the lowest level

[IEC]

Alarm Level	Description	Tone	Displayed Color
Level 1	Life Threatening Alarm	Continuous tone	Red
Level 2	Cautionary Alarm	5 seconds interval beep tone	Yellow
Level 3	Treatment Needed Alarm	Single beep tone (different tone from FUKUDA DENSHI mode) or 15 seconds interval beep tone　(*)	Blue
Level 4	Notification Alarm	Display Only	White
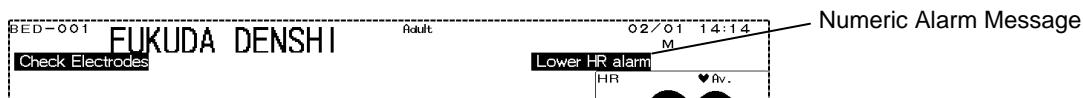
> **⚠ CAUTION**
> ● The alarm priority is high for level 1 (life threatening alarm), medium for level 2 (cautionary alarm), and low for level 3 (treatment needed alarm).
> ● Alarm messages will be displayed according to the priority. (Level 1 → Level 2 → Level 3 → Level 4)
> ● For the same alarm level, the alarm message of the newer alarm will be displayed.
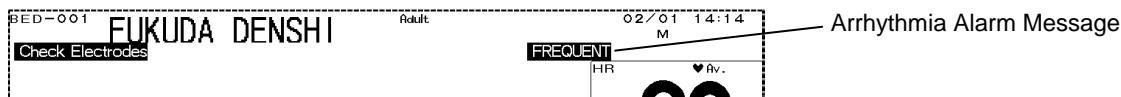
> *Reference*　* The time interval for Level 3 alarm sound can be set. The setting can be performed under the "Monitor Setup" menu. For procedure, refer to "8. System Configuration　Monitor Setup ●Level 3 Alarm System Sound" (Default: One time)

●Vital Alarm Message

The vital alarm message is generated when a measurement exceeds the alarm limit, or when arrhythmia is detected.

Numeric Alarm Message

BED-001 **FUKUDA DENSHI**   Adult   02/01 14:14   M ——— Arrhythmia Alarm Message
Check Electrodes   FREQUENT
                                HR   ♥ Av.

There are 2 types of alarm messages, numeric alarm message and arrhythmia alarm message. If the 2 types of alarm generate at the same time, the numeric alarm message and arrhythmia alarm message will be alternately displayed for 2 seconds each. The message will be displayed according to the priority of the alarm level. If the alarms of the same level generate, the message for the newer alarm will be displayed.

⚠ CAUTION	● The alarm message for the arrhythmia alarm will continue to be displayed for 30 seconds after the alarm is resolved. ● The alarm level listed below is the standard level set by Fukuda Denshi. By selecting ⎴ User ⎴ for "Alarm Level" on the 4th page of Monitor Setup, the alarm level set by each user can be applied.

Life Threatening Alarm (Alarm Level 1)

Parameter	*Message*
HR	"Lower HR alarm"
	"Upper HR alarm"
PR (SpO$_2$, BP)	"Lower PR alarm"
	"Upper PR alarm"
BP (BP1/ART)	"Lower BP1 alarm" or "Lower ART alarm"
	"Upper BP1 alarm" or "Upper ART alarm"
SpO$_2$	"Lower SpO$_2$ alarm"
	"Upper SpO$_2$ alarm"
Respiration (Impedance, CO$_2$, Ventilator)	"Apnea alarm"
	"Lower RR alarm"
	"Upper RR alarm"
NIBP	"Lower NIBP alarm"
	"Upper NIBP alarm"
CO$_2$	"Upper EtCO$_2$ alarm"
	"Lower EtCO$_2$ alarm"
Arrhythmia	"ASYSTOLE"
	"VF"
	"VT"
	"SLOW VT"
	"TACHY"
	"BRADY"
	"RUN"

Cautionary Alarm (Alarm Level 2)

Parameter	*Message*
BP (BP2 to 5)	"Lower BP✻ alarm" or "Lower (label) alarm"
	"Upper BP✻ alarm" or "Upper (label) alarm"
ST1 to 12	"Lower ST✻ alarm"
	"Upper ST✻ alarm"
Temperature (TEMP1 to 3)	"Lower TEMP✻ alarm" or "Lower (label) alarm"
	"Upper TEMP✻ alarm" or "Upper (label) alarm"
CO$_2$	"Upper InspCO$_2$ alarm"
Arrhythmia	"PAUSE"
	"COUPLET"
	"BIGEMINY"
	"TRIGEMINY"
	"FREQUENT"

✻ indicates the channel no. of BP, ST and TEMP.

Treatment Needed Alarm (Alarm Level 3)

Parameter	Message
None	

Notification Alarm (Alarm Level 4)
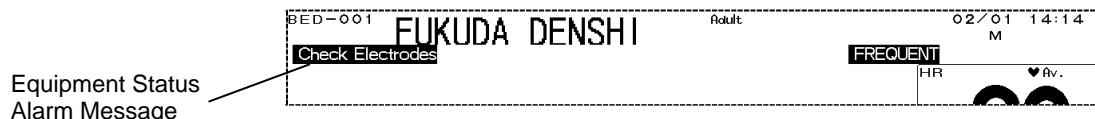
Parameter	Message
All Alarm	"Alarm Suspend ($\ast\ast\ast$sec.)"
Arrhythmia	"LEARN"
	"ARRHY. OFF"

⚠ CAUTION	Even during "LEARN" status, alarm for HR, ASYSTOLE, VF, TACHY, BRADY will be generated.

NOTE	● ($\ast\ast\ast$sec) of the "Alarm Suspend ($\ast\ast\ast$sec)" message indicates the remaining time to suspend the alarm. ● The "ARRHY OFF" message will be displayed when the ASYSTOLE, VF, VT, SLOW_VT, and HR alarm is OFF.

●Equipment Status Alarm Message

The equipment status alarm message will be displayed when proper monitoring cannot be performed. The alarm message will be displayed according to the priority of the alarm level. If more than one alarm with the same level is generated, the newest alarm message will be displayed.

Equipment Status Alarm Message

Cautionary Alarm (Alarm Level 2)

Item	Message
ECG Impedance Respiration	"Check Electrodes"
Arrhythmia	"Cannot analyze" [1]
SpO$_2$ (DS-7210, DS-7210M)	"Check SpO$_2$ Sensor"
	"Replace SpO$_2$ Sensor"
SpO$_2$ (DS-7210)	"No pulse detect"
SpO$_2$ (DS-7210M)	"Unknown SpO$_2$ Sensor"
	"SpO$_2$ Low Perfusion"
	"SpO$_2$ Pulse Search"
NIBP	"NIBP measurement failed." [2]
CO$_2$ (MGU-722)	"Check Sample Line"
	"Check CO$_2$ Exhaust Port"
	"Check CO$_2$ unit"
	"CO$_2$ Cal. Required"
Connector	"ECG Disconnected"
	"BP$\ast$ Disconnected" [3]
	"BP$\ast$ Transducer OFF" [3]
	"SpO$_2$ Disconnected"
	"T$\ast$ Disconnected" [3]
	"Sample Line Disconnected"　　　(MGU-722)
	"CO$_2$ Disconnected"　　　　(MGU-721)
	"CO Disconnected"
	"Multiport$\ast$ Disconnected" [3]
	"DS-LANII Disconnected" or "DS-LANIII Disconnected"
	"Printer Cable Disconnected"
Others	"Check Backup Battery"
	"Check Equip. Config. (CO$_2$)"
	"Charge the battery."
	"Check Memory Card"

*1 This alarm will generate when analysis is suspended for more than 30 seconds, regardless of ON/OFF setting of "Suspend Arrhy. Analysis during Noise Interference" under Hospital Setup (Preset Menu).
   ● Refer to "10. Maintenance Troubleshooting ECG".
*2 "NIBP measurement failed." will be displayed only if "Alarm Occurrence at NIBP Failure" is set to ON on the alarm setup menu. (Default: OFF)
*3 ＊ indicates the channel no. of BP and TEMP.

⚠ WARNING	When a parameter is in a connector-off condition, the alarm will be generated only on the bedside monitor and not on the central monitor. Make sure that the connector is securely connected. If the waveform/numeric data is not displayed for a monitored parameter, check the patient's condition and pay attention not to miss the connector-off condition.

⚠ CAUTION	● Even during "Cannot analyze" alarm generation, alarm for HR, ASYSTOLE, VF, TACHY, BRADY will be generated. ● If OFF is selected for "PI Display" under the SpO_2 configuration setup, "SpO_2 Low Perfusion" alarm will be indicated by message display only. The alarm sound will not be generated.

NOTE	The "NIBP measurement failed.", "Connector Disconnected" alarm can be cancelled by pressing the Alarm Silence key. When silencing the alarm, make sure that important alarm is not missed.

Treatment Needed Alarm (Alarm Level 3)

Item	Message
NIBP	"Check NIBP Cuff, Air Hose"
Impedance Respiration	"CVA detected"
SpO_2 (DS-7210)	"No pulse detect"
SpO_2 (DS-7210M)	"SpO_2 Low Perfusion"
	"SpO_2 Pulse Search"
	"SpO_2 Interference Detected"
	"Check SpO_2 Sensor"
	"SpO_2 Low Signal IQ"
ECG	"Pacing detection error"

Notification Alarm (Alarm Level 4)

Item	Message
Operation	"Waveform is frozen. (＊＊sec.)"
	"Key Lock"
	"Night Mode Active"
ECG	"ECG Low Amplitude"
	"ECG Noise Interference"
	"ECG Unit Failure"
ECG, Impedance Respiration	"Check Electrodes"
BP	"BP＊ Transducer OFF" *1
	"BP＊ Zeroing Required" *1
Temperature	"Unknown Temp. Sensor"
	"TEMP Unit Auto Check"
	"TEMP Unit Failure"
SpO_2 (DS-7210)	"Motion artifact"
SpO_2 (DS-7210, DS-7210M)	"SpO_2 unit error"
Microstream® CO_2 (MGU-722)	"CO_2 Unit Failure (O)"
	"CO_2 Suspended"
Mainstream CO_2 (MGU-721)	"CO_2 Unit Failure (C)"
	"CO_2 Sensor Failure"
	"CO_2 Warming Up"
	"Zero CO_2 Adapter"
	"Check CO_2 Adapter"
	"Unknown CO_2 Sensor"
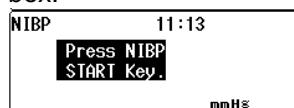
NIBP	"NIBP Unit Failure"
	"Initializing NIBP"
Built-in Recorder	"Check Built-in Recorder"
	"Built-in Recorder Unit Failure"
	"Check Rec. Paper (Built-in)" *2
	"Check Cassette (Built-in)" *2
	"Recorder busy"
All Alarm	"Alarm is silenced."
TCON	"Check TCON Comm."
	"Chk TCON Receive"
	"TCON Interference"
Main Unit	"Main Unit Failure"
	"Display Unit Failure"
	"Sub Unit Failure"
	"Analog Unit Failure"
	"High Internal Temperature"
	"Display Unit Backlight Failure"
	"Check Rotary SW"
	"Check DIP-SW"
External Equipment	"HU Module Failure"
	"Telemetry Unit Failure"
Network Recorder	"Check Central Recorder"
	"Recorder busy (Cent.)"
	"Check Paper (Central)"
	"Check Cassette (Central)"

*1 "＊" indicates the channel no. of BP and TEMP.
*2 These messages will not be displayed if $\boxed{\text{OFF}}$ is selected for "Built-in Rec. Status Display" on the Monitor Setup menu.

●Numeric Data Box Message

The measurement status of each parameter will be displayed inside the corresponding numeric data box.

HR Data

Alarm Level	Message
1	"Upper HR alarm"
1	"Lower HR alarm"
2	"Check Electrodes"
2	"Lower ST alarm"
2	"Upper ST alarm"
3	"Pacing detection error"
4	"Out of range"
4	"ECG Low Amplitude"
4	"Artifact"
4	"Check Electrodes"
4	"ECG Unit Error"

ST

Alarm Level	Message
2	"Lower ST alarm"
2	"Upper ST alarm"

BP1 to 5

Alarm Level	Message
1(*)	"Lower BP alarm"
1(*)	"Upper BP alarm"
4	"Zeroing Required"
4	"Out of range"

* : Level 1 for BP1 and ART, Level 2 for other label

Pulse Rate (BP Source)

Alarm Level	Message
1	"Upper PR alarm" (BP)
1	"Lower PR alarm" (BP)
4	"Out of range"

NIBP

Alarm Level	Message	Description
1	"Cannot Measure (C02)"	・Could not measure although the pressure dropped to minimum deflating pressure. (When not quick measurement) ・Could not measure although the pressure dropped to minimum deflating pressure. (During quick measurement)
1(*)	"Exhaust Error (C03)"	・Exhaust was suspended for 15 seconds due to body motion. ・Deflation speed of 1mmHg/sec. continued for 5 seconds. ・20 seconds elapsed since the exhaust started, but deflation of 30mmHg was not achieved. ・10 seconds elapsed since the exhaust started, but the target deflation speed was not achieved.
1(*)	"Insuff. Inflation (C04)"	・The first 5 pulse amplitude was on a decreasing trend. ・SYS cannot be measured. ・Pressure difference between the pulses is too large.
1(*)	"Osc. Pattern Err. (C05)"	・Pressure difference between the pulses is too large. ・Too much pulse compensation.
1(*)	"Meas. Error (C06)"	・Set inflation value>systolic>mean>diastolic was not achieved. ・Systolic pulse amplitude is too small. ・Pulse pressure is too small. ・Diastolic pulse amplitude is too small.
1(*)	"Meas. Timeout (C07)"	Measurement Timeout
1(*)	"PR Over (C08)"	Measured PR value is too large.
1(*)	"Overinflation (C09)"	Maximum pressure is exceeded.
1(*)	"Pulse Amp. Error (C10)"	・Pulse amplitude is too large. ・Pulse amplitude is too small.
1(*)	"Check Cuff Size (C11)"	・Neonate cuff is detected with adult mode. ・Infant cuff is detected with adult mode. ・Neonate cuff is detected with child mode.
2	"Lower NIBP Alarm"	
2	"Upper NIBP Alarm"	
2	"Inflation Timeout (C01)"	
2	"System Error (E08-1)"	Communication Error with Sub CPU
2	"System Error (E08-2)"	Watchdog Timeout
2	"System Error (E08-3)"	Pressure Offset Error
2	"System Error (E08-4)"	Pressure Comparison Failure
2	"System Error (E08-5)"	Sub CPU Power Supply Failure
2	"System Error (E08-6)"	Pressure Sensor 2 Power Supply Failure
2	"System Error (E08-7)"	Pressure Sensor 1 A/D Reference Power Voltage Failure
2	"System Error (E09-A)"	Maximum cuff pressure is exceeded.
2	"System Error (E09-B)"	Inflation time is exceeded.

Alarm Level	Message	Description
2	"System Error (E09-C)"	Quick mode timeout
2	"System Error (E09-D)"	Measurement started during the long term mode pause period
2	"System Error (E09-E)"	Measurement Time Over
2	"System Error (E09-F)"	Timeout of pressure data transmission from main CPU
2	"System Error (E09-G)"	Pressure Sensor 1 +5V Power Supply Failure
2	"System Error (E09-H)"	Zero Calibration Timeout
2	"System Error (E09-I)"	ROM Test Error
2	"System Error (E09-J)"	RAM Test Error
2	"System Error (E09-L)"	Clock transmission is ceased.
2	"System Error (E09-M)"	Communication Failure at Power ON
2	"System Error (E09-N)"	Pressure Comparison Failure
2	"System Error (E09-O)"	Maximum inflation time is exceeded.
2	"System Error (E09-Q)"	Measurement was started before zero calibration
2	"System Error (E09-R)"	Zero Calibration Error
2	"System Error (E09-S)"	Watchdog Timeout
2	"System Error (E09-T)"	+5V Digital Power Supply Failure
2	"System Error (E09-U)"	Main CPU Power Supply Failure
2	"System Error (E09-V)"	Pump Control Signal Failure
2	"System Error (E09-W)"	Quick Exhaust Valve Control Signal Failure
2	"System Error (E09-X)"	Sub CPU Constant Exhaust Valve Control Signal Failure
2	"System Error (E09-Y)"	Main CPU Constant Exhaust Valve Control Signal Failure
3	"Check NIBP Cuff, Air Hose"	
4	"NIBP Unit Error"	

*:   Level 4 if NIBP measurement is retried, level 1 if measurement is not retried.

"System Error" message can be cleared by pressing the ⎣Cancel NIBP System Error⎦ key on the second page of the NIBP configuration menu. If it cannot be cleared, failure can be considered.

SpO$_2$ (Nellcor® Model: DS-7210)

Alarm Level	Message
1	"Lower SpO$_2$ alarm"
1	"Upper SpO$_2$ alarm"
2	"Replace SpO$_2$ Sensor"
2	"Check SpO$_2$ Sensor"
2	"No pulse detect"
4	"SpO$_2$ Unit Error"
4	"Motion artifact"
4	"SpO$_2$ Pulse search"

SpO$_2$ (Masimo® Model: DS-7210M)

Alarm Level	Message
1	"Lower SpO$_2$ alarm"
1	"Upper SpO$_2$ alarm"
2	"Replace SpO$_2$ Sensor"
2/3*	"Check SpO$_2$ Sensor"
2	"SpO$_2$ Low Perfusion"
2	"SpO$_2$ Pulse search"
3	"SpO$_2$ Interference Detected"
3	"Unknown SpO$_2$ Sensor"
3	"SpO$_2$ Low Signal IQ"
4	"SpO$_2$ Unit Error"

*The alarm level differs depending on the cause.

PR-SpO₂

Alarm Level	Message
1	"Upper PR alarm" (SpO₂)
1	"Lower PR alarm" (SpO₂)
4	"Out of range"

TEMP1 to 3

Alarm Level	Message
2	"Upper TEMP alarm"
2	"Lower TEMP alarm"
4	"Unknown Temp. Sensor"
4	"TEMP Unit Auto Check"
4	"Out of range"

Tb

Alarm Level	Message
2	"Upper Tb alarm"
2	"Lower Tb alarm"
4	"Out of range"

RR (Impedance)

Alarm Level	Message
1	"Apnea alarm"
1	"Upper RR alarm"
1	"Lower RR alarm"
2	"Check Electrodes"
3	"CVA detected"
4	"Check ECG cable"
4	"Out of range"
4	"Suspended"

RR (Ventilator)

Alarm Level	Message
1	"Apnea alarm"
1	"Upper RR alarm"
1	"Lower RR alarm"

RR (CO₂)

Alarm Level	Message
1	"Apnea alarm"
1	"Upper RR alarm"
1	"Lower RR alarm"

CO₂ (When MGU-721 is used)

Alarm Level	Message
1	"Zeroing CO₂"
1	"Upper EtCO₂ alarm"
1	"Lower EtCO₂ alarm"
2	"Upper InspCO₂ alarm"
4	"CO₂ Unit Error"
4	"CO₂ Sensor Failure"
4	"CO₂ Warming Up"
4	"Zero CO₂ Adapter
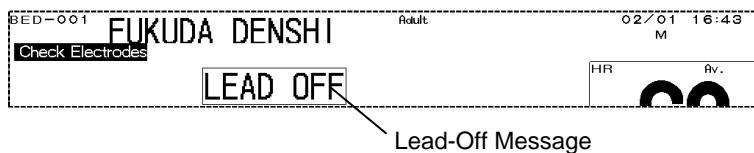
4	"Check CO$_2$ Adapter"
4	"Unknown CO$_2$ Sensor"
4	"Out of range"

CO$_2$ (When MGU-722 is used)

Alarm Level	Message
1	"Upper EtCO$_2$ alarm"
1	"Lower EtCO$_2$ alarm"
2	"Check Sample Line"
2	"Check CO$_2$ Exhaust Port"
2	"Check CO$_2$ unit"
2	"CO$_2$ Cal. Required"
2	"Upper InspCO$_2$ alarm"
4	"Initializing CO$_2$"
4	"CO$_2$ Suspended"

4 Display Configuration

●Lead-Off Message

If the ECG electrodes are detached, HR alarm and arrhythmia alarm will not be generated.
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.
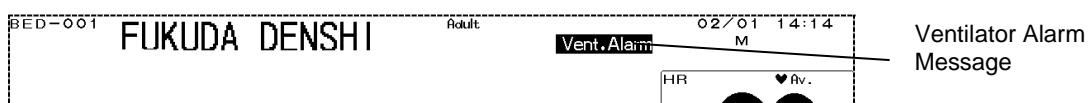
Lead-Off Message

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

●Ventilator Alarm Message

When ventilator is connected to the DS-7200, ventilator alarm and the connection status alarm will be generated. The alarm message with the higher alarm level will be displayed.

【**Ventilator Alarm Message**】

Ventilator Alarm Message
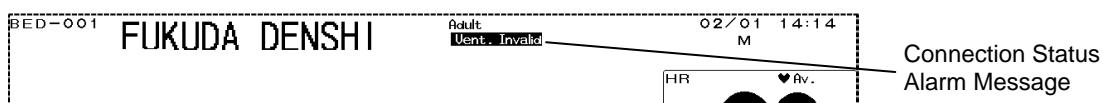
Life Threatening Alarm (Alarm Level 1)

Parameter	Message
Ventilator	"Vent. Alarm"

⚠WARNING	The ventilator alarm sound is set to OFF at factory default setting. For procedure to turn ON the alarm sound, refer to "Volume Setup".

【**Connection Status Alarm Message**】

Connection Status Alarm Message

Life Threatening Alarm (Alarm Level 1)

Parameter	Message
Ventilator	"Vent. Invalid"

Cautionary Alarm (Alarm Level 2)

Parameter	Message
None	

Treatment Needed Alarm (Alarm Level 3)

Parameter	Message
None	

Notification Alarm (Alarm Level 4)

Parameter	Message
Ventilator	"Vent. Disable ⊠"
	"Vent. Online"

●Ventilator Alarm Factor

For the SV-300, Servo-i, Servo-s, ventilator alarm factor if specified will be notified and displayed on the central monitor.

Displayed Alarm Message	Description
VENT AWP	Airway Pressure Alarm
VENT MV	Minute Ventilation Alarm
VENT APNEA	Apnea Alarm
VENT CONT. HP	Continuous High Pressure Alarm
VENT Upper FiO_2	FiO_2 Upper Limit Alarm
VENT Lower FiO_2	FiO_2 Lower Limit Alarm
VENT Upper CO_2	$EtCO_2$ Upper Limit Alarm
VENT Lower CO_2	$EtCO_2$ Lower Limit Alarm
VENT Upper RR	RR Upper Limit Alarm
VENT Lower RR	RR Lower Limit Alarm
VENT PEEP	PEEP Low Alarm
VENT COMM	Power OFF, Cable disconnected, Standby condition, etc.
VENT URGENT	Other high level alarm
VENT	Other ventilator alarm

⚠CAUTION	● For the SV-900, PB, Evita, and Savina ventilator alarm factor cannot be transmitted to the central monitor. ● Depending on the central monitor type and software version, ventilator alarm factor may not be displayed. For details, refer to our service representative. ● The ventilator alarm factor listed above are displayed only on the central monitor. These will not be displayed on the bedside monitor.

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

The laser printer status will be displayed.

🖨 Cancel LP Com Error   : Printer is not connected to the TCP/IP network, paper-out condition, etc.
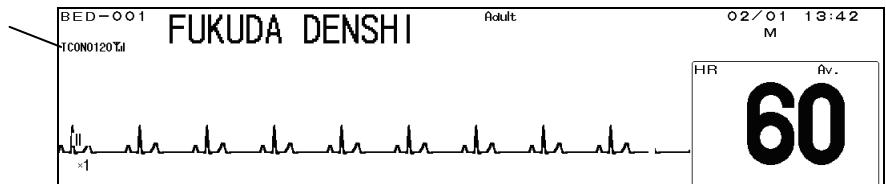
▐ 🖨 Cancel   : In process of printer output.
▐ indicates the current output progress.
(▐ ▐ ▐ ▐ ▐)

🖨 Cancel LP Waiting   : Waiting condition for printer output.

Description of Bidirectional Wireless Communications (TCON) Display

This section explains about the message displayed on the home display when performing the bidirectional wireless communications (TCON).

The communication condition of the bidirectional wireless communications

```
BED-001   FUKUDA DENSHI          Adult           02/01  13:42
TCON0120Tıl                                           M
                                                   HR        Av.
                                                     60
 ×1
```

Ex.)

TCON0120Tıl

· "TCON" is displayed when performing bidirectional wireless communications.
· "01" indicates the TCON ID of this monitor. The TCON ID can be set from 01 to 16.
· "20" indicates the TCON channel (group) of this monitor. This will be the same as the TCON channel (1 to 60) of the TCON base station.

NOTE	Only when the communication with central monitor (TCON base station) is established, the TCON channel (group) number in light blue will appear.
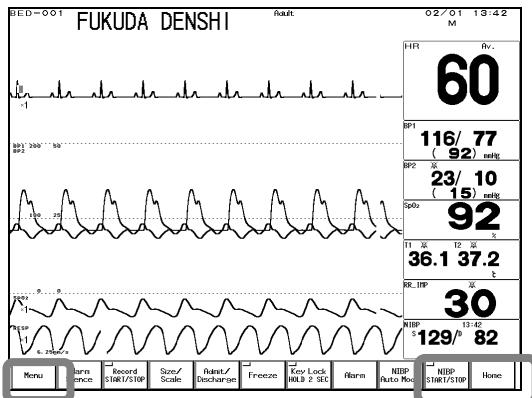
· Tıl indicates the current communication condition.

Indications	Tıl	Tıl	T	X
Communication Condition	Good	Moderately Good	Bad	Cannot Communicate
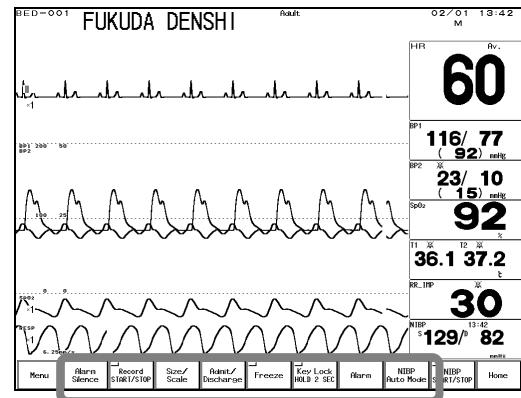
The DS-7200 system operation is performed through the touch keys displayed on the screen.
The touch keys consist of fixed keys (Menu, Home / Enlarge, NIBP Start/Stop) and 6 or 8 user keys
which can be programmed according to the monitoring purpose.

<Fixed Keys>   <User Keys>

<Large Key Size: 3 fixed keys, 6 user keys>

<Small Key Size: 3 fixed keys, 8 user keys>
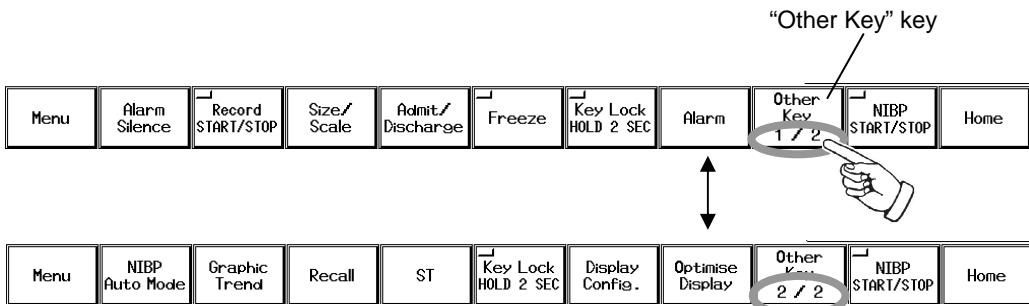
By preprogramming the Other Key as user key, 2 pages of user keys can be programmed and
pressing the Other Key key allows to switch the user key selection.
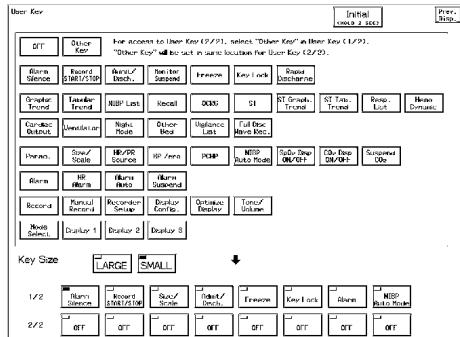
"Other Key" key

Other than the user key setup, the menu key setup allows to change the menu display key
configuration, and key mask setup allows to erase the unnecessary keys on the function menu display
and system configuration menu display according to user's preference.

To Set the User Keys

The user keys can be programmed for quick access to the frequently used menu.

1 Press the $\boxed{\text{Menu}}$ → $\boxed{\text{System Configuration}}$ → $\boxed{\text{Pre-Set}}$ → $\boxed{\text{Monitor Setup}}$ → $\boxed{\text{User Key}}$ keys.

The user key setup menu will be displayed.
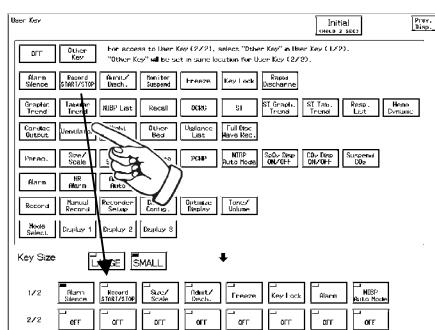
2 Select a position to set the user key.

Selecting $\boxed{\text{Large}}$ for the key size will allow setup of user key 1 to 6.
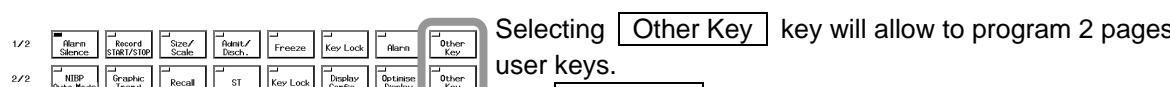
The key location is the same as the home display.

Selecting $\boxed{\text{Small}}$ for the key size will allow setup of user key 1 to 8.

3 Select the function for the user key.

First, select the location to set the user key. Then, select the function for the user key.

Selecting $\boxed{\text{Other Key}}$ key will allow to program 2 pages of user keys.
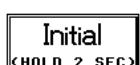
The $\boxed{\text{Other Key}}$ key will be located at the same position for both first and second page.

User Key	Function
Alarm Silence	Silences the alarm for fixed amount of time.
Record START/STOP	Starts/stops the manual recording.
Admit / Disch.	Displays the admit/discharge menu.
Monitor Suspend	Displays the confirmation display whether to suspend monitoring or not.
Freeze	Temporarily stops the waveform trace. By pressing the $\boxed{\text{Record START/STOP}}$ key during freeze mode, the waveform in freeze mode can be recorded. When "Freeze Mode Cursor" (monitor setup) is set ON, a cursor will be displayed.
Key Lock	Turns ON/OFF the touch key operation. This function can be used when cleaning the touch screen.
Rapid Discharge	Displays the confirmation screen (latest 12 NIBP list data), and erases patient data, patient information, monitoring condition, etc. (same function as discharge procedure.)
Graphic Trend	Displays the graphic trend.

User Key	Function
Tabular Trend	Displays the tabular trend.
NIBP List	Displays the NIBP list.
Recall	Displays the recall screen.
OCRG	Displays the OCRG screen.
ST	Displays the ST measurement menu.
ST Grap. Trend	Displays the ST graphic trend.
ST Tab. Trend	Displays the ECG 12-lead ST value in tabular format.
Resp. List	Displays the respiration measurement value in tabular format.
Hemodynamic	Hemodynamic calculation menu will be displayed.
Cardiac Output	CO measurement menu will be displayed.
Ventilator	P-V, F-V menu will be displayed.
Night Mode	Turns ON / OFF the night mode.
Other Bed	Displays the other bed display menu.
Vigilance List	Displays the Vigilance data list when the Vigilance (or Vigilance CEDV/VigilanceII/Vigileo) oximeter is used.
Full Disc Wave Rec.	When the CF card for full disclosure waveform recording is inserted in the CF card slot, full disclosure waveform screen will be displayed.
Parame.	Displays the parameter setup menu.
Size/Scale	Displays the keys to adjust the size, scale, and the baseline position of the displayed waveform.
HR/PR Source	Sequentially selects the HR source in the order of ECG → SpO_2 → BP1/ART* → Auto → ECG. * BP1/ART can be selected when $\boxed{ECG/SpO_2/BP}$ is set for HR/PR source on the monitor setup menu.
BP Zero	Performs the zero balance of BP1 to BP5.
PCWP	Displays the PCWP measurement menu.
NIBP Auto Mode	Displays the NIBP measurement interval setup menu.
SpO_2 Disp ON/OFF	Turns ON/OFF the SpO_2 display.
CO_2 Disp ON/OFF	Turns ON/OFF the CO_2 display.
Suspend CO_2	Suspends the CO_2 measurement.
Alarm	Displays the alarm setup menu.
HR Alarm	Displays the HR/PR alarm setup menu.
Alarm Auto	Automatically determines the alarm range from the current measurement value.
Alarm Suspend	Suspends the alarm.
Record	Displays the recording setup menu.
Manual Record	Displays the manual record setup menu.
Recorder Setup	Displays the recorder setup menu.
Display Config.	Displays the display configuration menu.
Optimize Display	The confirmation message for optimizing the display will appear. The display will be automatically configured according to the priority set on the "Display Configuration Optimization Setup" (monitor setup).
Tone/Volume	Displays the tone/volume setup menu.
Mode Select	Displays the alarm mode/display mode selection menu to set during surgery.
Display 1 (2, 3)	Switches the home display to Mode 1 (2, 3) preprogrammed on the display mode setup (preset menu).
Other Key	Switches the first page and second page of the user key.
OFF	User key will not be displayed.

4 **Initialize the user key setup.**

Initial
(HOLD 2 SEC)

Pressing the $\boxed{\text{Initial}}$ key for more than 2 seconds will initialize the user key setup to factory default.

The factory setting is as follows.
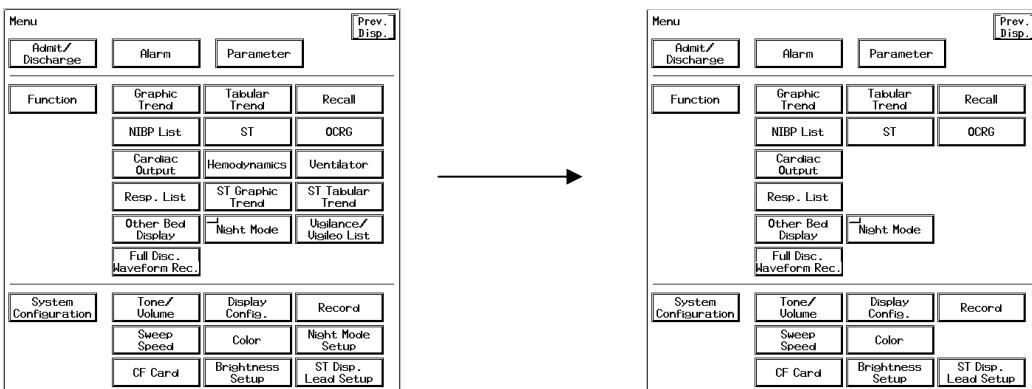
User Key 1: Alarm Silence　　　User Key 5: Freeze
User Key 2: Rec. START/STOP　 User Key 6: Key Lock
User Key 3: Size / Scale　　　　User Key 7: Alarm
User Key 4: Admit / Discharge　 User Key 8: NIBP Auto Mode
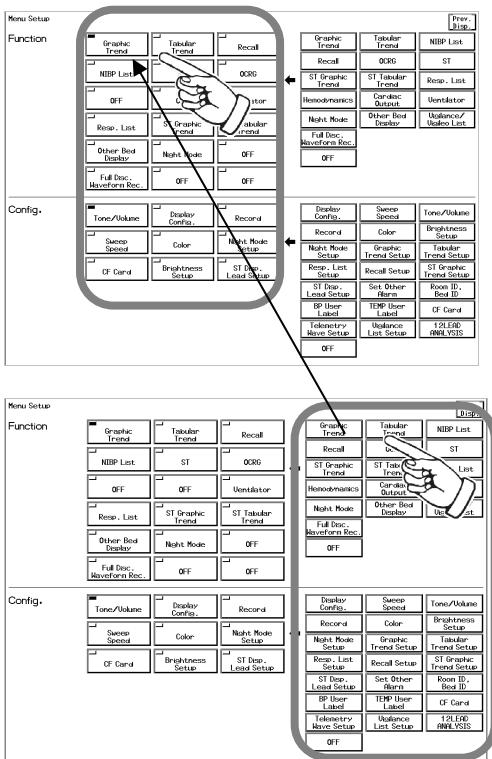
The menu display can be configured for easier use.

1   **Press the** | Menu | → | System Configuration | → | Pre-Set | → | Monitor Setup | →
| Menu Setup | **keys.**

First, select the key location.
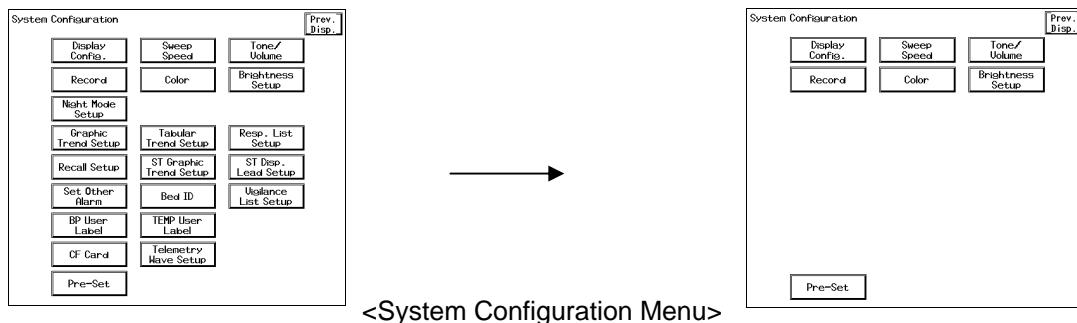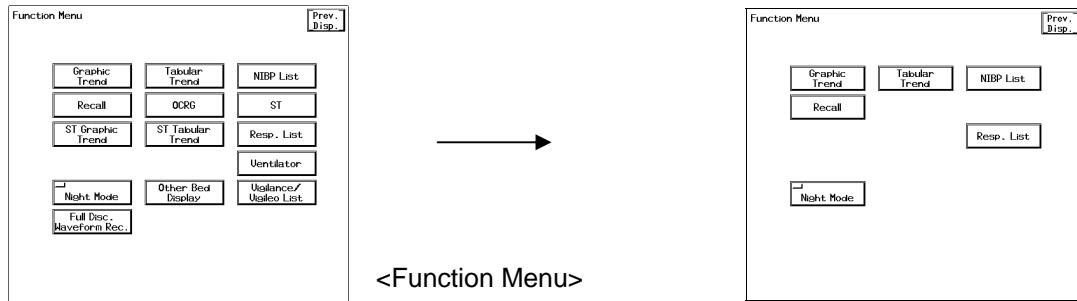
Select the key for the location.
Select function key for the function key location, and configuration key for the configuration key location.

4
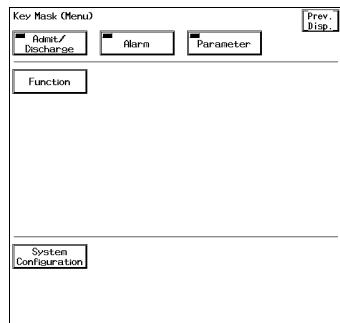
Key Setup

The unnecessary keys on the function menu and configuration menu can be blanked out.

<Function Menu>

<System Configuration Menu>

1 **Press the** [Menu] → [System Configuration] → [Pre-Set] → [Monitor Setup] →
  [Key Mask] **keys.**
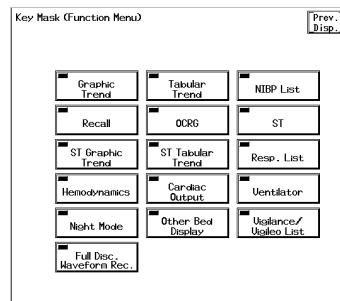
Select the keys to be displayed on the menu display.

[Parameter]   The key with the LED lit in green will be displayed.

[Parameter]
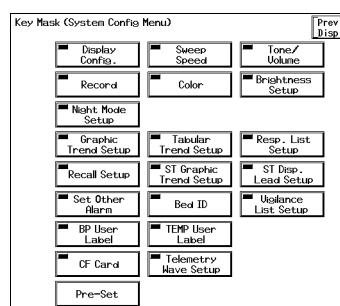
Press the [Function] key to select the keys to be displayed on the
function menu.
Press the [System Configuration] key to select the keys to be
displayed on the function menu.

The green LED will turn off by pressing the key.
The key with the LED turned off will not be displayed.
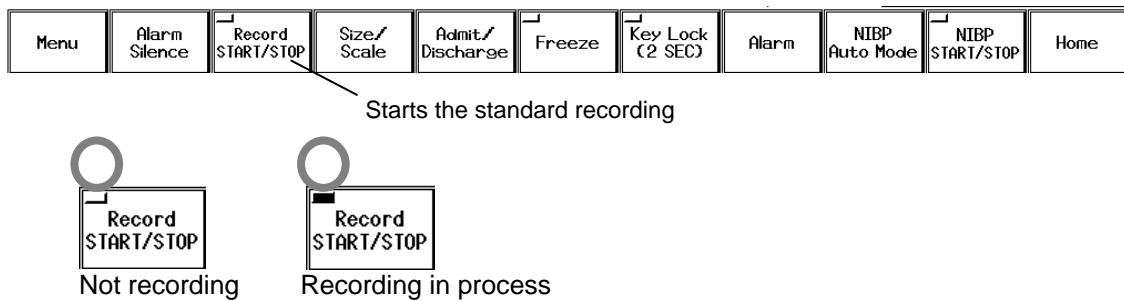
On the DS-7200 system, the waveform recording by manual recording, periodic recording, alarm recording, freeze recording, and graphic recording such as graphic trend, tabular trend can be performed. This section describes the procedure for the following recording.

       ・Manual Recording
       ・Periodic Recording
       ・Alarm Recording
       ・Freeze Recording
       ・Graphic Recording (Graphic Trend, Tabular Trend, Recall, NIBP List, etc.)

Manual Recording

●To Start / Stop the Recording

For manual recording (standard recording), pressing the | Record START/STOP | key will start / stop the recording. Pressing this key during periodic recording, alarm recording, graphic recording, or recall recording will cease the recording in process.

Starts the standard recording

Not recording   Recording in process

Also, the output recorder status for manual recording will be displayed inside the | Record START/STOP | key.

Message	Description
None	Normal Operation
PAPER OUT	No recording paper
CASSETTE	Check the cassette.
CHECK?	Other abnormality.
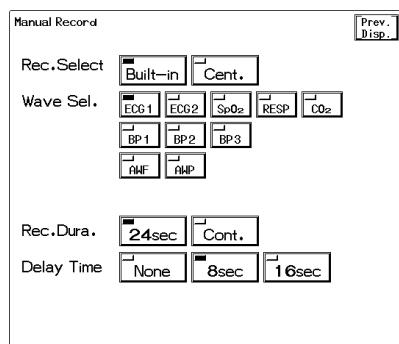
●Manual Recording Setup

The manual recording can be started from the time the key is pressed, or 8 sec. / 16 sec. prior to the time the key is pressed.
The recording can be set to automatically stop after 24 seconds or continue to record until the | Record START/STOP | key is pressed again.

1   **Press the | Menu | → | System Configuration | → | Record | → | Manual Record | keys.**

The manual recording setup menu will be displayed.

2 **Select the output recorder.**

Rec.Select [■ Built-in] [⌐ Cent.]

[Built-in] will record on the built-in recorder.
[Cent.] will record on the 3ch recorder connected to the central monitor.

3 **Select the waveform for recording.**

Wave Sel. [■ ECG1] [⌐ ECG2] [⌐ SpO2] [⌐ RESP] [⌐ CO2]
[⌐ BP1] [⌐ BP2] [⌐ BP3] [⌐ BP4] [⌐ BP5]
[⌐ AWF] [⌐ AWP]

Up to 3 waveforms can be selected.
The waveforms will be automatically located at recording.

4 **Select the duration for recording.**

Rec.Dura. [■ 24sec] [⌐ Cont.]

Select the duration from [24sec] or [Cont.].
[24sec] will automatically stop the recording after 24 seconds.

5 **Select the delay time for recording.**

Delay Time [⌐ None] [■ 8sec] [⌐ 16sec]

[None] will start the recording from the time the
[Rec. START/STOP] key is pressed.
[8sec], [16sec] will start the recording 8 sec. / 16 sec. prior to the time the key is pressed.

NOTE	If [None] is selected for the manual recording delay time, QRS classification will not be printed. To record the QRS classification, select [8sec] or [16sec] for the delay time.
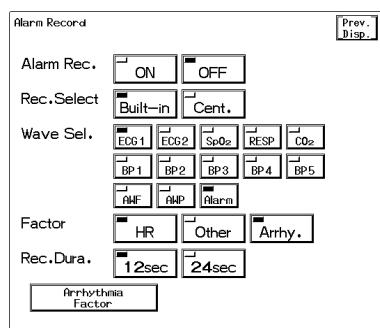
Alarm Recording

The recording will automatically start at occurrence of a numeric alarm or arrhythmia alarm.

NOTE	• The alarm detection is performed each second, and if more than one alarm occurs at the same time, one data will be stored according to the priority of the alarm factor. • Maximum of 3 alarm data can be stored, but if the same or higher priority alarm is newly generated exceeding 3 data, the older recording data will be replaced with the newly generated alarm recording data. The stored data will be erased when recorded. • Priority of alarm recording factor ; ASYSTOLE > VF > VT > SLOW VT > TACHY > BRADY > RUN > HR(HR / PR_SpO2 / PR_IBP) > APNEA > BP1(or ART) > SpO2 > NIBP > RR (RR_IMP / RR_CO2 / RR_VENT)> EtCO2 > PAUSE > COUPLET > BIGEMINY > TRIGEMINY > FREQUENT > BP2 > BP3 > BP4 > BP5 > ST > TEMP > Tb > InspCO2 • If recording on the central monitor recorder, alarm recording and recall recording cannot be performed for the following alarm factor; T3, TACHY, BRADY, SLOW_VT, COUPLET, PAUSE, TRIGEMINY

1 **Press the** [Menu] → [System Configuration] → [Record] → [Alarm Record] **keys.**

Alarm Record [Prev. Disp.]

Alarm Rec. [■ ON] [⌐ OFF]
Rec.Select [■ Built-in] [⌐ Cent.]
Wave Sel. [■ ECG1] [⌐ ECG2] [⌐ SpO2] [⌐ RESP] [⌐ CO2]
[⌐ BP1] [⌐ BP2] [⌐ BP3] [⌐ BP4] [⌐ BP5]
[⌐ AWF] [⌐ AWP] [■ Alarm]
Factor [■ HR] [⌐ Other] [⌐ Arrhy.]
Rec.Dura. [■ 12sec] [■ 24sec]
[Arrhythmia Factor]

The alarm recording setup menu will be displayed.

2 Select the output recorder

Rec.Select [Built-in] [Cent.]

[Built-in] will record on the built-in recorder.
[Cent.] will record on the 3ch recorder connected to the central monitor.
The central monitor recorder will be the one with the smallest central ID.

3 Select the waveform for recording.

Wave Sel. [ECG1] [ECG2] [SpO2] [RESP] [CO2] [BP1] [BP2] [BP3] [BP4] [BP5] [AWF] [AWP] [Alarm]

Up to 3 waveforms can be selected.
The waveforms will be automatically located at recording.
[Alarm] will record the waveform which generated the alarm.

4 Select the recording factor.

Factor [HR] [Other] [Arrhy.]

Select the recording factor for alarm recording.
[HR] will start the alarm recording when a HR or PR alarm is generated.
[Other] will start the alarm recording when a numeric alarm other than HR and PR alarm is generated.
[Arrhy.] will start the alarm recording when an arrhythmia alarm is generated.

5 Select the recording duration.

Rec.Dura. [12sec] [24sec]

Select the recording duration from [12sec], [24sec].
The recording will automatically stop after the selected time.

NOTE	The delay time differs depending on the recording duration.				
	Recording Duration	Delay Time			
		Adult	Child	Neonate	
				Numeric Alarm	Arrhythmia Alarm
	12 sec.	12 sec.	12 sec.	8 sec.	12 sec.
	24 sec.	16 sec.	16 sec.	16 sec.	16 sec.
	Ex) If [24sec] is selected for adult, the recording will start from the data 16 seconds before the alarm and ends 8 seconds after the alarm.				

6 Select the arrhythmia type.

If arrhythmia is selected for the recording factor, select the arrhythmia type.

Arrhythmia
Factor

Alarm Record
Arrhythmia Factor   [Prev. Disp.]

[Asystole] [VF] [VT]
[Slow VT] [Run] [Bigeminy]
[Trigeminy] [Pause] [Couplet]
[Tachy] [Brady] [Frequent]

Pressing the [Arrhythmia Factor] key will display the arrhythmia selection window for alarm recording.

[Asystole] Selected as alarm recording factor.

[Pause] Not selected as alarm recording factor.

7 Start the alarm recording.

Alarm Rec. [□ ON] [□ OFF]   ON will automatically start the recording at alarm occurrence. If alarm recording is not required, select OFF .

| NOTE | The data at the time of alarm occurrence will be recorded. |
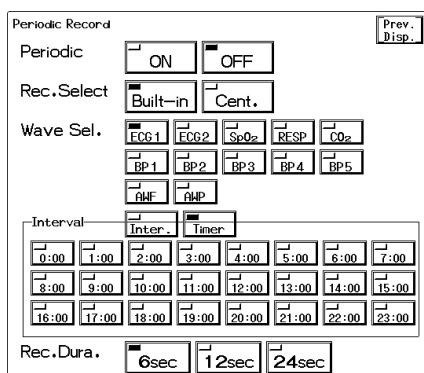
Periodic Recording

The recording will be automatically performed with the selected interval. Periodic recording can be performed on the central monitor connected on the wired network system.

| NOTE | • If the periodic recording was interrupted due to paper out, etc., only the latest data will be printed when it becomes available again.
• QRS judgment will not be printed for periodic recording. |

1 Press the Menu → System Configuration → Record → Periodic Record keys.

```
Periodic Record                          Prev.
                                         Disp.
Periodic        □ ON   □ OFF
Rec.Select      ■ Built-in  □ Cent.
Wave Sel.   ■ECG1 □ECG2 □SpO2 □RESP □CO2
            □BP1 □BP2 □BP3 □BP4 □BP5
            □AWF □AWP
 Interval       □ Inter.  ■ Timer
  □0:00 □1:00 □2:00 □3:00 □4:00 □5:00 □6:00 □7:00
  □8:00 □9:00 □10:00 □11:00 □12:00 □13:00 □14:00 □15:00
  □16:00 □17:00 □18:00 □19:00 □20:00 □21:00 □22:00 □23:00
Rec.Dura.  ■6sec □12sec □24sec
```

The periodic recording setup menu will be displayed.

2 Select the output recorder.

Rec.Select [■ Built-in] [□ Cent.]

Built-in will record on the built-in recorder.
Cent. will record on the 3ch recorder connected to the central monitor.
The central monitor recorder will be the one with the smallest central ID.

3 Select the waveform for recording.

Wave Sel. [■ECG1 □ECG2 □SpO2 □RESP □CO2 □BP1 □BP2 □BP3 □BP4 □BP5 □AWF □AWP]

Up to 3 waveforms can be selected.
The waveforms will be automatically located at recording.
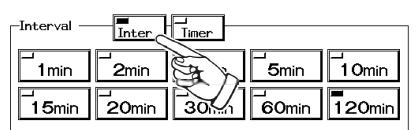
4 Select the periodic interval.

Interval — [□ Inter.] [■ Timer]

Interval recording or timer recording can be selected for periodic recording.

Timer : Recording will automatically start at the programmed time. Select the time to start recording.

Inter. : The recording will automatically start with the selected interval. 5min. will start the recording at 10:00, 10:05, … 10:25. 60 min. will start the recording at 10:00, 11:00, … 12:00.

5 **Select the recording duration.**

Rec.Dura.　[■ 6sec] [□ 12sec] [□ 24sec]　Select the duration from ⌐6sec¬, ⌐12sec¬, ⌐24sec¬ keys.
The recording will automatically stop after the selected time.

6 **Start the periodic recording.**

Periodic　[□ ON] [■ OFF]　⌐ON¬ will activate the periodic recording with the selected interval. If periodic recording is not necessary, select ⌐OFF¬.

12-Lead Waveform Recording

The monitored 12-lead waveform can be output on the built-in recorder or laser printer.

Reference | To use the laser printer, TCP/IP network setup is necessary.
For procedure, refer to "9. Installation　TCP/IP Network Connection".

●Recording Setup

The procedure to set the 12-lead waveform recording condition is explained below.

1 **Press the** [**Menu**] ➜ [**System Configuration**] ➜ [**Record**] ➜ [**12-Lead**] **keys.**

The 12-Lead Waveform Recording Setup menu will be displayed.
The setup screen differs depending on the laser printer usage.

<When laser printer is used>　　　　<When laser printer is not used>

2 **When laser printer is used, select the output printer for 12-lead waveform.**

Rec. Select　　　　[□ Built-in] [■ Laser]

3 **Select the output format for the laser printer.**

Rec. Format

[■ 3 Waves × 4] [□ 3 Waves × 4 + Rhy.] [□ 6 Waves × 2] [□ 12 Waves]

$\boxed{\text{3 Waves} \times 4}$ will print 3 waveforms × 4 columns. The length of each waveform is 2.5 seconds.
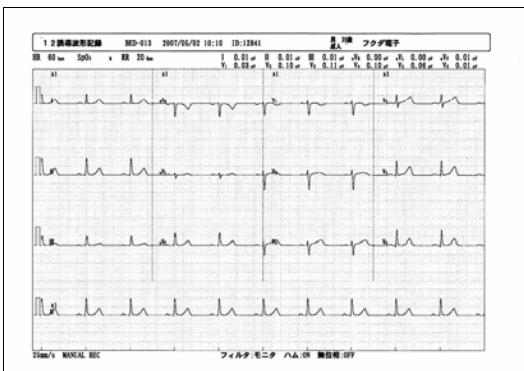
For the example shown on left; the waveforms are as follows;
1st column: I, II, III
2nd column: aVR, aVL, aVF
3rd column: V1, V2, V3
4th column: V4, V5, V6

$\boxed{\text{3 Waves} \times 4\text{+Rhythm}}$ will print 3 waveforms × 4 columns along with 10 seconds of rhythm waveform (ECG1 lead on the home display).
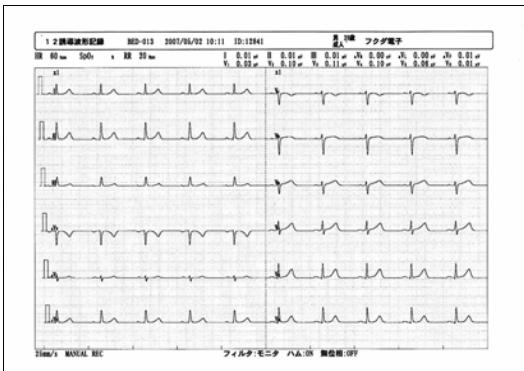
For the example shown on left; the waveforms are as follows;
1st column: I, II, III
2nd column: aVR, aVL, aVF
3rd column: V1, V2, V3
4th column: V4, V5, V6

$\boxed{\text{6 Waves} \times 2}$ will print 6 waveforms × 2 column. The length of each waveform is 5 seconds.
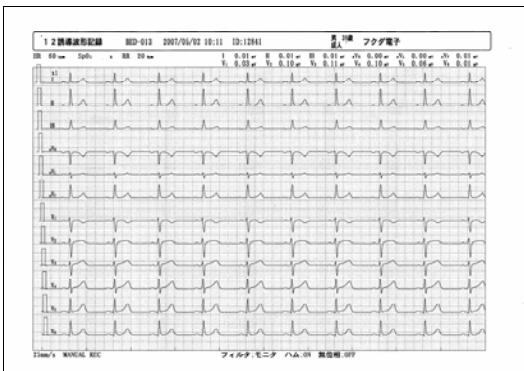
For the example shown on left, the waveforms are as follows;
1st column: I, II, III, aVR, aVL, aVF
2nd column: V1, V2, V3, V4, V5, V6

$\boxed{\text{12 Waves}}$ will print 12 waveforms. The length of each waveform is 10 seconds.

For the example shown on left, the waveforms from the top are as follows;
I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6

4 **Select the output format for the built-in recorder.**

Rec. Format

| 3 Waves ×4 | 2 Waves × 6 |

$\boxed{\text{3 Waves}\times 4}$ will print 3 waveforms × 4 columns.

1st column: I, II, III
2nd column: aVR, aVL, aVF
3rd column: V1, V2, V3
4th column: V4, V5, V6

$\boxed{\text{2 Waves}\times 6}$ will print 2waveforms × 6 columns.

1st column: I, II
2nd column: III, aVR
3rd column: aVL, aVF
4th column: V1, V2,
5th column: V3, V4
6th column: V5, V6
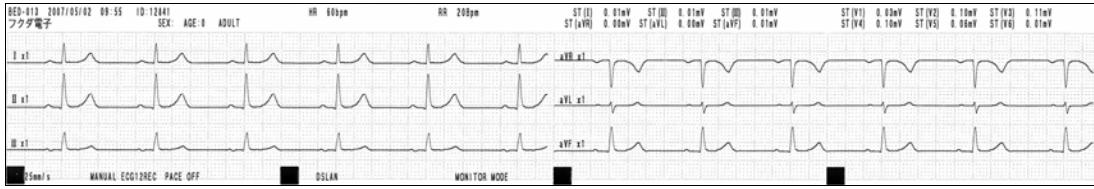
【**Example of "3 Waves×4"**】

If the output recorder is built-in recorder, the length of each waveform is fixed as 6 seconds for both output formats.

5 **Set the waveform position.**

Position

| Center | Proportional | OFF |

$\boxed{\text{Center}}$ will equalize 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.
$\boxed{\text{Proportional}}$ will equalize the blank space between each lead to avoid overlapping of the waveforms. The recording scale of the waveform will be also automatically adjusted.
$\boxed{\text{OFF}}$ will not adjust the waveform position when printing.

6 **Set the printing order of the waveforms.**

Wave Format

| Regular | Reverse |

$\boxed{\text{Regular}}$ will start printing from the limb leads.
(In the order of I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6)
$\boxed{\text{Reverse}}$ will start printing from the chest leads.
(In the order of V1, V2, V3, V4, V5,V6, I, II, III, aVR, aVL, aVF)

7 **Select whether or not to automatically adjust the scale.**

Recorder Auto Scale

| ON | OFF |

When position adjustment is $\boxed{\text{OFF}}$, select whether or not to automatically adjust the scale.
$\boxed{\text{ON}}$ will automatically adjust the printing scale.
$\boxed{\text{OFF}}$ will not automatically adjust the printing scale and prints with the displayed scale.

| NOTE | The printing scale will be adjusted in the range of ×1, ×1/2, ×1/4. It will not be adjusted to ×2 or ×4 even if the amplitude is small. |

8 **Select whether or not to print the calibration waveform.**

Print Calibration   ◼ ON   ⌐ OFF   ON will print the calibration waveform.
OFF will not print the calibration waveform.

9 **Select whether or not to print the lead boundary when recording on the laser printer.**

Lead Boundary   ⌐ ON   ◼ OFF   ON will print the lead boundary between the leads.
OFF will not print the lead boundary.
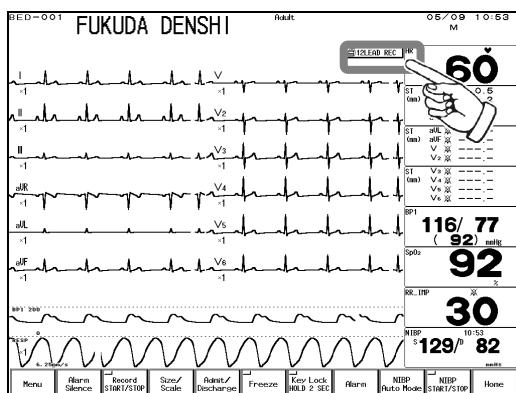
●To Print the 12-Lead Waveform

When the display mode is "12-Lead", 12LEAD REC key will be displayed on the home display. Press this key to start printing.

1 **Set the display mode to "12-Lead".**

12LEAD REC key will be displayed on the home display.

When laser printer is set as the output recorder, laser printer icon will be displayed inside the 12LEAD REC key.

2 **Print the 12-lead waveform.**

Press the 12LEAD REC key to start recording. For the laser printer, printing can be cancelled by pressing the 🖶 Cancel key.
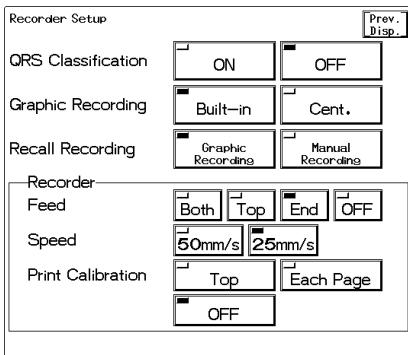
・The waveform for each lead will be printed in the same phase.
・The printing duration of the waveforms for each format are as follows.

Output Recorder	*Output Format*	*Printing Duration*
Built-in Recorder	3 Waves×4	6 sec.
	2 Waves×6	
Laser Printer	3 Waves×4	2.5 sec.
	3 Waves×4+Rhythm	
	6 Waves ×2	5 sec.
	12 Waves	10 sec.

Recorder Setup

The recording condition common to manual, periodic, alarm recording, and output recorder for graphic recording can be set.

1 **Press the** **Menu** → **System Configuration** → **Record** → **Setup** **keys.**

```
┌─────────────────────────────────┐
│ Recorder Setup           Prev.  │
│                          Disp.  │
│ QRS Classification   ON    OFF  │
│                                 │
│ Graphic Recording  Built-in Cent.│
│                                 │
│ Recall Recording   Graphic  Manual│
│                   Recording Recording│
│  ┌Recorder─────────────────────┐│
│  │ Feed   Both Top End OFF      ││
│  │ Speed  50mm/s 25mm/s         ││
│  │ Print Calibration            ││
│  │         Top   Each Page      ││
│  │         OFF                  ││
│  └──────────────────────────────┘│
└─────────────────────────────────┘
```

The recorder operation setup menu will be displayed.

2 **Select ON/OFF for QRS classification symbol recording.**

QRS Classification   ON   OFF   ON will record the QRS classification symbol on to the ECG waveform.

Symbol	Description
N (Normal)	Normal QRS beat
V (VPC)	Ventricular Extrasystole
S (SVPC)	Supraventricular Extrasystole
P (Pacing Beat)	Pacing beat
F (Fusion Beat)	Fusion beat of pacing and spontaneous beat.
? (Undetermined beat)	Learning arrhythmia, or beat not matching the pattern

NOTE
● The QRS classification symbol cannot be recorded for the manual recording without delay time and periodic recording. To record the QRS classification symbol, set the delay time to 8 seconds or 16 seconds for manual recording.
● The "S" (QRS symbol) will be printed as "N" on the central recorder.

3 **Select the output recorder for the graphic recording.**

Graphic Recording   Built-in   Cent.
Built-in will record on the built-in recorder.
Cent. will record on the central monitor recorder.
The central monitor recorder of the smallest ID will be used.

4 **Select the output recorder for the recall recording.**

Recall Recording   Graphic Recording   Manual Recording
Graphic Recording will record on the recorder selected at procedure 3.
Manual Recording will record on the recorder selected for manual recording.

5 **Set the paper feed operation for the recorder.**

Feed   Both Top End OFF

Both will start the recording from the perforation, and feeds the paper to the next perforation, so that the paper can be easily cut off.
Top will start the recording from the perforation, and will not feed the paper after recording.
End will start the recording from the position where the previous recording ended, and feeds the paper to the next perforation after recording so that the paper can be easily cut off.
OFF will start the recording from the position where the previous recording ended, and will not feed the paper after recording.

| Speed | 50mm/s 25mm/s | Set the recording speed for the recorder. |

| Print Calibration | Top Each Page OFF | Select whether or not to print the calibration waveform.
Top will print the calibration waveform at the beginning of the waveform.
Each Page will print the calibration waveform on each page.
OFF will not print the calibration waveform. |
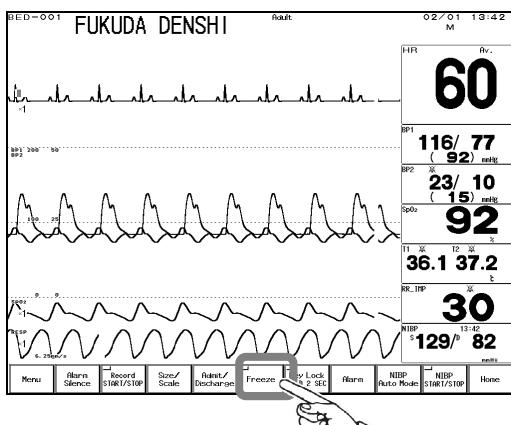
Freeze Recording

The waveform display can be frozen and recorded from 12 seconds prior to the frozen point.
The recording duration is fixed as 12 seconds.
To freeze the waveform display, the Freeze key needs to be assigned as a user key.

1 Freeze the waveform display.

Press the Freeze key on the user key.

2 Start freeze recording.

Press the Record START/STOP key to record the displayed waveform.
The freeze recording will be printed on the built-in recorder.
The waveform set for the manual recording will be recorded.

Graphic Recording (Graphic/Tabular Trend, etc.)

Graphic trend recording, tabular trend recording, NIBP list recording, recall recording, and Vigilance list recording can be performed.

Reference | Refer to respective section of "7. Function " for recording procedure.

Graphic Trend

3 (three) parameters from the following can be selected for graphic recording.

Parameter	Description
HR	HR, PR (PR_SpO$_2$), PR (PR_IBP)
ST	ST(I), ST(II), ST(III), ST(aVR), ST(aVL), ST(aVF), ST(V), ST(V2), ST(V3), ST(V4), ST(V5), ST(V6)
VPC	VPC beats
BP1	BP1 (SYS / Mean / DIA)
BP2	BP2 (SYS / Mean / DIA)
BP3	BP3 (SYS / Mean / DIA)
BP4	BP4 (SYS / Mean / DIA)
BP5	BP5 (SYS / Mean / DIA)
PDP	Peak Diastolic Pressure

Parameter	Description
CPP	Cerebral Perfusion Pressure
NIBP	NIBP (SYS / Mean / DIA)
SpO_2	SpO_2 value
TEMP1, TEMP2	TEMP1, TEMP2
TEMP3	TEMP3
Tb	Blood Temperature
RR	Impedance Resp. (RR), CO_2 Resp. (RR_CO_2), Ventilator Resp. (RR_VENT)
APNEA	Apnea Time (Impedance, CO_2, Ventilator)
CO_2	$EtCO_2$/$InspCO_2$
SvO_2	Mixed Venous Oxygen Saturation
$ScvO_2$	Central Venous Oxygen Saturation
CCO	Continuous Cardiac Output
CCI	Continuous Cardiac Index
BT	Blood Temperature (Vigilance Data)
BIS	BIS Monitor Data
EVENT1	ASYSTOLE, VF, VT, SLOW_VT, RUN, BIGEMINY
EVENT2	TRIGEMINY, PAUSE, COUPLET, TACHY, BRADY, FREQUENT

Tabular Trend

17 parameters from the following can be displayed / recorded as tabular trend.

Parameter	Description
HR	HR, PR (PR_SpO_2), PR (PR_IBP)
ST	ST(I), ST(II), ST(III), ST (aVR), ST (aVL), ST (aVF), ST (V), ST (V2), ST (V3), ST (V4), ST (V5), ST (V6)
VPC	VPC beats
BP	BP (SYS): BP1-S, BP2-S, BP3-S, BP4-S, BP5-S, BP (Mean): BP1-M, BP2-M, BP3-M, BP4-M, BP5-M BP (DIA): BP1-D, BP2-D, BP3-D, BP4-D, BP5-D
PDP	Peak Diastolic Pressure
CPP	Cerebral Perfusion Pressure
PCWP	Pulmonary Capillary Wedge Pressure
NIBP	NIBP (SYS / Mean / DIA) NIBP-S, NIBP-M, NIBP-D
SpO_2	SpO_2 value
TEMP	T1, T2, T3
Tb	Blood Temperature
RR	Impedance Resp. (RR), CO_2 Resp. (RR_CO_2), Ventilator Resp. (RR_VENT)
APNEA	Apnea Time (Impedance, CO_2, Ventilator)
$EtCO_2$	$EtCO_2$ value
$InspCO_2$	$InspCO_2$ value
SvO_2	Mixed Venous Oxygen Saturation
$ScvO_2$	Central Venous Oxygen Saturation
CCO	Continuous Cardiac Output
CCI	Continuous Cardiac Index
BT	Blood Temperature (Vigilance Data)
BIS	BIS, BIS_SQI, BIS_EMG, BIS_SR (BIS Monitor Data)

NIBP List

The numeric data for the following parameters can be recorded.

Parameter	Description
HR	HR
PR_SpO$_2$	PR (PR_SpO$_2$)
SpO$_2$	SpO$_2$ value
NIBP	NIBP (SYS / Mean / DIA)

Recall

The waveform and numeric data at alarm occurrence will be recorded with the following setup.

Parameter	Description
Waveform (Max. 2)	ECG1, ECG2, BP1 to BP5, SpO$_2$, CO$_2$, RESP
Numeric	HR, ST, NIBP, BP1 to BP5, RR, APNEA, SpO$_2$, T1 to T3, Tb, CO$_2$,
Arrhythmia Factor	ASYSTOLE, VF, VT, SLOW VT, RUN, BIGEMINY, TRIGEMINY, PAUSE, COUPLET, TACHY, BRADY, FREQUENT
Recording Duration	12 sec.

Respiration List

17 parameters from the following can be selected for list recording.

Parameter	Description
RR_IMP	Impedance RR
RR_CO$_2$	CO$_2$ RR
RR_VENT	Ventilator RR
SpO$_2$	SpO$_2$ value
APNEA	Apnea time (Impedance, CO$_2$, Ventilator)
E-TV	Expiratory Tidal Volume
I-TV	Inspiratory Tidal Volume
MV	Minute Ventilation
SMV	Spontaneous Minute Ventilation
P_PEAK	Maximum Airway Pressure
P_PAUSE	Pause Airway Pressure
PEEP	Peak End Expiratory Pressure
P_MEAN	Mean Airway Pressure
D-RES	Dynamic Resistance
S-RES	Static Resistance
D-COMP	Dynamic Compliance
S-COMP	Static Compliance
P_Min	Minimum Airway Pressure
S_RR	Spontaneous Respiration
FIO$_2$	Fractional Concentration of Inspiratory Gas
EtCO$_2$	EtCO$_2$ value
SvO$_2$	Mixed Venous Oxygen Saturation
ScvO$_2$	Central Venous Oxygen Saturation
CCO	Continuous Cardiac Output
CCI	Continuous Cardiac Index

NOTE	The displayed name of the parameter differs depending on the used ventilator. Also, some parameters may not be displayed depending on the used ventilator. For example, Resistance (Insp/Exp) and Compliance will not be displayed for the SV-300 and Servo-i.

Vigilance List

17 parameters from the following can be selected for list recording.

Parameter	Description
SvO$_2$	Mixed Venous Oxygen Saturation
ScvO$_2$	Central Venous Oxygen Saturation
SaO$_2$	Arterial Oxygen Saturation
O$_2$EI	Oxygen Uptake Index
DO$_2$	Oxygen Transport
VO$_2$	Oxygen Consumption
SV	Stroke Volume
SV_STAT	Stroke Volume (STAT Mode)
SVI	Stroke Volume Index
SVI_STAT	Stroke Volume Index (STAT Mode)
HR	Heart Rate
MAP	Mean Arterial Pressure
CVP	Central Venous Pressure
CCO	Continuous Cardiac Output
CCO_STAT	Continuous Cardiac Output (STAT Mode)
CCI	Continuous Cardiac Index
CCI_STAT	Continuous Cardiac Index (STAT Mode)
SVR	Systemic Vascular Resistance
SVRI	Systemic Vascular Resistance Index
B_Temp	Blood Temperature
EF	Ejection Fraction
EF_STAT	Ejection Fraction (STAT Mode)
EDV	End-Diastolic Volume
EDV_STAT	End-Diastolic Volume (STAT Mode)
EDVI	End-Diastolic Volume Index
EDVI_STAT	End-Diastolic Volume Index (STAT Mode)
ESV	End-Systolic Volume
ESVI	End-Systolic Volume Index
SVV	Stroke Volume Variance

4

Recording Setup
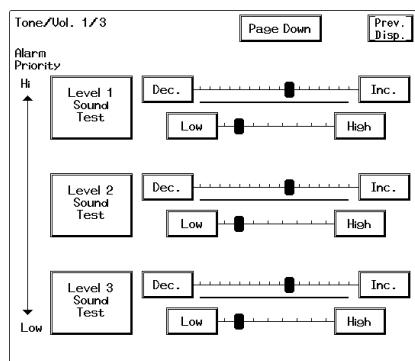
This menu allows volume setup of the pulse tone, alarm sound, key sound and other bed alarm sound. The ON/OFF of ventilator alarm sound can be also selected.
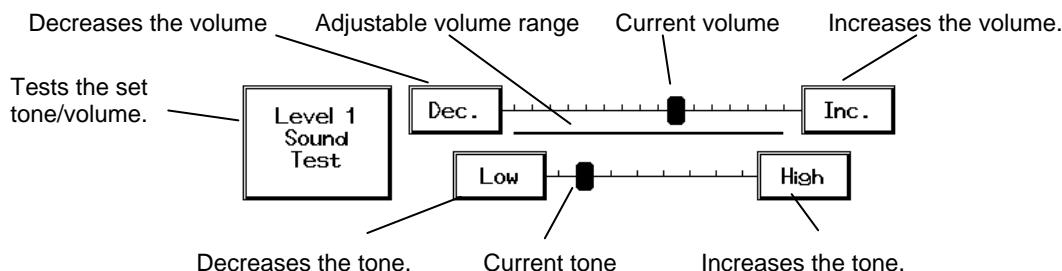
1 **Press the** | **Menu** | **→** | **Tone / Volume** | **keys.**
The tone/volume setup screen will be displayed.

2 **On the first page, set the tone/volume for the alarm sound.**

The tone and volume can be set for each alarm level.
However, if | IEC | is selected for "Alarm System" under the "Monitor Setup" menu, tone for level 2 and level 3 cannot be set. The tone setting for level 1 will be applied.

Decreases the volume   Adjustable volume range   Current volume   Increases the volume.

Tests the set tone/volume.

Decreases the tone.   Current tone   Increases the tone.

Reference | For the low limit for the alarm volume, refer to "8. System Configuration   Monitor Setup"
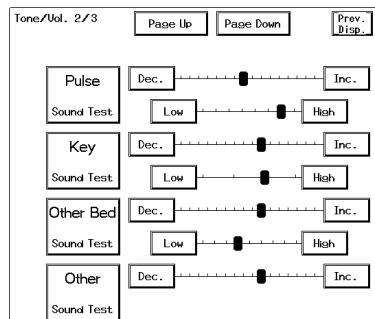
⚠CAUTION
- The alarm priority is high for level 1 (life threatening alarm), medium for level 2 (cautionary alarm), and low for level 3 (treatment needed alarm).
- Pay attention not to set the alarm volume too low to avoid missing any important alarms.
- During the night mode, the volume set on the "Night Mode Setup" will be applied.
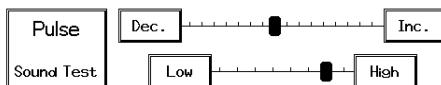
Reference | For the night mode setup, refer to "8. System Configuration   Night Mode"

3 **Press the** | **Page Down** | **key and adjust the tone/volume of the other bed alarm sound and other sound.**
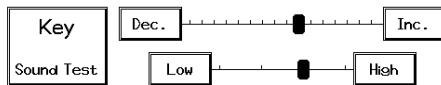
Adjust the tone/volume of the pulse, key, other bed, and other sound.

```
┌─────────┐  ┌────┐                    ┌────┐
│ Pulse   │  │Dec.│••••••••━■━••••••••••│Inc.│
├─────────┤  └────┘                    └────┘
│Sound Test│  ┌───┐                ┌────┐
└─────────┘  │Low│━━━━━━━━━━━━■━━━│High│
             └───┘                └────┘
```
Set the tone/volume for the pulse sound.
The HR synchronized sound, SpO$_2$ synchronized sound, BP synchronized sound can be adjusted.
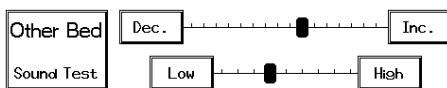
NOTE	The tone setup is only effective for HR synchronized sound and BP synchronized sound. The tone for SpO$_2$ synchronized sound will change according to the SpO$_2$ value. The tone will increase as the SpO$_2$ value increases and decreases as the SpO$_2$ value decreases.
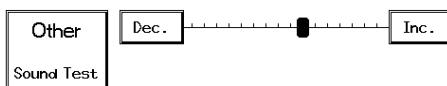
```
┌─────────┐  ┌────┐                    ┌────┐
│ Key     │  │Dec.│••••••••••━■━•••••••│Inc.│
├─────────┤  └────┘                    └────┘
│Sound Test│  ┌───┐                ┌────┐
└─────────┘  │Low│━━━━━━━━━━■━━━━━│High│
             └───┘                └────┘
```
Set the tone/volume for the key sound.
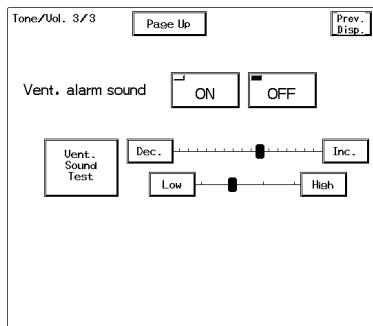
NOTE	The pulse sound and key sound will be silenced if set to the minimum volume.

```
┌─────────┐  ┌────┐                    ┌────┐
│Other Bed│  │Dec.│••••••••••━■━•••••••│Inc.│
├─────────┤  └────┘                    └────┘
│Sound Test│  ┌───┐                ┌────┐
└─────────┘  │Low│━━━━━■━━━━━━━━━│High│
             └───┘                └────┘
```
Set the tone/volume for the other bed alarm sound. However, if IEC is selected for "Alarm System" on the Monitor Setup menu, this setting cannot be performed. The tone/volume setting for alarm level 1 will be applied.

```
┌─────────┐  ┌────┐                    ┌────┐
│ Other   │  │Dec.│••••••••••━■━•••••••│Inc.│
├─────────┤  └────┘                    └────┘
│Sound Test│
└─────────┘
```
Set the volume for the other sound.
The volume of the sound which notifies the completion of BP zero balance, NIBP measurement, etc. can be adjusted.

4 **Press the** │ Page Down │ **key.**

```
┌──────────────────────────────────────┐
│Tone/Vol. 3/3   ┌─────────┐     ┌─────┐│
│                │ Page Up │     │Prev.││
│                └─────────┘     │Disp.││
│                                └─────┘│
│                 ┌─┐   ┌─┐              │
│Vent. alarm sound│ │ON │■│OFF           │
│                 └─┘   └─┘              │
│        ┌─────┐ ┌────┐          ┌────┐ │
│        │Vent.│ │Dec.│••••••━■━•│Inc.│ │
│        │Sound│ └────┘          └────┘ │
│        │Test │ ┌───┐       ┌────┐     │
│        └─────┘ │Low│━━━━■━│High│      │
│                └───┘       └────┘     │
│                                        │
└──────────────────────────────────────┘
```
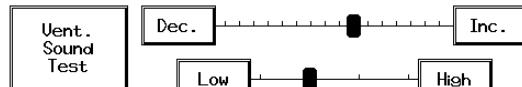
5 **Set ON/OFF of ventilator alarm sound and adjust the tone/volume of the ventilator alarm sound.**

```
                  ┌─┐       ┌─┐
Vent. alarm sound │ │ON    │■│OFF
                  └─┘       └─┘
```
│ OFF │ will not generate ventilator alarm on the DS-7200.
│ ON │ will generate ventilator alarm on the DS-7200.

```
┌─────┐  ┌────┐                    ┌────┐
│Vent.│  │Dec.│••••••••••━■━•••••••│Inc.│
│Sound│  └────┘                    └────┘
│Test │  ┌───┐                ┌────┐
└─────┘  │Low│━━━━━■━━━━━━━━━│High│
         └───┘                └────┘
```
Set the tone/volume for the ventilator alarm. However, if IEC is selected for "Alarm System" on the Monitor Setup menu, this setting cannot be performed. The tone/volume setting for alarm level 1 will be applied.
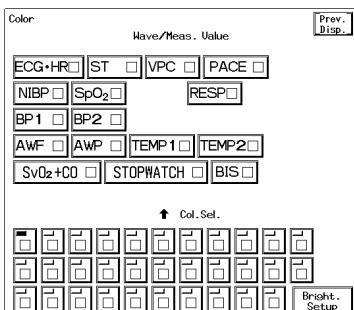
Color/Brightness Setup

This menu allows the setup of the colors of numeric data / waveform and brightness of the display.

Color Setup (Numeric Data, Waveform)
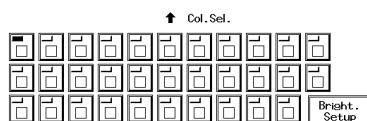
The displayed color for each parameter can be selected from the 32-color palette.

1 **Press the** `Menu` → `System Configuration` → `Color` **keys.**

<Color Setup Menu>
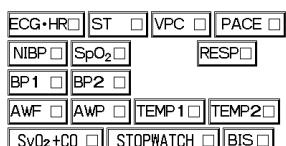
2 **Select the color from the 32-color palette.**

Press the key of the desired color.

3 **Assign the selected color to the parameter.**
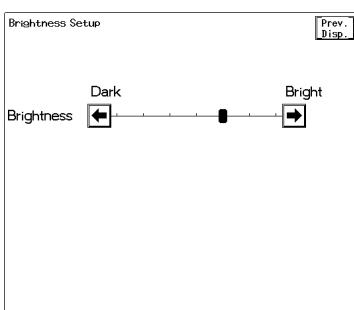
Press the parameter key to assign the selected color.
The selected color for the parameter will be applied to the waveform, numeric data, graphic trend, and tabular trend.

Brightness Setup

The brightness of the display can be adjusted.

1 **Press the** `Menu` → `System Configuration` → `Brightness Setup` **keys.**

<Brightness Setup Menu>

2 **Adjust the brightness.**

Use the `←`, `→` keys to adjust the brightness.
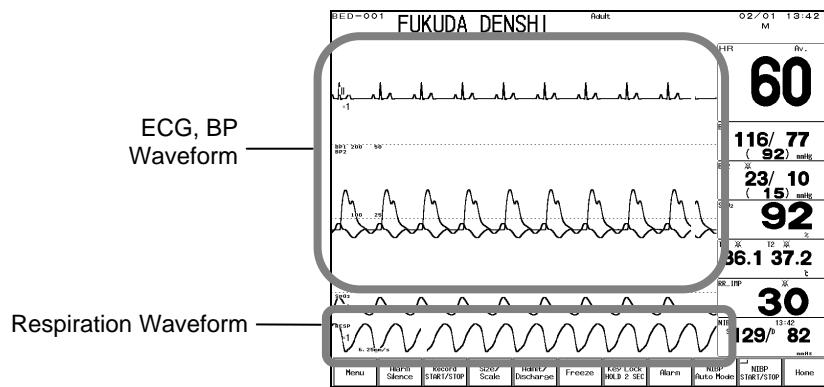
Darkens the display.   Current brightness   Brightens the display.

⚠ CAUTION	The display panel utilizes exclusive fluorescent light for the backlight. Since this fluorescent light deteriorates by the life cycle, the display may become dark, scintillate, or may not light by the long term use. In such case, contact your nearest service representative.

Sweep Speed   Waveform Display Speed/Time
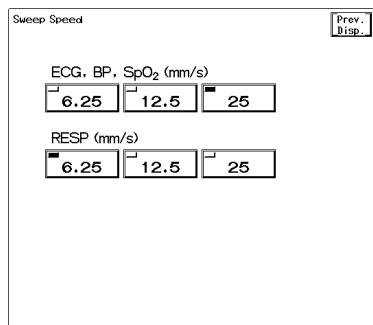
This section describes the procedure to set up the sweep speed of the waveform display.

The sweep speed can be set separately for ECG/BP waveform and respiration waveform.

ECG, BP Waveform

Respiration Waveform
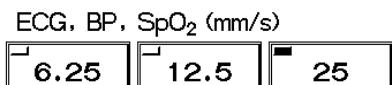
Display Unit	*Display Time*		
Display Config. Selection	*Standard*	*Ext.1, Ext.2*	*Enlarged*
25mm/s	7.9sec.	5.5sec.	10.2sec.
12.5mm/s	15.8sec.	11.0sec.	20.4sec.
6.25mm/s	31.6sec.	22.0sec.	40.8sec.

1 **Press the** **Menu** → **System Configuration** → **Sweep Speed** **keys.**
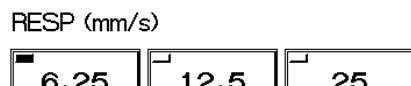
The sweep speed setup menu will be displayed.

2 **Set the sweep speed for ECG, BP, SpO$_2$ waveform.**

ECG, BP, SpO$_2$ (mm/s)

| 6.25 | 12.5 | 25 |

3 **Select the sweep speed for respiration waveform.**

RESP (mm/s)

| 6.25 | 12.5 | 25 |
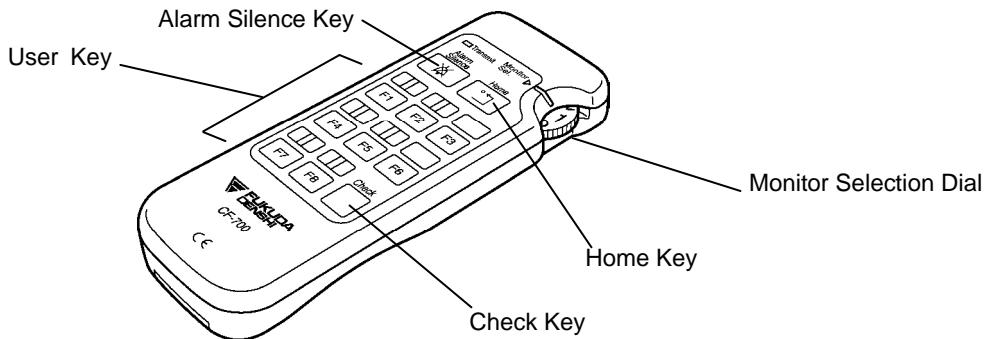
Remote Control Setup

This section explains the setup procedure on how to use the optional remote control unit, CF-700.

About the Remote Control Unit

There are 11 keys on the remote control unit of which 8 keys are user keys.

Monitor Selection Dial

The remote control bed ID to control can be selected. The remote control bed ID should be preprogrammed on each bedside monitor. Maximum of 8 monitors can be controlled with one remote control unit.

Check Key

Displays the remote control bed ID on the bedside monitor. Also, pressing one of the function keys (ex. NIBP START/STOP key) will display a message on the monitor which will ask you to press this Check key.

Alarm Silence Key

This key has the same function as the ⎢ Alarm Silence ⎢ key on the bedside monitor.

Home Key

This key functions the same as the ⎢ Home ⎢ key on the bedside monitor.

User Key (F1 to F8)

The function for each key can be assigned on the bedside monitor.
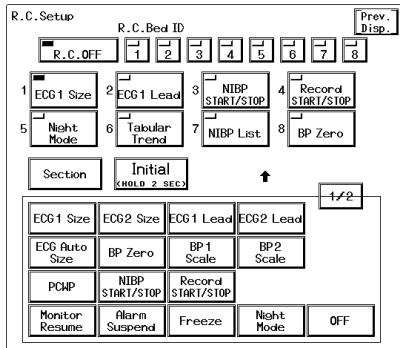
Key	Default	Function
F1	ECG1 Size	Switches the ECG1 size each time the key is pressed. $\times 1/4 \rightarrow \times 1/2 \rightarrow \times 1 \rightarrow \times 2 \rightarrow \times 4 \rightarrow \times 1/4$
F2	ECG1 Lead	Switches the ECG1 lead each time the key is pressed. 3-electrode: I→II→III→I 4-electrode: I→II→III→aVR→aVL→aVF→I 5-electrode: I→II→III→aVR→aVL→aVF→V→I 10-electrode: I→II→III→aVR→aVL→aVF→V1→V2→V3→ V4→V5→V6→I
F3	NIBP START/STOP	Starts/stops the NIBP measurement. Pressing this key will display a message on the monitor to press the "Check" key. When the "Check" key is pressed, the measurement will start. To cancel the process, press the "Home" key. Pressing this key during the measurement will stop the measurement.
F4	Record START/STOP	Starts/stops the manual recording.
F5	Night Mode	Sets ON/OFF of the Night Mode.
F6	Tabular Trend	Displays the tabular trend data.
F7	NIBP List	Displays the NIBP list.
F8	BP Zero	Starts the BP zeroing.

Remote Control Setup

Functions can be assigned to 8 user keys on the remote control unit.
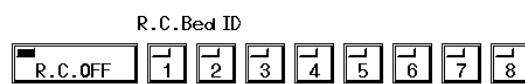
1 **Press the** ⎡Menu⎤ → ⎡System Configuration⎤ → ⎡Pre-Set⎤ → ⎡Monitor Setup⎤ →
⎡R.C. Setup⎤ **keys.**

The remote control unit setup menu will be displayed.

2 **Set the remote control bed ID.**
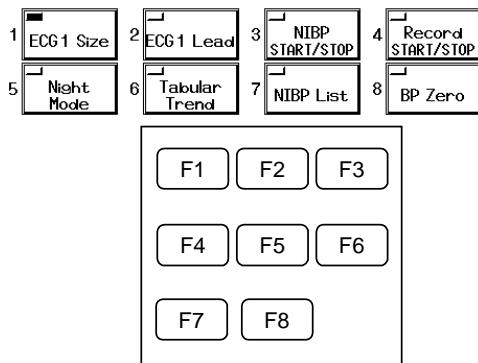
Set the bed ID that will respond to the monitor selection dial on the remote control unit.

Select the bed ID from ⎡1⎤ to ⎡8⎤.
Select ⎡R.C. OFF⎤ if not using the remote control function.
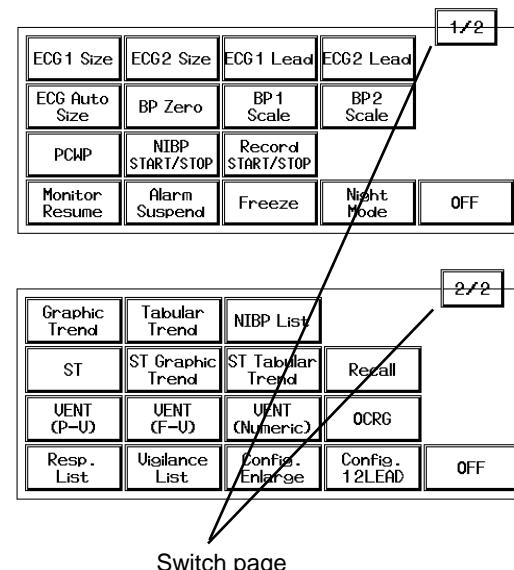
3 **Select the key location.**

Select the key location of the remote control unit to change or assign a function.

The "F1" key on the remote control unit is the same key as the "1" key on the remote control setup menu.

Key Location on the Remote Control Unit

4 **Select the function.**

Select a function to be assigned for the selected key location.
Pressing the function key will assign the function to the selected key location.

Use the ⎡1/2⎤, ⎡2/2⎤ keys to switch the page for function selection.

Switch page

Functions that can be assigned to the User Keys
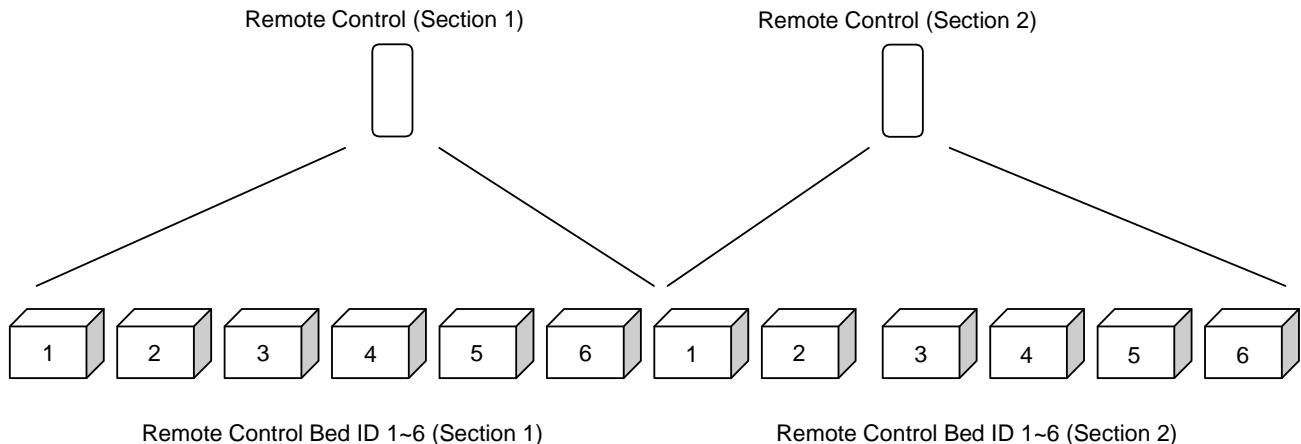
Function	Description
ECG1 Size ECG2 Size	Switches the ECG1 (ECG2) size each time the key is pressed. ×1/4→×1/2→×1→×2→×4→×1/4
ECG1 Lead ECG2 Lead	Switches the ECG1 (ECG2) lead each time the key is pressed. 3-electrode: I→II→III→I 4-electrode: I→II→III→aVR→aVL→aVF→I 5-electrode: I→II→III→aVR→aVL→aVF→V→I 10-electrode: I→II→III→aVR→aVL→aVF→V1→V2→V3→V4→V5→V6→I
ECG Auto Size	Automatically adjusts the ECG size to 10mm. This function is effective only when the key is pressed.
BP1 to BP5 Scale	Switches the BP1 to BP5 scale each time the key is pressed. 20→50→75→100→150→200→250→300→20 (mmHg) 4→8→12→16→20→24→32→40 (kPa)
PCWP	If the BP label is PAP, PCWP input menu will be displayed.
BP Zero	Starts zeroing for all BP. It will not function unless the transducers for all BP is opened to air.
NIBP START/STOP	Starts/stops the NIBP measurement. Pressing this key will display a message on the monitor to press the "Check" key. When the "Check" key is pressed, the measurement will start. To cancel the process, press the "Home" key. Pressing this key during the measurement will stop the measurement.
Record START/STOP	Starts/stops the manual recording. The recording duration set on the manual recording setup menu will be applied.
Monitor Resume	Resumes monitoring when the monitoring is suspended.
Alarm Suspend	Suspends the alarm for fixed amount of time. When pressed during the alarm is suspended, the alarm function will resume.
Freeze	Temporarily stops the waveform trace. Pressing the key again will resume the waveform trace.
Graphic Trend	Displays the graphic trend.
Tabular Trend	Displays the tabular trend.
NIBP List	Displays the NIBP list.
OCRG	Displays the OCRG.
Recall	Displays the recall data.
ST	Displays the ST measurement display.
ST Graphic Trend	Displays the ST graphic trend.
ST Tabular Trend	Displays the ST tabular trend.
Cardiac Output	CO measurement menu will be displayed. This key will not start the CO measurement.
Hemodynamic	Hemodynamic calculation menu will be displayed.
VENT (P-V)	Displays P-V loop on the ventilator display.
VENT (F-V)	Displays F-V loop on the ventilator display.
VENT (Numeric)	Displays numeric data on the ventilator display.
Resp. List	Displays respiration list.
Vigilance List	Displays Vigilance list/
Night Mode	Turns ON/OFF the Night Mode.
Config. Enlarge	Switches the display configuration to "Enlarge" mode. Pressing the key again will return the display to previous configuration.
Config. 12LEAD	Switches the display configuration to "12-lead" mode. Pressing the key again will return the display to previous configuration.
OFF	Turns OFF the key operation.

5 **Check the setting.**
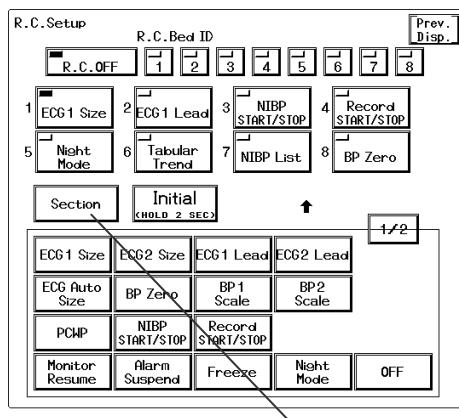
⚠CAUTION	● Do not set the same remote control bed ID to more than one monitors on the same floor. Otherwise, it may cause to remote control more than one monitors at the same time. ● After the remote control setup, check that the remote control unit is properly operating.

Section Setup

One remote control unit can control a maximum of 8 monitors. When controlling more than 8 monitors, it is necessary to set a section for the remote control. If the section is not properly set, the remote control may unintentionally control 2 monitors at the same time. The set section number must be the same between the remote control unit and the monitor.

Remote Control (Section 1)   Remote Control (Section 2)

Remote Control Bed ID 1~6 (Section 1)   Remote Control Bed ID 1~6 (Section 2)

1 **Press the** **Menu** → **System Configuration** → **Pre-Set** → **Monitor Setup** → **R.C. Setup** **keys.**

Press the **Section** key.

Set the section number corresponding to the remote control unit from **1** to **4**.

Reference	For procedure to set the section on the remote control unit, refer to the operation manual of the remote control unit.

This monitor is equipped with an alarm pole.
The alarm generation can be indicated with the alarm pole flashing and can be seen from distance.
The alarm pole can be also synchronized with HR.
The alarm pole function setup can be performed for (1) flashing at alarm generation, and for (2) flashing synchronized with HR.
When $\boxed{\text{IEC}}$ is selected for "Alarm System" on the Monitor Setup menu, not all items can be set on the Alarm Pole Setup menu.

Setup	When $\boxed{\text{FUKUDA DENSHI}}$ is set	When $\boxed{\text{IEC}}$ is set
Sync. with Alarm		Setting is not possible. (Fixed to "ON")
Alarm Type		Setting is not possible. (Fixed to "Level 1, 2 and 3")
Ventilator Alarm	Setting is possible.	Setting is not possible. (Fixed to "ON")
Pattern Setup		Setting is not possible.
Sync. with HR		Setting is possible.
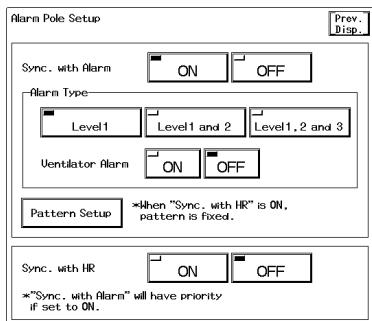
⚠ CAUTION | The alarm priority is high for level 1 (life threatening alarm), medium for level 2 (cautionary alarm), and low for level 3 (treatment needed alarm).

Flashing the Alarm Pole at Alarm Generation

The alarm level to flash the alarm pole and the flash pattern for each alarm level can be set.

1 Press the $\boxed{\text{Menu}}$ → $\boxed{\text{System Configuration}}$ → $\boxed{\text{Pre-Set}}$ → $\boxed{\text{Monitor Setup}}$ → $\boxed{\text{Alarm Pole}}$ keys.

The alarm pole setup menu will be displayed.
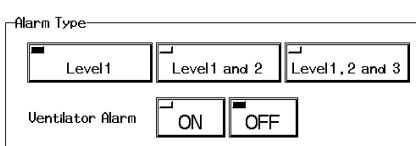
2 Select whether the alarm pole should flash at alarm generation.

Sync. with Alarm   [ON] [OFF]

To flash at alarm generation, select $\boxed{\text{ON}}$.
To not flash at alarm generation, select $\boxed{\text{OFF}}$.

3 Select the alarm type to flash the alarm pole.

Select the alarm level to flash the alarm pole from $\boxed{\text{Level 1}}$, $\boxed{\text{Level 1 and 2}}$, and $\boxed{\text{Level 1, 2, and 3}}$.
Whether to flash the alarm pole at ventilator alarm generation can be also selected. $\boxed{\text{ON}}$ will flash the alarm pole at ventilator alarm generation.

⚠ CAUTION | The alarm level shown in next page is the standard level set by Fukuda Denshi. By selecting $\boxed{\text{User}}$ for "Alarm Level" in the 4th page of Monitor Setup menu, the user programmed alarm level will be applied.

Alarm Level 1 (Life Threatening Alarm)

Parameter	Message
HR	"Lower HR alarm"
	"Upper HR alarm"
PR (SpO$_2$, BP)	"Lower PR alarm"
	"Upper PR alarm"
BP (BP1/ART)	"Lower BP1 alarm" or "Lower ART alarm"
	"Upper BP1 alarm" or "Upper ART alarm"
SpO$_2$	"Lower SpO$_2$ alarm"
	"Upper SpO$_2$ alarm"
Respiration (Impedance, CO$_2$, ventilator)	"Apnea alarm"
	"Lower RR alarm"
	"Upper RR alarm"
NIBP	"Lower NIBP alarm"
	"Upper NIBP alarm"
CO$_2$	"Upper EtCO$_2$ alarm"
	"Lower EtCO$_2$ alarm"
Arrhythmia	"ASYSTOLE"
	"VF"
	"VT"
	"SLOW VT"
	"TACHY"
	"BRADY"
	"RUN"

Alarm Level 2 (Cautionary Alarm)

Parameter	Message
BP (BP2 to 5)	"Lower BP✳ alarm" or "Lower (label) alarm"
	"Upper BP✳ alarm" or "Upper (label) alarm"
ST1 to 12	"Lower ST✳ alarm"
	"Upper ST✳ alarm"
Temperature (TEMP1 to 3)	"Upper TEMP✳ alarm" or "Lower (label) alarm"
	"Lower TEMP✳ alarm" or "Upper (label) alarm"
CO$_2$	"Upper InspCO$_2$ alarm"
Arrhythmia	"PAUSE"
	"COUPLET"
	"BIGEMINY"
	"TRIGEMINY"
	"FREQUENT"
	"Cannot analyze"
ECG, Impedance RESP	"Check Electrodes"
SpO$_2$ (DS-7210, DS-7210M)	"Check SpO$_2$ Sensor"
	"Replace SpO$_2$ Sensor"
SpO$_2$ (DS-7210)	"No pulse detect"
SpO$_2$ (DS-7210M)	"Unknown SpO$_2$ Sensor"
	"SpO$_2$ Low Perfusion"
	"SpO$_2$ Pulse search"
CO$_2$ (MGU-722)	"Check Sample Line"
	"Check CO$_2$ Exhaust Port"
	"Check CO$_2$ unit"
	"CO$_2$ Cal. Required"

Parameter	Message
Connector	"ECG Disconnected"
	"BP✳ Disconnected"
	"SpO$_2$ Disconnected"
	"T✳ Disconnected"
	"CO$_2$ Disconnected"
	"CO Disconnected"
	"Multiport✳ Disconnected"
	"DS-LANII Disconnected" or "DS-LANIII Disconnected"
Others	"Check Backup Battery"
	"Check Equip. Config. (CO$_2$)"
	"Charge the battery."
	"Check Memory Card"

✳ indicates the channel no. of BP and TEMP.
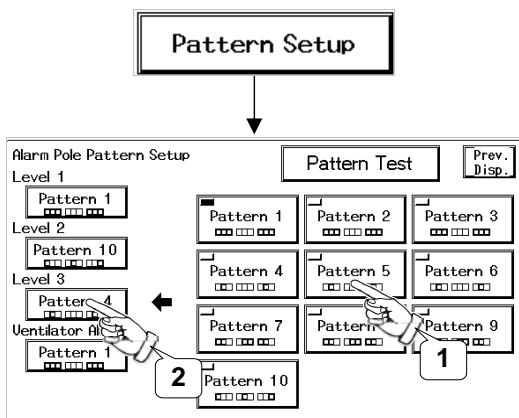
Alarm Level 3 (Treatment Needed Alarm)

Parameter	Message
NIBP	"Check NIBP Cuff, Air Hose"
Impedance RESP	"CVA detected"
SpO$_2$ (DS-7210)	"No pulse detect"
SpO$_2$ (DS-7210M)	"SpO$_2$ Low perfusion"
	"SpO$_2$ Pulse Search"
	"SpO$_2$ Interference Detected"
	"Check SpO$_2$ Sensor"
	"SpO$_2$ Low Signal IQ"
ECG	"Pacing detection error"

Ventilator Alarm

Parameter	Message
Ventilator	"Vent. Alarm"
	"Vent. Invalid"

4 **Set the alarm pole flash pattern for each alarm level.**

Press the ⎡Pattern Setup⎤ key to display the alarm pole flash pattern setup menu.

Assign the flash pattern for each alarm level.
1) First, select the flash pattern from ⎡Pattern 1⎤ to ⎡Pattern 10⎤.
   The alarm pole consists of 3 blocks.
   (Left: Red, Middle: Red/Orange/Green, Right: Red)
   The ways these 3 blocks flash are different for each pattern.
   By pressing the ⎡Pattern Test⎤ key, the flashing of the selected pattern can be verified.
2) Next, press the alarm level key to assign the selected flash pattern.

Flash Pattern

("✳" indicates that light is OFF.)

Pattern	Flash
Pattern 1	(Red, Red, Red)→(✳✳✳)→(Red, Red, Red)→(✳✳✳)→(Red, Red, Red)
Pattern 2	(Red, Orange, Red)→(✳✳✳)→(Red, Orange, Red)→(✳✳✳)→(Red, Orange, Red)
Pattern 3	(Red, Green, Red)→(✳✳✳)→(Red, Green, Red)→(✳✳✳)→(Red, Green, Red)
Pattern 4	(✳, Red,✳)→(✳✳✳)→(✳, Red,✳)→(✳✳✳)→(✳, Red,✳)
Pattern 5	(✳, Orange,✳)→(✳✳✳)→(✳, Orange,✳)→(✳✳✳)→(✳, Orange,✳)
Pattern 6	(✳, Green,✳)→(✳✳✳)→(✳, Green,✳)→(✳✳✳)→(✳, Green,✳)
Pattern 7	(Red, Red,✳)→(✳✳✳)→(✳, Red, Red)→(✳✳✳)→(Red, Red,✳)
Pattern 8	(Red, Orange,✳)→(✳✳✳)→(✳, Orange, Red)→(✳✳✳)→(Red, Orange,✳)
Pattern 9	(Red, Green,✳)→(✳✳✳)→(✳, Green, Red)→(✳✳✳)→(Red, Green,✳)
Pattern 10	(Red, ✳, ✳)→(✳✳✳)→(✳, Red, ✳)→(✳✳✳)→(✳, ✳, Red)

Default Setting

Alarm Level	Pattern	Flash
Level 1	Pattern 1	(Red, Red, Red)→(✳✳✳)→(Red, Red, Red)→(✳✳✳)→(Red, Red, Red) 480ms 480ms 480ms 480ms 480ms
Level 2	Pattern 10	(Red✳✳)→(✳✳✳)→(✳Red✳)→(✳✳✳)→(✳✳Red) 480ms 240ms 480ms 240ms 480ms
Level 3	Pattern 4	(✳Red✳)→(✳✳✳)→(✳Red✳)→(✳✳✳)→(✳Red✳) 480ms 480ms 480ms 480ms 480ms

Flash Pattern when IEC **is selected for "Alarm System" (Fixed)**

Alarm Level	Flash
Level 1	(Red, Red, Red)→(✳✳✳)→(Red, Red, Red)→(✳✳✳)→(Red, Red, Red) 320ms 320ms 320ms 320ms 320ms
Level 2	(✳Orange✳)→(✳✳✳)→(✳Orange✳)→(✳✳✳)→(✳Orange✳) 800ms 800ms 800ms 800ms 800ms
Level 3	(✳Orange✳) Lights constantly.

Flashing the Alarm Pole Synchronized with HR

The alarm pole can be flashed synchronizing with HR.

1 Select whether to flash the alarm pole synchronizing to the heartbeat.

Sync. with HR   [ON] [OFF]

To synchronize with HR, select ON . The middle LED will flash in green synchronized with HR.
To not synchronize with HR, select OFF .

NOTE	● When asystole is generated, the green LED at middle part of the alarm pole will remain lighted. However, if "Sync. with Alarm" is set to ON, the fixed flash pattern for the asystole alarm (Level 1: Pattern 1) will have priority. ● If the parameter other than ECG is selected as "HR/PR Alarm Source" on ECG (SpO$_2$, BP) setup menu, the alarm pole will not flash synchronizing with the pulse.

This section explains the setup of the alarm suspension and upper / lower alarm limit.
On the alarm setup menu, ON/suspend of system alarm, ON/OFF and upper / lower alarm limit of each parameter can be set.

Also, 5 patterns of alarm setting can be programmed using the alarm mode setup function.
By preprogramming the alarm setting to each alarm mode, the alarm setups at admittance of patient can be simplified by just selecting one of the alarm modes.
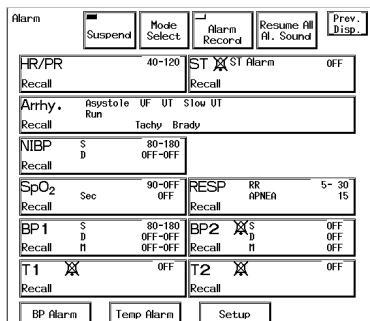
Reference	For alarm mode setup procedure, refer to "8. System Configuration Alarm Mode Setup To Program the Alarm Mode"

To Set the System Alarm (ON or Suspend)

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

⚠ WARNING	● When the system alarm is suspended, all the alarm will be suspended even if the parameter alarm is set to ON. Also, the alarm event will not be stored as recall. ● 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 ⎤ → ⎡ Alarm ⎤ keys.

The alarm setup menu will be displayed.

2 When the ⎡ Suspend ⎤ key LED is extinguished, the system alarm is ON.

The alarm ON/OFF function and alarm limit for each parameter is effective.

3 When the ⎡ Suspend ⎤ key LED is lighted, the system alarm is suspended.

Pressing the ⎡ Suspend ⎤ key when the LED is extinguished will light the LED and temporarily suspends the system alarm.
While the alarm is suspended, "Alarm Suspend (✳✳✳sec)" message will be displayed.
(✳✳✳sec.) indicates the remaining time.
The alarm will turn ON when the suspended time completes.

Alarm Suspend Message

BED-001 FUKUDA DENSHI   Adult   02/01 16:51
                                                          M
                                            Alarm Suspend(115sec.)
                                            HR   ♥Av.
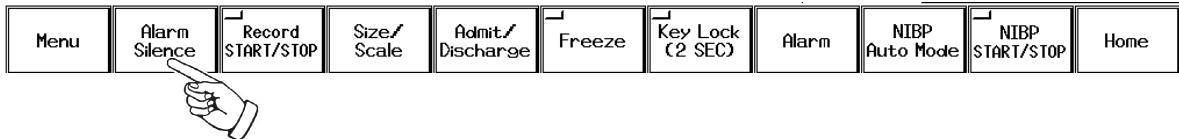
To Silence the System Alarm

The alarm sound can be silenced for fixed amount of time. This setting will not affect the alarm message. If the alarm cause still remains at completion of the silence duration, the alarm sound will generate again. Also, if another alarm with the same or higher priority occurs during the alarm silence duration, the alarm sound for the new alarm will generate.
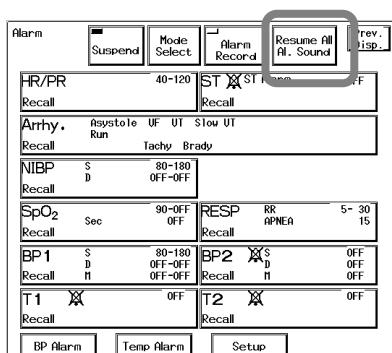
●Precautions about Silencing the Alarm

- Alarm silence function is effective for each parameter. If an alarm condition for the selected parameter is resolved for a moment but is generated again during the alarm silence time, the alarm will remain silenced. The recall and alarm recording will not function at this time.

- If another alarm with the lower priority occurs during the alarm silence time, alarm sound will not generate. The recall and alarm recording will function.

- If the ⎿Alarm Silence⏌ key is pressed for the alarm of another parameter which occurred during the alarm silence time, the alarm silence time for the first alarm will not be extended.

- The alarm silence state for all parameters will cease in the event of any of the following.
    - ・When the main power is turned ON.
    - ・When the system alarm status (ON / suspend) is changed.
    - ・When ⎿Resume All Al. Sound⏌ key is pressed on the alarm setup menu.
    - ・When monitoring is suspended on the patient admit / discharge menu.
    - ・When the alarm mode is changed on the patient admit / discharge menu.
    - ・When the patient has been discharged.

- The alarm silence state for each parameter will cease in the event of any of the following.
    - ・When the alarm silence duration for the parameter is completed.
    - ・When automatic alarm is selected for the parameter.
    - ・When the alarm is turned OFF for the parameter.

- If ⎿Linked to each new occurrence⏌ is selected for "Status Alarm Control" in the alarm setup menu, the status alarm sound will not resume after the alarm silence time unless a new status alarm generates.

●To Cancel "Alarm Silence"
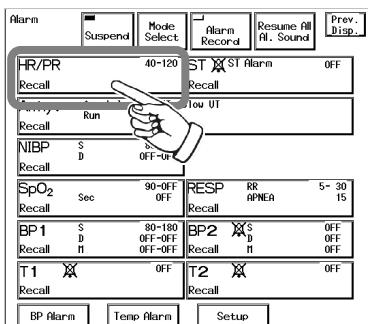
The alarm silence state can be cancelled by pressing the ⎿Resume All Al. Sound⏌ on the Alarm Setup menu. The alarm silence state for all parameters and equipment status will be cancelled and alarm sound will resume if alarm factor exists.

Alarm Setup for Each Parameter
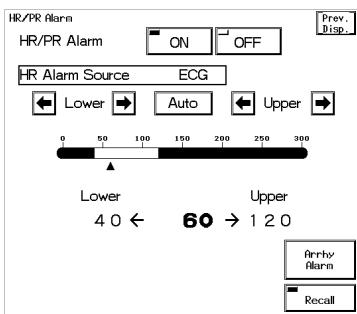
The alarm for each parameter can be turned ON or OFF, and upper and lower alarm limit can be set.
The numeric data alarm generates when a value exceeds the upper and lower alarm limit.
But, for adult and child, HR/PR, BP, RR, SpO_2, TEMP, $EtCO_2$/$InspCO_2$, TACHY, BRADY alarm
generates after 5 seconds from the point when the limit is exceeded. For neonate, alarm will generate
at the point when the limit is exceeded.

1 Press the ⎡Menu⎤ → ⎡Alarm⎤ keys.

The alarm setup menu will be displayed.

2 Select the parameter to display the alarm setup menu.

The alarm setup menu for each parameter will be displayed.

<HR/PR Alarm Setup Menu>

Display	Description
0 50 100 150 200 250 300 ▲	Displays the upper and lower alarm limit and the current measurement (▲). The limits can be adjusted by directly pressing the bar display or using the arrow keys.
Lower Upper 40 ← **60** → 120	Displays lower limit←current value→upper limit.

Key	Item	Description
ON OFF	Individual Alarm	Selecting ⎡ON⎤ will generate the alarm. Selecting ⎡OFF⎤ will not generate the alarm.
← Lower →	Lower Alarm Limit	Sets the lower alarm limit. The lower limit will be turned OFF when a value below the range is selected.
← Upper →	Upper Alarm Limit	Sets the upper alarm limit. The upper limit will be turned OFF when a value above the range is selected.
Auto	Automatic Setup	Automatically sets the limits corresponding to the current value. If the limit is turned OFF, it will be remained OFF. The system alarm and parameter alarm will be in a ON condition.

To maintain the alarm setting even after the power is turned OFF or after the discharge procedure,
store the setting to one of the alarm modes, or select ⎡Backup⎤ for "Alarm" on the "Backup at
Discharge" menu. (Monitor Setup).
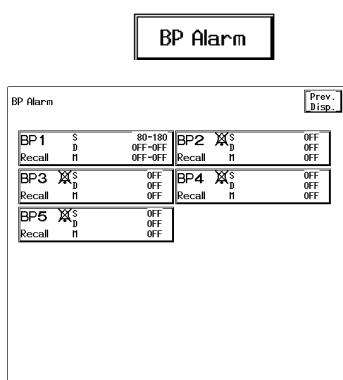
3 **Select ON/OFF and set upper and lower alarm limit for the parameter alarm.**

Numeric Data Key	Item	Description
HR/PR　40-120　Recall	HR / PR / BPR	ON, OFF　20 to 300bpm*
ST ⊠ ST Alarm　OFF　Recall	ST1 to ST12	ST All Alarm ON, OFF ST1 to ST12　±2.0mV　Individual Alarm ON, OFF
BP1　S 80-180　D OFF-OFF　Recall　M OFF-OFF	BP1	ON, OFF　0 to 300mmHg 0 to 40.0kPa
BP2 ⊠ S OFF　D OFF　Recall　M OFF	BP2	ON, OFF　0 to 300mmHg 0 to 40.0kPa
SpO₂ 90-OFF　Sec OFF　Recall	SpO₂	ON, OFF　50 to 100%
RESP　RR 5- 30　APNEA 15　Recall	RR	ON, OFF　5 to 150bpm (Adult) 2 to 150bpm (Child, Neonate)
	APNEA (Upper Limit)	ON, OFF　5 to 20 sec.
T1 ⊠ OFF　Recall	TEMP1	ON, OFF　30 to 50°C 86 to 122°F
T2 ⊠ OFF　Recall	TEMP2	ON, OFF　30 to 50°C 86 to 122°F
NIBP　S 80-180　D OFF-OFF　Recall	NIBP	ON, OFF　10 to 300mmHg* 1.5 to 40.0kPa
CO₂　Et 30- 45　Insp 3　Recall	EtCO₂	ON, OFF　1 to 115mmHg* 0.1 to 15.0kPa 0.1 to 15.0%
	InspCO₂ (Upper Limit)	ON, OFF　1 to 24mmHg 0.1 to 3.0kPa 0.1 to 3.0%

⚠ CAUTION	*The measurement range and alarm range differs for the following parameters. Be cautious not to set the alarm limit outside the measurement range. • PR for DS-7210M (Masimo® Model) Measurement Range: 25 to 240bpm (If 25bpm and below or 240bpm and above is measured, "xxx" will be displayed.) Alarm Range: 20 to 300bpm • NIBP Measurement Range: 10 to 280mmHg Alarm Range: 10 to 300mmHg • CO₂ for MGU-722 (Microstream® CO₂ Unit) Measurement Range: 0 to 99mmHg/0 to 13.3kPa Alarm Range: 1 to 115mmHg/0.1 to 15.0kPa

4
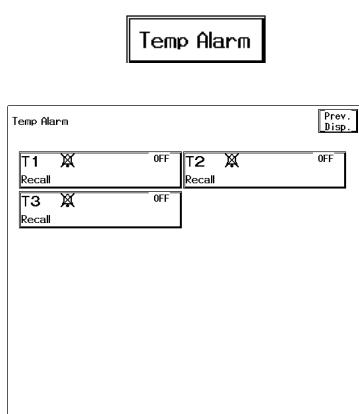
Alarm Setup

4 **Set ON/OFF and upper and lower limit for each BP alarm (BP1 to 5).**

BP Alarm

Pressing the BP Alarm key will display the alarm setup menu for BP1 to BP5.

Set ON/OFF and upper and lower limit (0 to 300mmHg / 0 to 40.0kPa) for each BP alarm by pressing the BP1 to BP5 keys.
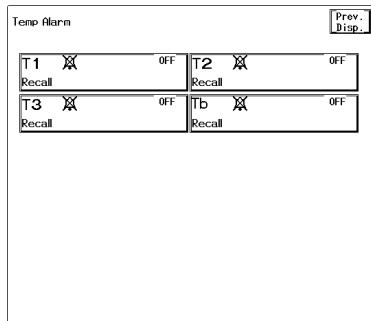
5 **Set ON/OFF and upper and lower limit for each temperature alarm (T1 to T3).**

Temp Alarm

Pressing the Temp Alarm key will display the alarm setup menu for T1 to T3.

Set ON/OFF and upper and lower limit (30 to 50°C / 86 to 122°F) for each temperature alarm by pressing the T1 to T3 keys.

6 **Set ON/OFF and upper and lower limit for blood temperature. (For HU-73)**
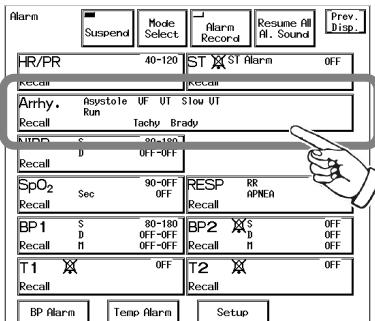
Press the Tb key to set ON/OFF and upper and lower limit (30 to 45°C / 86 to 113°F) for the blood temperature.

Arrhythmia Alarm Setup
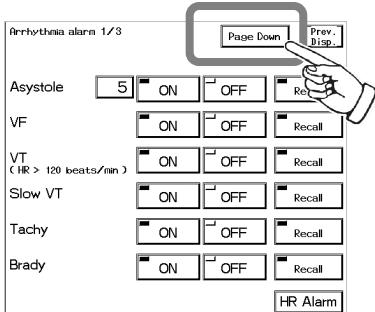
The arrhythmia alarm can be turned ON or OFF, and arrhythmia detection level can be set.

1 **Press the** Menu → Alarm **keys.**
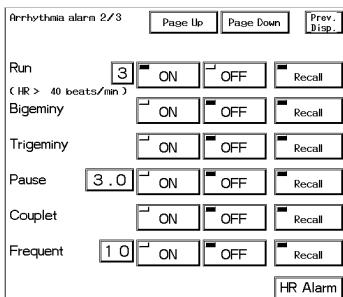
The alarm setup menu will be displayed.
Press the Arrhy. key to display the arrhythmia alarm setup menu.
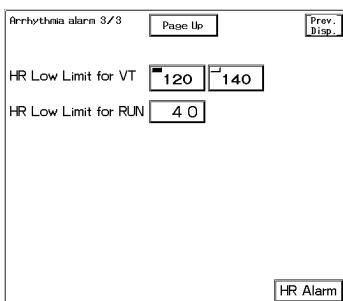
2 **Set the alarm condition for each arrhythmia. Pressing the** Page Down **key will display the next page.**

The alarm setup menu for Asystole, VF, VT, Slow_VT, Tachy, and Brady will be displayed.

On the second page, the alarm setup menu for Run, Couplet, Bigeminy, Trigeminy, Pause, and Frequent will be displayed.

On the third page, the analysis condition (HR Low Limit) setup menu for VT and RUN will be displayed.

Page	Item
Page 1/3	ASYSTOLE, VF, VT, SLOW_VT, TACHY, BRADY
Page 2/3	RUN, BIGEMINY, TRIGEMINY, PAUSE, COUPLET, FREQUENT
Page 3/3	HR Low Limit for VT, HR Low Limit for RUN

4

Alarm Setup

●To Set ON/OFF of Arrhythmia Alarm

| ON | OFF |

Selecting ON will generate the arrhythmia alarm.
Selecting OFF will not generate the arrhythmia alarm.

Page	Item	Selection
Page 1/3	Asystole	ON (ON, OFF)
	VF	ON (ON, OFF)
	VT	ON (ON, OFF)
	Slow_VT	ON (ON, OFF)
	Tachy	ON, OFF
	Brady	ON, OFF
Page 2/3	Run	ON, OFF
	Couplet	ON, OFF
	Bigeminy	ON, OFF
	Trigeminy	ON, OFF
	Pause	ON, OFF
	Frequent	ON, OFF

⚠CAUTION	In case of the wired (DS-LANII) network, there are the following restrictions. • Arrhythmia alarm of TACHY, BRADY, COUPLET, PAUSE, TRIGEMINY will not be transmitted. • "SLOW_VT" will be transmitted as "VT". • The setups for "HR Low Limit for VT" and "HR Low Limit for Run" cannot be performed on some central monitors and on some monitors with old software version.

NOTE	The "Arrhythmia alarm OFF" message will be displayed when the ASYSTOLE, VF, VT, SLOW_VT, and HR alarm is OFF.
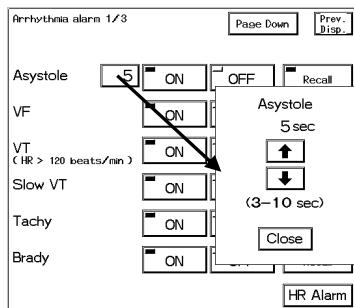
Reference	If ON is selected for "Asystole, VF, VT" on the hospital setup menu, Asystole, VF, VT, Slow_VT alarm can not be set to OFF. →"8. System Configuration Hospital Setup Asystole, VF, VT"

●To Set the Arrhythmia Detection Level

Select the level to detect each arrhythmia.
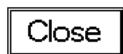
1 **Pressing the detection level key (ex. 5 for Asystole) for each arrhythmia will display the window to adjust the detection level.**

Set the detection level.

Item	Range
Asystole	3 to 10 sec.
Run	2 to 8 beats
Pause	1.5 to 5 sec.
Frequent	1 to 50 beats/min.
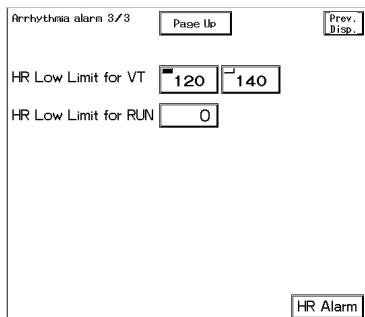
2 **Close the window to adjust the detection level.**

Press the Close key.

●To Set the HR Low Limit for VT

Set the analysis condition to detect VT.
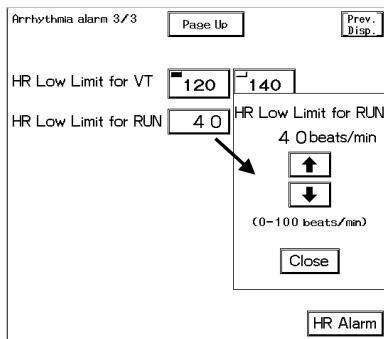
Select the HR low limit to detect VT from 120 or 140bpm.
If HR is below the set value, it will be detected as Slow_VT.
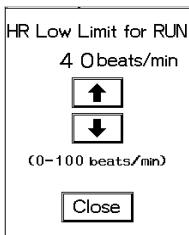
●To Set the HR Low Limit for RUN

Set the analysis condition to detect RUN.

1 **Pressing the detection level key (ex. 40 for the following screen) will display the window to adjust the detection level.**

2 **Set the detection level.**

```
HR Low Limit for RUN
     4 0 beats/min
        ↑
        ↓
 (0-100 beats/min)

      Close
```

Use the arrow keys to set the detection threshold.
It can be set in the range from 0 to 100bpm.

3 **Close the window to adjust the detection level.**

Close   Press the Close key.

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

●Alarm Limit for TACHY, BRADY

The arrhythmia detection level for tachycardia (Tachy) and bradycardia (Brady) alarm links with the upper and lower alarm limit for HR / PR.
The tachycardia (Tachy) alarm generates when the measurement exceeds the HR / PR upper alarm limit. When the upper alarm limit is OFF, alarm will not generate.
The bradycardia (Brady) alarm generates when the measurement is below the HR / PR lower alarm limit. When the lower alarm limit is OFF, alarm will not generate.
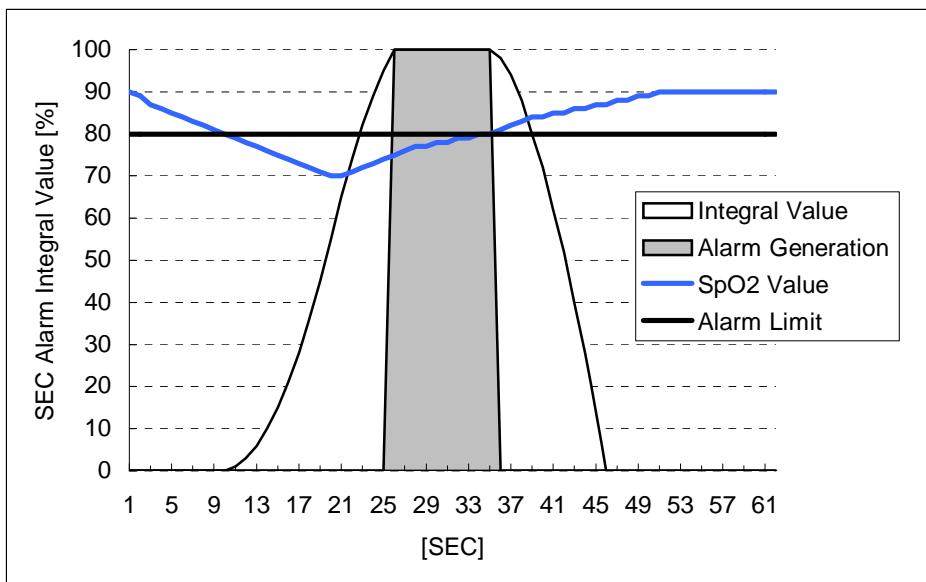
When the SpO$_2$ value is unstable around the lower alarm limit, the frequently generated alarm may be annoying. The SEC alarm function controls these frequent alarms.

This function generates the alarm only when the integral value (the accumulation of difference between the alarm limit and SpO$_2$ value at every second) reaches the preprogrammed SEC alarm threshold value.

The integral value of the SEC alarm is calculated as follows.

On this graph, the SEC alarm threshold value is set as 100.

The SpO$_2$ value begins to fall below the alarm limit at approximately 10 seconds. At the same time, the integral value begins to increase.

(Alarm limit) – (SpO$_2$ value) is accumulated each second.
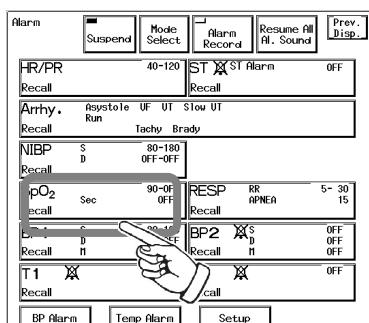
At around 25 seconds, the integral value reaches 100 and the alarm is generated.

At approximately 36 seconds, the SpO$_2$ value returns to the level within the alarm limit, and at the same time, the integral value begins to decrease. $\{$(Alarm limit) – (SpO$_2$ value)$\} \times 2$ is subtracted each second.

Also, there is a safety net when setting the SEC alarm function. This safety net is for the case when the SpO$_2$ value frequently falls below the alarm limit but does not last long enough to reach the SEC alarm threshold.
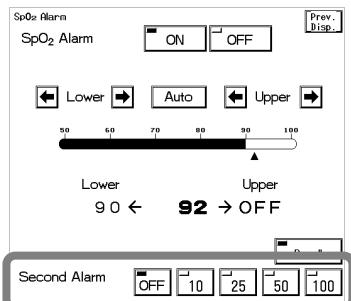
If the SpO$_2$ value falls below the limit 3 times or more during the last 60 seconds, an alarm will be generated even if the SEC alarm threshold is not reached.

1 **Press the** $\boxed{\text{Menu}}$ → $\boxed{\text{Alarm}}$ **keys.**
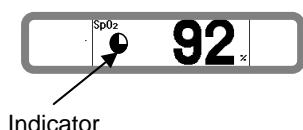
The alarm setup menu will be displayed.

2 Press the $\boxed{\text{SpO}_2}$ key to display the alarm setup menu.

```
SpO₂ Alarm                              Prev.
                                        Disp.
  SpO₂ Alarm        ■ ON    □ OFF

        ← Lower →  Auto  ← Upper →
       50  60  70  80  90  100
       ███████████████████▲
        Lower           Upper
         90 ←    92  → OFF
                            ■
Second Alarm    OFF  10  25  50  100
```

3 Select the SEC alarm value according to the alarm frequency.

```
SpO₂
  ● 92  ₓ
```

Indicator

If $\boxed{10}$ / $\boxed{25}$ / $\boxed{50}$ / $\boxed{100}$ is selected, a circular SEC alarm indicator will be displayed inside the parameter key. As the integral value increases, the indicator will begin to fill, and when it is completely filled, an alarm will be generated.
If $\boxed{\text{OFF}}$ is selected, this SEC alarm indicator will not be displayed.
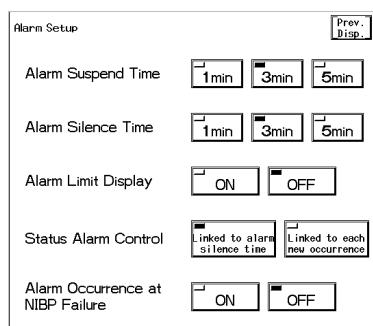
⚠ CAUTION	● Whether to use the SEC alarm function and its threshold selection should be based on the patient's clinical indication portent and medical evaluation. ● If the SpO₂ alarm and SEC alarm setup is set to OFF, the SEC alarm integral value will be set to 0.

Alarm Suspend / Alarm Silence Time

The time for suspending the system alarm and suspending the alarm sound can be selected.

1 Press the $\boxed{\text{Menu}}$ → $\boxed{\text{Alarm}}$ → $\boxed{\text{Setup}}$ keys.

```
Alarm Setup                             Prev.
                                        Disp.
Alarm Suspend Time    1min  3min  5min

Alarm Silence Time    1min  3min  5min

Alarm Limit Display    ON    OFF

Status Alarm Control  Linked to alarm  Linked to each
                      silence time     new occurrence

Alarm Occurrence at    ON    OFF
NIBP Failure
```

The alarm setup menu will be displayed.

2 Select the time for "Alarm Suspend Time".

Alarm Suspend Time $\boxed{1\text{min}}$ $\boxed{3\text{min}}$ $\boxed{5\text{min}}$ Select the appropriate time for alarm suspend time.

3 Select the time for "Alarm Silence Time".
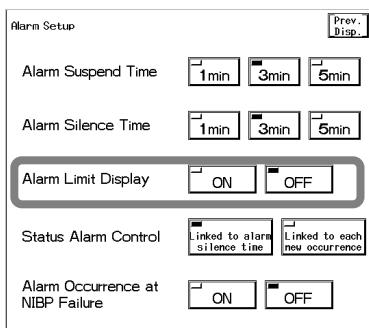
Alarm Silence Time $\boxed{1\text{min}}$ $\boxed{3\text{min}}$ $\boxed{5\text{min}}$ Select the appropriate time for alarm silence time.

ON / OFF of Alarm Limit Display

The alarm limit can be selected to display or not display on the home display.

<Display OFF>

<Display ON>

1 **Press the** | **Menu** | → | **Alarm** | → | **Setup** | **keys.**

The alarm setup menu will be displayed.

2 **Select ON or OFF for alarm limit display.**

Alarm Limit Display   [ON] [OFF]   Select | ON | or | OFF |.

NOTE	● The alarm limit for the parameter with the alarm turned OFF will not be displayed regardless of this setup. ● If the lower limit setting for SpO$_2$ alarm is 85% or below, alarm limit will be displayed even if OFF is selected for "Alarm Limit Display".
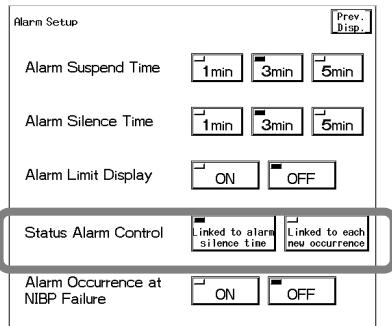
Alarm Silence Time for Equipment Status Alarm

The alarm silence time for the level 2 equipment status alarm ("Check electrodes", "Check SpO$_2$ sensor", etc.) can be set.

> | Reference | For details of level 2 equipment status alarm, refer to " –Display Configuration– Description of Alarm Message and Alarm Sound ●Equipment Status Alarm Message" in this chapter.

1 **Press the** | **Menu** | → | **Alarm** | → | **Setup** | **keys.**

```
Alarm Setup                          [Prev.
                                      Disp.]

Alarm Suspend Time    [1min] [3min] [5min]

Alarm Silence Time    [1min] [3min] [5min]

Alarm Limit Display   [ON]  [OFF]

Status Alarm Control  [Linked to alarm  [Linked to each
                       silence time]     new occurrence]

Alarm Occurrence at   [ON]  [OFF]
NIBP Failure
```

The alarm setup menu will be displayed

2 **Set the "Status Alarm Control".**

Status Alarm Control   [Linked to alarm   [Linked to each
                        silence time]   new occurrence]

| Linked to alarm silence time | will silence the alarm when the | Alarm Silence | key is pressed for fixed amount of time set on "Alarm Silence Time".

- If the alarm cause still remains at completion of silence time, the alarm sound will generate again.
- If the same alarm occurs during the alarm silence time, the alarm sound will not generate.
- If the new alarm occurs during the alarm silence time, the alarm sound for the new alarm will generate.
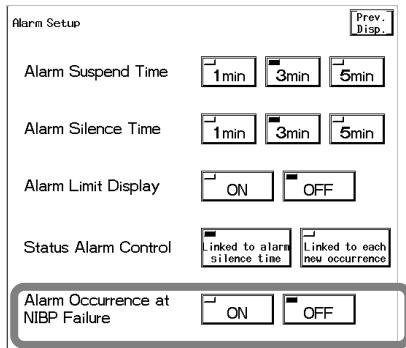
| Linked to each new occurrence | will silence the alarm when the | Alarm Silence | key is pressed until the situation changes.

- The alarm will be silenced as long as the alarm cause remains.
- If the alarm cause is resolved during the alarm silence time, the alarm silence will be cancelled.
- If the same alarm generates again during the alarm silence time, the alarm sound will generate.

ON/OFF of Alarm Occurrence at NIBP Failure

The NIBP measurement failure can be notified by alarm.

1 **Press the** $\boxed{\text{Menu}}$ → $\boxed{\text{Alarm}}$ → $\boxed{\text{Setup}}$ **keys.**

Alarm Setup menu will be displayed.

```
Alarm Setup                                    Prev.
                                               Disp.

Alarm Suspend Time     1min   3min   5min

Alarm Silence Time     1min   3min   5min

Alarm Limit Display      ON      OFF

Status Alarm Control   Linked to alarm   Linked to each
                       silence time      new occurrence

Alarm Occurrence at      ON      OFF
NIBP Failure
```

2 **Select ON or OFF for "Alarm Occurrence at NIBP Failure".**

Alarm Occurrence at NIBP Failure $\boxed{\text{ON}}$ $\boxed{\text{OFF}}$

$\boxed{\text{ON}}$ will display a "NIBP measurement failed." message (equipment status alarm, level 2) and generates an alarm sound when NIBP measurement fails.
This alarm can be cancelled by pressing the $\boxed{\text{Alarm Silence}}$ key.

$\boxed{\text{OFF}}$ will not generate alarm ("NIBP measurement failed." message and alarm sound) even if NIBP measurement fails.

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Chapter 5
Admit/Discharge of a Patient

This chapter describes the procedure to admit or discharge a patient to the monitor.
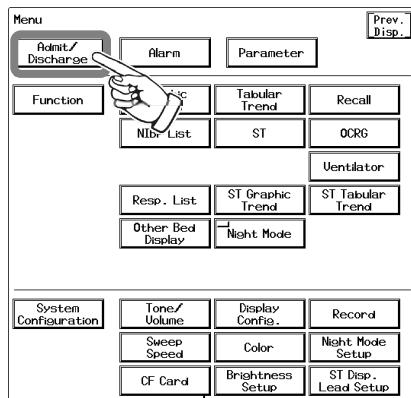
Admit / Discharge of a Patient

This menu allows admitting, discharging, suspend monitoring of a patient, and selection of the display configuration mode and alarm mode according to the monitoring purpose.

⚠ CAUTION	If you start monitoring a new patient without performing a discharge procedure for the previous patient, new data will be added to the previous data which will result in inaccuracy.

1 **Press the** ⎣ **Menu** ⎦ → ⎣ **Admit / Discharge** ⎦ **keys.**

The admit / discharge menu will be displayed.

There are two ways to enter the patient information.

1. Manually using the alphanumeric keypad displayed on the screen.
2. Automatically acquiring patient information from the patient data server using the patient ID via TCON communication with the central monitor.

This menu allows entering patient's name, ID, age, and selection of the patient classification (adult, child, neonate) and pacemaker use (used, not used), which affects the monitoring accuracy.

> Reference
>
> Whether to display or not display the following keys on the admit menu can be selected.
> · Impedance Mode key
> · Filter Mode key (Monitor / ESIS / DIAG.)
> · Bed ID key
> For procedures, refer to "8. System Configuration   Hospital Setup"

Patient Name

For patient's name, up to 16 characters can be used.

1 Press the Name key.

Enter the name using the alphanumeric keypad.

2 The entered patient's name will be displayed on the home display.

Patient Name

Patient ID

Up to 20 characters of alphabets, numbers, or symbols can be used for the patient ID.
Enter the ID according to the monitoring purpose. The entered ID will be printed on the recording paper.

1 **Press the ID key.**

Enter the ID using the alphanumeric keypad.
20 digits can be input, but only 10 digits can be transmitted through the DS-LAN II network. On the hospital setup under the preset menu, set which 10 digits to send to the central monitor.

If DS-LANIII network is used, all 20 digits can be transmitted to the central monitor.

Reference | Refer to "8. System Configuration   Patient ID Transmission Starting Digit for DS-LANII" for procedure to set the 10-digit patient ID.

Patient Classification

The selection of the patient classification affects the accuracy of NIBP, HR, and RR measurement. Also the delay time to generate the measurement data alarm will change according to the patient classification.

		Adult	*Child*	*Neonate*
NIBP	SYS	60 to 250mmHg	30 to 180mmHg	40 to 120mmHg
	MEAN	45 to 235mmHg	15 to 160mmHg	30 to 100mmHg
	DIA	40 to 200mmHg	10 to 150mmHg	20 to 90mmHg
HR		0bpm, 12 to 300bpm		0bpm, 30 to 300bpm
Filter Mode	Monitor	0.5 to 40Hz		1.6 to 40Hz
	ESIS	1.6 to 15Hz		1.6 to 15Hz
	Diagnosis	3-lead: 0.05 to 100Hz 4, 5, 10-lead: 0.05 to 150Hz		
Impedance Respiration		1.5Hz		2.5Hz
Alarm Delay Time		5 sec.		0 sec.

The alarm delay time is a function to prevent frequent generation of the measurement data alarm by holding the alarm generation for the corresponding alarm delay duration.
The alarm delay time applies to the measurement data alarm for the following parameters; HR / PR, BP, RR, SpO_2, TEMP, $EtCO_2$ / $InspCO_2$, TACHY, BRADY.
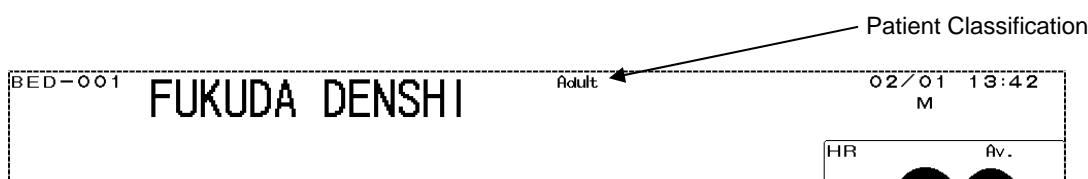
⚠ WARNING	The monitor determines the detection algorithms for QRS and NIBP according to the selected patient classification. Make sure the proper selection is made.

1 Select the patient classification.

Select Adult, Child, or Neonate.

2 The selected patient classification will be displayed on the home display.

Patient Classification

Patient Sex

Select the patient's sex from male or female. The default is set as undetermined. The selected sex will be printed on the recording paper.

1 Select │ Male │ or │ Female │.

This selection will not affect the measurement accuracy of the monitoring.

Pacemaker Use

●Pacemaker Use Selection

If the patient is wearing a pacemaker, the monitor will identify the pacemaker pulse and insert an artificial pulse onto the ECG waveform for easy identification. By detecting the pacemaker pulse, it prevents to erroneously detect QRS as pacemaker pulse when pacing waveform does not appear (pacing failure). The arrhythmia analysis analyzes pacing beat as P (pacemaker beat) or F (fusion beat) to prevent erroneous judgment of VPC.

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

1 Select │ Used │ or │ Not used │ for pacemaker use.

2 The pacemaker use will be displayed on the home display.

When pacemaker is used.
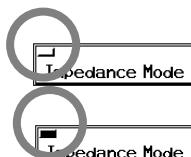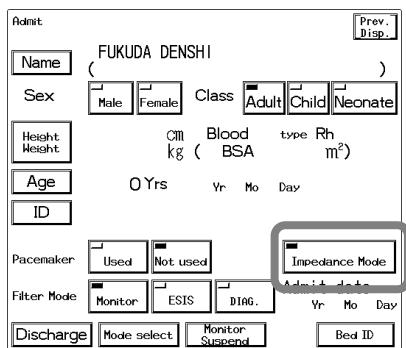
BED-001 FUKUDA DENSHI   Adult Pacemaker used   12/11 14:51
                                                         M

●Impedance Respiration Measurement

The respiration measurement using the impedance method conducts high-frequency and weak current between the ECG electrodes attached to the patient, and measures the potential difference between the electrodes caused by thoracic movement using the synchronous rectification system. For the patient using the adaptive (minute ventilation) pacemaker, the pacemaker measurement signal and the high-frequency current of this equipment interferes with each other which causes incorrect respiration measurement.

If the patient is using an adaptive (minute ventilation) pacemaker, set the impedance respiration measurement OFF.

1 **Press the** | **Impedance Mode** | **key.**
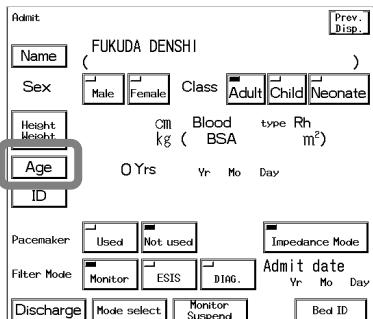
If the LED is extinguished, the impedance respiration measurement is stopped.

If the LED is lighted, the impedance respiration measurement can be performed.
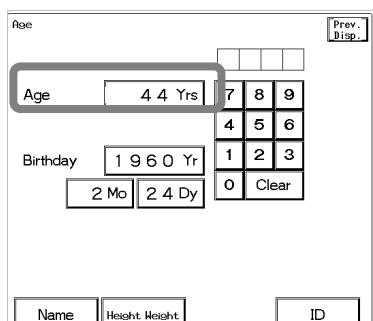
Patient Age

There are two ways to set 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 as patient classification, the age in days will be displayed.
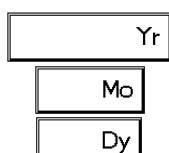
1 **Press the** | **Age** | **key, and enter patient's age.**

To directly enter the age, use the numeric keypad to enter the age and press the | Yrs | key.

The entered age will be displayed inside the key.

2 **Enter the patient's birth date using the numeric keypad. The age will be automatically calculated.**
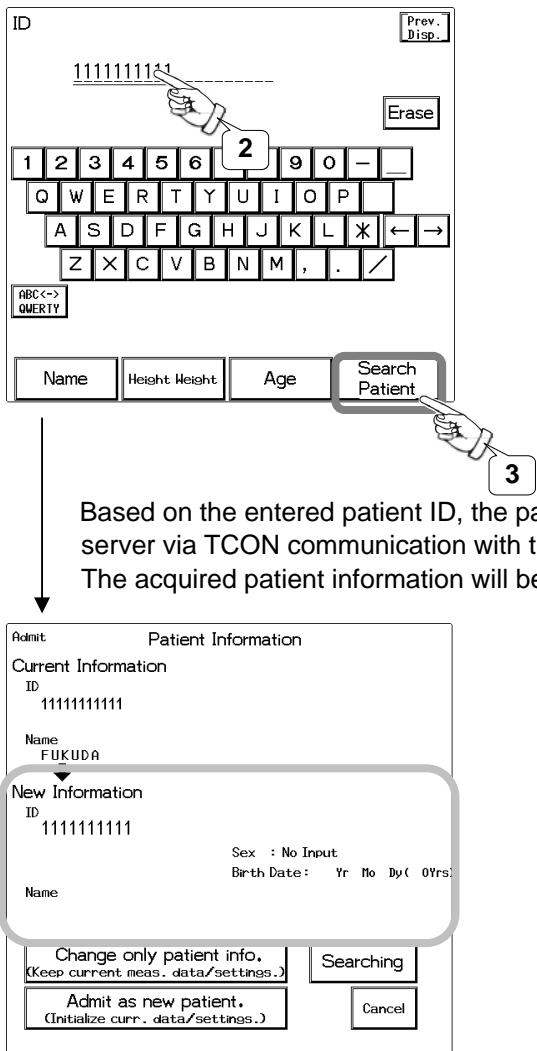
Enter the year, month, day using the numeric keypad, and press the | Yr |, | Mo |, | Dy | keys respectively.

The entered year, month, day will be displayed inside the | Yr |, | Mo |, | Dy | keys respectively.

Acquiring Patient Information from the Patient Data Server (TCON system)

If the TCON system is used and the central monitor is connected to the Patient Data Server, the patient information can be automatically acquired from the Patient Data Server via the central monitor.

1 Press the | Menu | → | Admit / Discharge | → | ID | keys.

2 Enter the patient ID.

3 Press the | Search Patient | key to search patient information on the patient data server.

Based on the entered patient ID, the patient information will be searched on the patient data server via TCON communication with the central monitor.
The acquired patient information will be displayed on the "New Information" field.

4 Press the | Change only patient info. |, | Admit as new patient. |, or | Cancel | key.

| Change only patient info. | : Only the patient information will be changed to the new information.
This function is mainly used to correct the patient information.
| Admit as new patient. | : Initializes the current patient data/monitoring condition and performs the admit process with the newly acquired information.
| Cancel | : Cancels the acquired data.

The item not acquired from the patient data server will be left blank. For the blank item, manually input the information.

Reference For procedure on how to manually enter data using the alphanumeric keypad, refer to the above "Patient Name", "Patient Classification", "Patient Sex", "Pacemaker Use", and "Patient Age".

⚠ CAUTION 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 | Admit as new patient. | key.
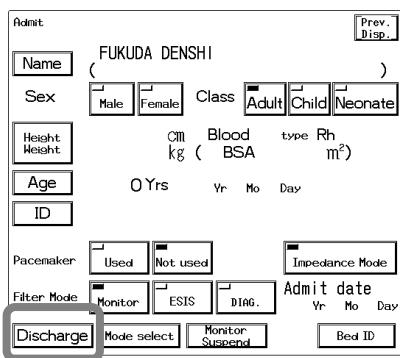
Discharging a Patient   Erasing Name, Data, etc.

This menu allows to clear the patient name, ID, age, and past measurement data such as tabular trend, graphic trend, and recall data.
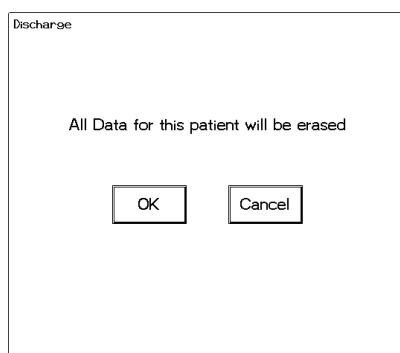
By pressing the ⌷Rapid Discharge⌷ key preprogrammed as user key, a quick discharge process can be performed.

Discharging Procedure

1 **Press the ⌷Discharge⌷ key.**

The confirmation display will appear. To cancel the discharge process, press the ⌷Cancel⌷ key to return to the previous display.

2 **Erase the patient data.**

To initialize the patient data and patient information, press the ⌷OK⌷ key. The data will be initialized and the screen will return to the home display selected for the display mode. The alarm setup will be initialized to the selected alarm mode.

Data	Description
Patient Data	Erases the data of graphic trend, tabular trend, NIBP list, recall, ST Display, OCRG, cardiac output, hemodynamic, P-V / F-V control data, vigilance list. The setup condition of recall setup, tabular trend setup, graphic trend setup, vigilance list will remain.
Patient Information	Erases the data of patient name, ID, sex, age. The patient classification will not be initialized.
Measurement Condition	Pacemaker use will be set to unused, and impedance respiration measurement will be set to ON. The BP zero-balance condition will be cleared.

NOTE	● Depending on the setup of "Backup at Discharge" on the monitor setup menu, some data may not be initialized. ● If discharge procedure is performed during stopwatch operation, the counting will stop and the stopwatch time will be reset to "00:00:00".

5

Discharging a Patient

Monitor Suspend

Patient has been discharged.

Admit

When ⎢ Suspend ⎥ is selected for "Discharge Mode" (Monitor Setup), the window as shown in the left will be displayed.
Pressing the ⎢ Admit ⎥ key will start monitoring.
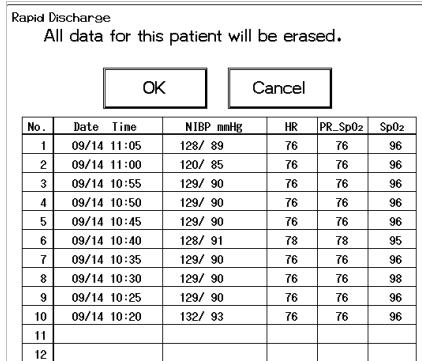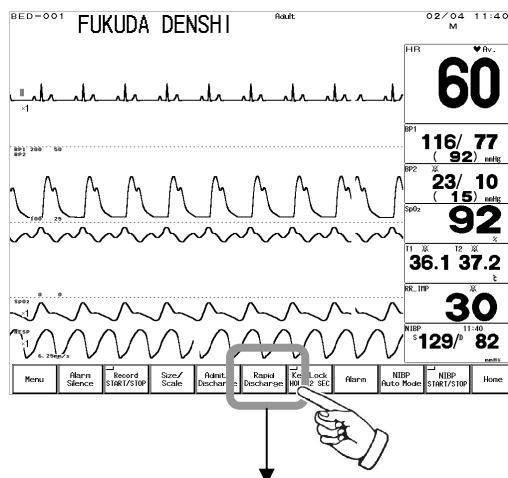
Reference   Refer to "To Resume Monitoring" (p.5-13).

Discharge Procedure by User Key

The patient's monitoring data (trend data), patient information, monitoring condition can be initialized by pressing the ⎢ Rapid Discharge ⎥ key preprogrammed as user key.
This key will function the same as the discharge procedure.

1 **Press the ⎢ Rapid Discharge ⎥ key preprogrammed as user key.**

The confirmation message for erasing the data will be displayed.
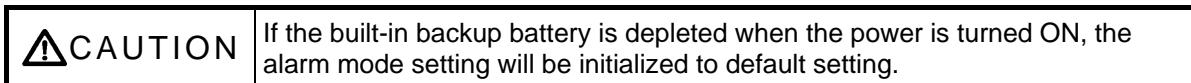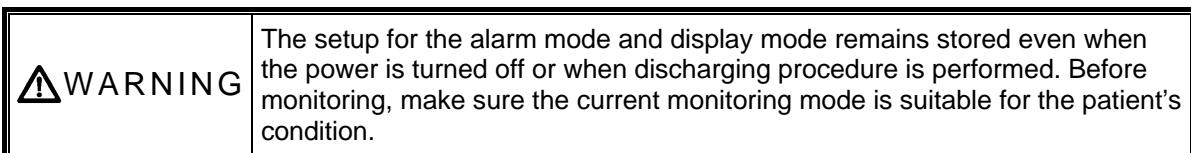
2 **Pressing the ⎢ OK ⎥ key will initialize the patient data.**

This menu allows to select the alarm mode and display mode.
The alarm setting and display configuration can be each selected from 5 modes depending on the monitoring purpose. Select the appropriate mode when admitting a patient.

⚠ WARNING	The setup for the alarm mode and display mode remains stored even when the power is turned off or when discharging procedure is performed. Before monitoring, make sure the current monitoring mode is suitable for the patient's condition.

⚠ CAUTION	If the built-in backup battery is depleted when the power is turned ON, the alarm mode setting will be initialized to default setting.

> *Reference*   Refer to "11. Technical Information   Setup Item   Default and Backup" for default settings of the display modes and alarm modes.

Mode Selection

1   **Press the** | **Mode Select** | **key.**

The mode selection menu for alarm mode and display mode will be displayed.

2   **Select an alarm mode from the selection.**

Select from the | ALM MODE1 | to | ALM MODE5 | keys or | DISP MODE1 | to | DISP MODE5 | keys to set the mode which meets the monitoring purpose.
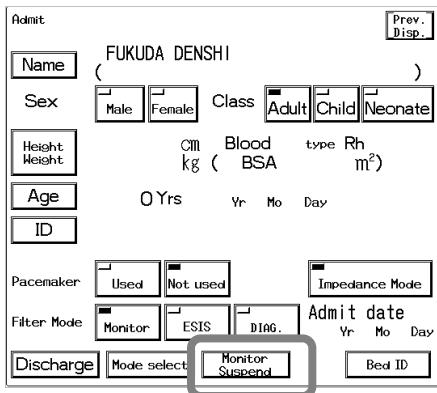
The alarm mode and display mode setting remains stored even when the power is turned off or when discharging procedure is performed. The previously selected mode will be effective if the selection is not made.

This menu allows to suspend and resume monitoring when a patient temporarily leaves the bed. Turning the power OFF will erase the recall and ST measurement data, but with this suspend monitoring function, data measurement, alarm generation, automatic measurement, and automatic recording can be suspended without erasing any data and setup condition.

To Suspend Monitoring

1 **Press the ⎿ Monitor Suspend ⏌ key.**

The confirmation menu will be displayed. If the ⎿ Monitor Suspend ⏌ key was pressed by mistake, press the ⎿ Cancel ⏌ key to return to the previous display.

2 **Suspend monitoring.**

Pressing the ⎿ OK ⏌ key will return to the home display with the ⎿ Resume ⏌ key displayed.
The numeric data display and waveform display on the home display will be suspended and only the ⎿ Resume ⏌ key will be effective.

NOTE	● The telemetry transmission will cease when monitoring is suspended. Note that the square wave will be displayed on the central monitor indicating the too far condition of the telemetry. ● The stopwatch counting will continue even when the monitoring is suspended.

To Resume Monitoring
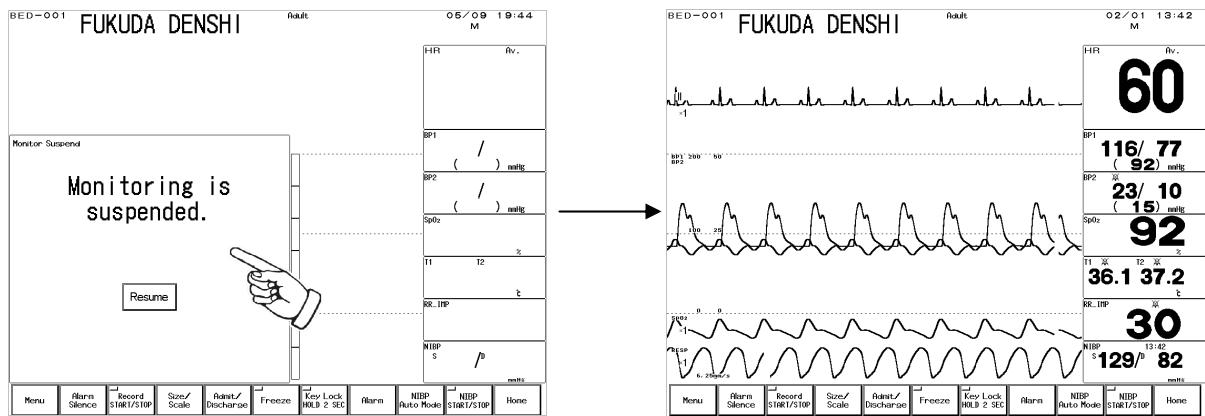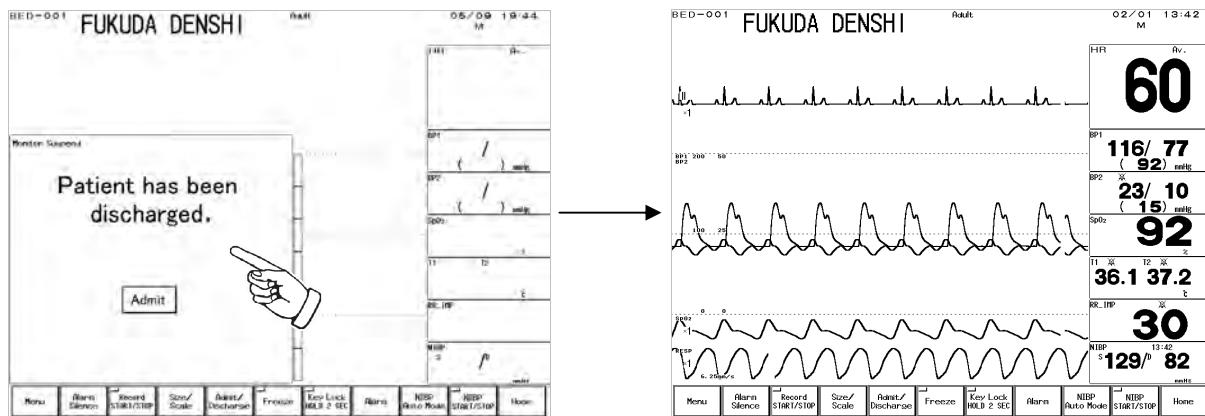
⚠ C A U T I O N	Resuming monitoring will also resume the suspended alarm.

1 **Press the** ⬜ Resume ⬜ **key.**

The monitor suspend display will be cleared and monitoring will resume.

2 **When the discharge procedure is performed, and** ⬜ Suspend ⬜ **is selected for "Discharge Mode" (Monitor Setup), the following window will be displayed.**
Pressing the ⬜ Admit ⬜ **key will clear the window and start monitoring.**

Blank Page

Chapter 6
Parameter Setup

6

Parameter Setup

This menu allows setting the measurement condition, waveform size, scale, etc. of ECG, BP, NIBP, SpO_2, RESP, TEMP, CO_2, and Vigilance data.
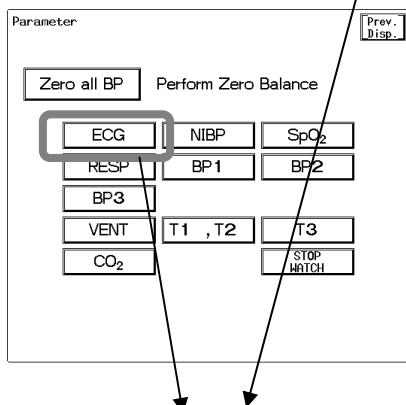
To Display the Parameter Setup Menu

Press the ⌐Menu⌐ → ⌐Parameter⌐ keys to display the parameter setup menu, and select the parameter. On the parameter setup menu, BP zero balance can be performed.
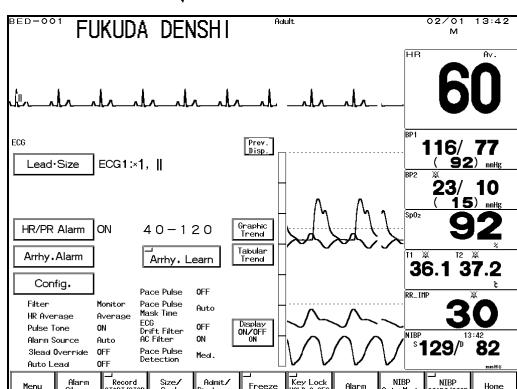
The parameter setup menu for each parameter can be also accessed by pressing the parameter key where the numeric data is displayed.

Press the parameter key (numeric data box).

Press the ⌐Menu⌐ → ⌐Parameter⌐ keys to display the parameter setup menu, and select the parameter.

<ECG Parameter Setup Menu>

By selecting ⌐Store⌐ for "Parameter Key Operation" in the monitor setup menu, the previously displayed screen can be directly accessed when pressing the parameter key.
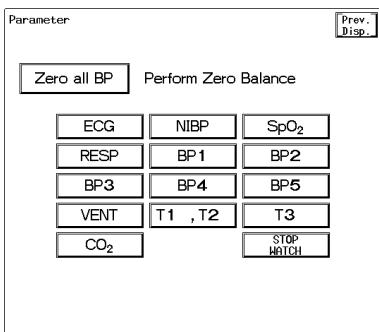
Reference   For setup procedure, refer to "8. System Configuration   Monitor Setup".

Zero Balance of All Pressure Lines

If all the displayed BP's are opened to air, the zero balance procedure for all BP can be performed.
If any of the BP is in progress of measurement, perform the zero balance on each BP parameter setup menu.
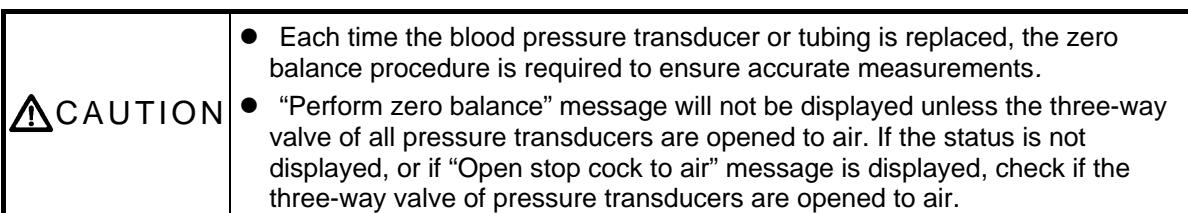
1 **Open the three-way valve of all the pressure transducers to air.**

2 **Press the** | Zero All BP | **key when "Perform zero balance" message is displayed.**

```
Parameter                    Prev.
                             Disp.

 Zero all BP    Perform Zero Balance

    ECG      NIBP      SpO2
    RESP     BP1       BP2
    BP3      BP4       BP5
    VENT    T1  ,T2    T3
    CO2               STOP
                      WATCH
```

Verify the BP waveform is positioned at zero, and "0" is displayed for the BP value. A message, "BP zero complete" will be displayed when the procedure is complete. A message, "BP zero failed" will be displayed when the process fails. The three-way valve may not be opened to air, artifact may be present, or the transducer may be defective.
Check the cause and try the zero balance procedure again.
A message, "BP zero drift" will be displayed when the interface cable is not connected. Check if the cable is connected correctly.
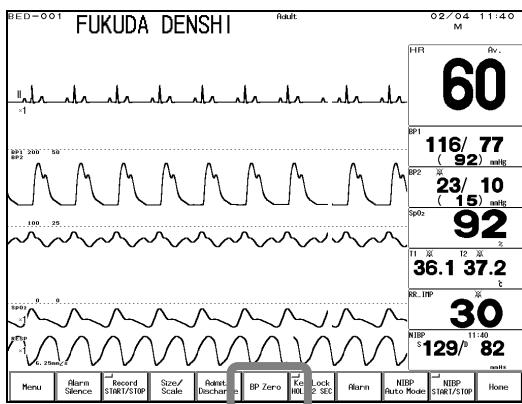
3 **Close the three-way valve when the zero balance is complete.**

⚠ CAUTION	● Each time the blood pressure transducer or tubing is replaced, the zero balance procedure is required to ensure accurate measurements.
	● "Perform zero balance" message will not be displayed unless the three-way valve of all pressure transducers are opened to air. If the status is not displayed, or if "Open stop cock to air" message is displayed, check if the three-way valve of pressure transducers are opened to air.

Zero Balance of All Pressure Lines (User Key)

The zero balance procedure of all pressure lines can be performed using the user key.
If any of the BP is in progress of measurement, perform the zero balance on each BP parameter setup menu.

1 **Open the three-way valve of all pressure transducers to air.**

2 **Press the** | BP Zero | **key when "READY" message is displayed inside the user key.**

Verify the BP waveform is positioned at zero, and "0" is displayed for the BP value. A message, "COMPLETE" will be displayed when the procedure is complete. A message, "FAILED" will be displayed when the process fails. The three-way valve may not be opened to air, artifact may be present, or the transducer may be defective.
Check the cause and try the zero balance procedure again.
A message, "DRIFT" will be displayed when the interface cable is not connected. Check if the cable is firmly connected.

3 **Close the three-way valve when the zero balance is complete.**

【**BP zero status displayed inside the user key**】

BP Zero

DRIFT

BP zero status
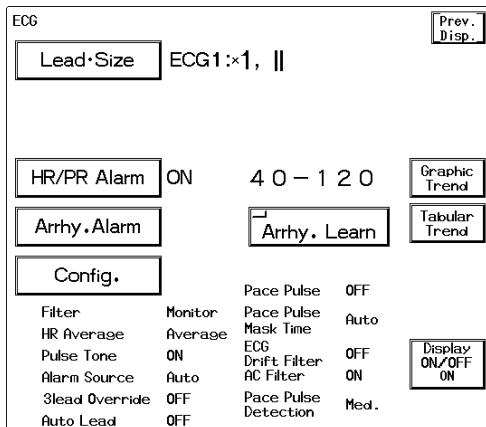
No display	: Open transducer to air
MEASURE	: Open transducer to air
READY	: Ready to perform zero balance.
BP ZERO	: BP zero in progress
FAILED	: BP zero failed
COMPLETE	: BP zero complete
DRIFT	: BP zero drift

⚠CAUTION	● Each time the blood pressure transducer or tubing is replaced, the zero balance procedure is required to ensure accurate measurements.
	● "READY" message will not be displayed unless the three-way valve of all pressure transducers are opened to air. If the status is not displayed, or if "MEASURE" message is displayed, check if the three-way valve of pressure transducers are opened to air.

ECG

The ECG measurement condition can be set on this menu.
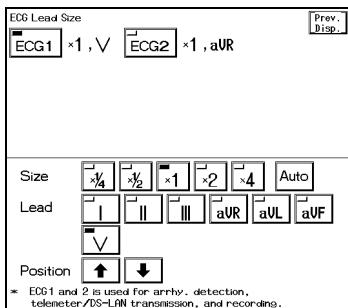
Lead, Size	: Sets the waveform size and lead for ECG display and recording.
HR/PR Alarm	: Sets ON/OFF of the HR/PR alarm, and sets the upper and lower alarm limit.
Arrhy. Alarm	: Sets ON/OFF and the detection threshold for each arrhythmia alarm.
Configuration	: Sets the condition for measuring ECG and HR.
Arrhy. Learn	: The monitor learns the normal QRS at ECG electrode replacement or at misdetection of the arrhythmia analysis.
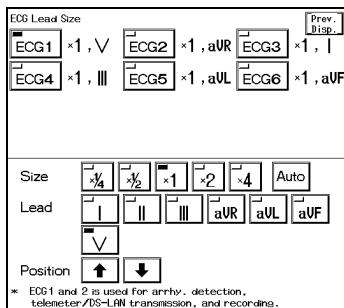
ECG Waveform Size and Lead

1 Press the ⎣ Lead, Size ⎤ key to display the size / lead setup menu.
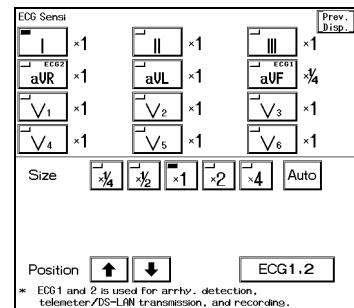
Select the lead and size for the waveform to display on the home display.

<2 Waveforms Display>   <6 Waveforms Display>   <12 Waveforms Display>

2 Select the ECG channel to set the lead, size, and the baseline position.

Select the ECG channel by pressing the ⎣ ECG✳ ⎤ key. The selected channel key LED will light.

3 Select the waveform size.

Select the waveform size for displaying and recording. Pressing the ⎣ Auto ⎤ key will automatically adjust the ECG amplitude to 10mm. The automatic adjustment is effective only when the key is pressed.

Size	×1/4	×1/2	×1	×2	×4
Voltage (10mm)	4mV	2mV	1mV	500μV	250μV
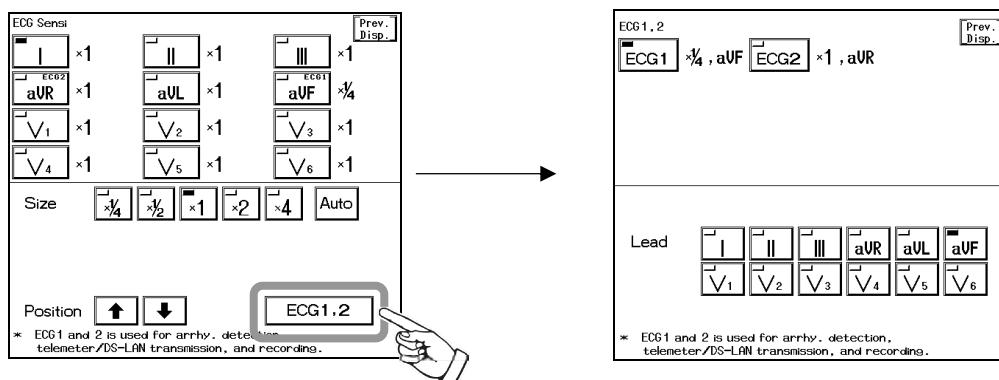
⚠ CAUTION	● The threshold level for arrhythmia detection and QRS detection changes with the ECG waveform size. Set a proper waveform size for monitoring. When the ECG waveform size is ×1/4, ×1/2, or ×1, the detection threshold is 250μV. When the ECG waveform size is ×2 or ×4, the detection threshold is 150μV. ● Automatic size/position of the ECG is effective only at the time the Auto key is pressed. This does not continuously adjust the size and position.

4 **Select the lead for ECG1, ECG2.**

The leads can be selected from 3 leads, 6 leads, 7 leads, or 12 leads depending on the connected ECG relay cable.

ECG Relay Cable	Lead
3-electrode	I II III
4-electrode	I II III aVR aVL aVF
5-electrode	I II III aVR aVL aVF V
10-electrode	I II III aVR aVL aVF V₁ V₂ V₃ V₄ V₅ V₆

When the 12-lead display configuration is used, press the ECG1, 2 key to display the lead selection menu.

⚠ CAUTION	The QRS detection leads, arrhythmia detection leads, monitoring leads on the central monitor, recording leads are fixed as ECG1 and ECG2. Especially for arrhythmia detection, set the most appropriate leads with high QRS amplitude for ECG1 and ECG2.

5 **Set the baseline position.**

Position ⬆ ⬇
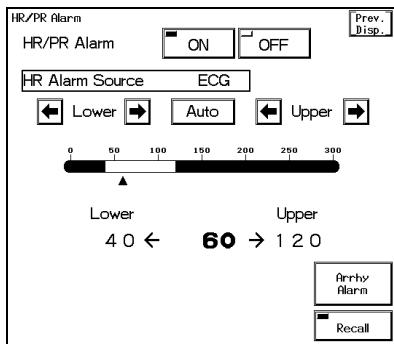
If the waveform is difficult to see due to ECG amplitude, set the 0mV baseline position.
The baseline position for the waveform display and recording will be adjusted.

HR/PR Alarm

1 **Press the** $\boxed{\text{HR/PR Alarm}}$ **key to display the alarm setup menu.**

Select ON/OFF for HR/PR alarm, and set the upper and lower alarm limit.

The common alarm value for HR measured from ECG, PR measured from SpO_2, PR measured from BP can be set. The upper and lower limit can be set in 5 bpm increments.

Key	Item	Description
$\boxed{\text{ON}}$ $\boxed{\text{OFF}}$	Individual Alarm	Selecting $\boxed{\text{ON}}$ will generate the HR/PR alarm. Selecting $\boxed{\text{OFF}}$ will not generate the HR/PR alarm.
$\boxed{\Leftarrow}$ Lower $\boxed{\Rightarrow}$	Lower Alarm Limit	Sets the lower alarm limit (20 to 295bpm). Setting a value 20bpm or below will turn OFF the alarm.
$\boxed{\Leftarrow}$ Upper $\boxed{\Rightarrow}$	Upper Alarm Limit	Sets the upper alarm limit (25 to 300bpm). Setting a value 300bpm or above will turn OFF the alarm.
$\boxed{\text{Auto}}$	Automatic Setup	Automatically sets the upper limit to +40bpm, and the lower limit to –40bpm from the current value. The lower limit will be restricted by "HR/PR Low Limit during Alarm Auto Setting (OFF/30bpm/40bpm)" under the Hospital Setup.

To maintain the alarm setting even after the power is turned OFF or after a discharge procedure, store the setting to one of the alarm modes, or select $\boxed{\text{Backup}}$ for "Alarm" on the "Backup at Discharge" menu (Monitor Setup).
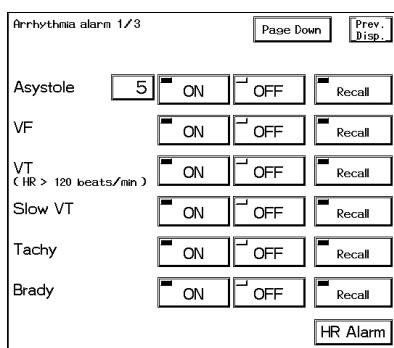
Reference | For the alarm mode setup procedure, refer to "8. System Configuration Alarm Mode".

Arrhythmia Alarm

1 **Press the** $\boxed{\text{Arrhy.}}$ **key to display the arrhythmia alarm setup menu.**
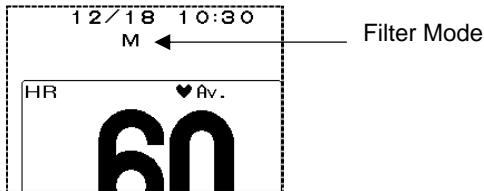
ON/OFF for each arrhythmia alarm and analysis threshold level can be set.

Reference | Refer to "4. Monitoring Setup Alarm Setup" for details.
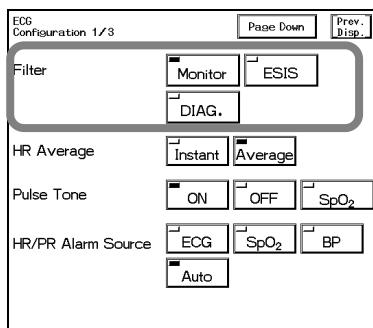
Filter Mode Selection

The waveform frequency characteristic can be selected from Monitor mode, ESIS mode, or Diagnosis mode according to the monitoring purpose. Each mode has different frequency characteristic.
The selected filter mode will be displayed on the home display. (Monitor: M, ESIS: E, Diagnosis: D)

```
12/18  10:30
   M  ◀──────────────────── Filter Mode

HR          ♥ Av.

60
```

The selected filter mode will be printed when recording.

1 Press the ⎢ Config. ⎢ key.

```
ECG
Configuration 1/3      Page Down   Prev.
                                   Disp.

Filter        ▪          □
           Monitor      ESIS
              □
            DIAG.

HR Average   □        ▪
          Instant  Average

Pulse Tone   □       □        ▪
            ON      OFF      SpO2

HR/PR Alarm Source  □      □      □
                  ECG    SpO2    BP
                    ▪
                  Auto
```

The configuration menu for selecting a filter will be displayed.

2 Select the filter mode from ⎢ Monitor ⎢, ⎢ ESIS ⎢, or ⎢ Diag. ⎢.

Monitor Mode
(Frequency Characteristic: Adult/Child 0.5 to 40Hz, Neonate 1.6 to 40Hz)

This is the standard mode for ECG monitoring. The upper frequency is set to 40Hz to reduce artifact caused by EMG, etc.

ESIS Mode (When a defibrillation and electrosurgery-proof ECG relay cable is used)
(Frequency Characteristic: Adult/Child/Neonate 1.6 to 15Hz)

The upper frequency is set to 15Hz, so that it can largely reduce the high-frequency artifact.

Diagnosis Mode
(Frequency Characteristic for 3-electrode Lead: Adult/Child/ Neonate 0.05 to 100Hz
** Frequency Characteristic for 4, 5, 10-electrode Lead: Adult/Child/ Neonate 0.05 to 150Hz)**

Select this mode if ST measurement or high frequency ECG monitoring is performed.
As the lower frequency is set to 0.05Hz, ST level can be accurately measured.
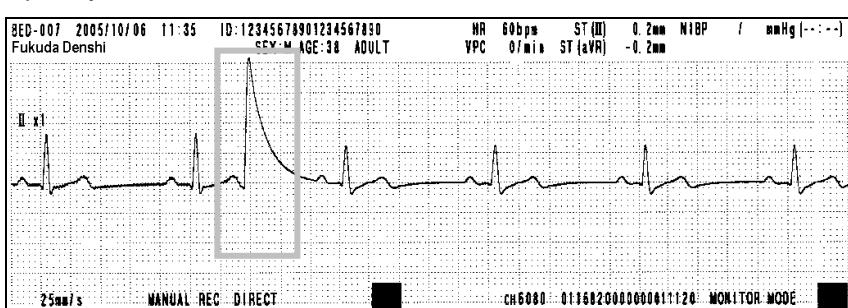
⚠ CAUTION	The ESIS mode can largely reduce the artifact such as electrosurgery noise and EMG, but it may also reduce the QRS amplitude. The ESIS mode should be selected only during electrosurgery.
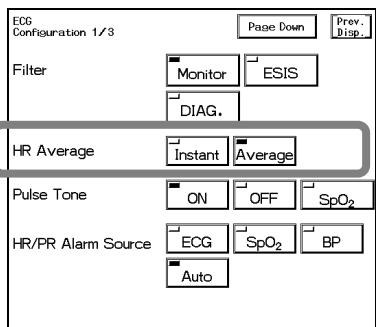
NOTE	When the filter mode is changed, a notch will appear on the ECG waveform due to the change in frequency characteristic.

HR Average Selection

The averaging method of HR measured from ECG can be selected.

1 **Press the** Config. **key.**

ECG
Configuration 1/3 | Page Down | Prev. Disp.

Filter | Monitor | ESIS
| DIAG.

HR Average | Instant | Average

Pulse Tone | ON | OFF | SpO₂

HR/PR Alarm Source | ECG | SpO₂ | BP
| Auto

The configuration menu for selecting HR average method will be displayed.

2 **Select** Instant **or** Average.

Selecting Instant will display the HR measured from RR interval of each heartbeat.
Selecting Average will display the HR measured from 6 seconds of heartbeat for adult and child, and 3 seconds of heartbeat for neonate.
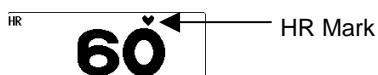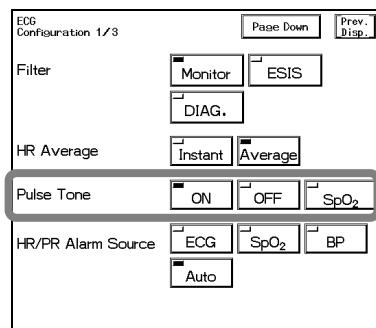
HR Synchronization Mark and Pulse Tone

The HR mark synchronized to ECG or PR can be displayed inside the parameter key.
ON/OFF of HR pulse tone can be also set.

HR **60** ← HR Mark

1 **Press the** Config. **key.**

ECG
Configuration 1/3 | Page Down | Prev. Disp.

Filter | Monitor | ESIS
| DIAG.

HR Average | Instant | Average

Pulse Tone | ON | OFF | SpO₂

HR/PR Alarm Source | ECG | SpO₂ | BP
| Auto

The configuration menu for setting the pulse tone will be displayed.

2 **Select from** ON **/** OFF **/** SpO₂ **.**

OFF will not display the synchronized mark. The pulse tone will not be generated.
ON will display the synchronized mark. The pulse tone will be generated.
SpO₂ will always synchronize to SpO₂ for synchronized mark/tone regardless of the "HR/PR Alarm Source" setup.
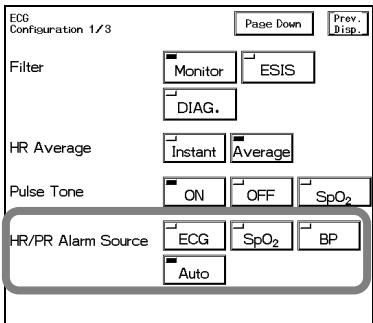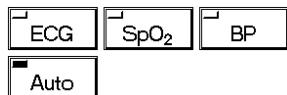
6
ECG

HR/PR Alarm Source

The parameter to display the HR synchronized mark and to generate the HR/PR alarm can be selected from ECG, SpO$_2$, and BP (BP1 or ART).

1 **Press the** ⌈ Config. ⌋ **key.**

```
ECG
Configuration 1/3          Page Down    Prev.
                                        Disp.
Filter                  ■Monitor  □ESIS
                          □DIAG.
HR Average              □Instant □Average
Pulse Tone              ■ON    □OFF  □SpO₂
HR/PR Alarm Source      □ECG  □SpO₂  □BP
                          ■Auto
```

The configuration menu for selecting the HR/PR alarm source will be displayed.

2 **Select a parameter.**

```
□ECG   □SpO₂   □BP
■Auto
```

Selecting ⌈ ECG ⌋ will generate the alarm based on HR measured from ECG. HR synchronized mark will be displayed.
Selecting ⌈ SpO$_2$ ⌋ will generate the alarm based on PR measured from SpO$_2$. SpO$_2$ synchronized mark will be displayed.
Selecting ⌈ BP ⌋ will generate the alarm based on PR measured from BP (BP1 or ART). BP synchronized mark will be displayed.
However ⌈ BP ⌋ can be selected only when ⌈ ECG/SpO$_2$/BP ⌋ is selected for "HR/PR Source" of the monitor setup menu.
Selecting ⌈ Auto ⌋ will automatically select the measurable HR source in the priority of ECG>SpO$_2$>BP. If the corresponding parameter key is displayed, alarm generation will be also effective.

⚠ WARNING	● The HR/PR alarm will not be generated unless the parameter key corresponding to the selected HR/PR source is displayed. Be sure to display the parameter key for the HR/PR source. ● The alarm for the parameter not selected for the "HR/PR Alarm Source" (ECG/SpO$_2$/BP) will be set to OFF on the DS-7600 Central Monitor. • The "HR/PR Alarm Source" setting will synchronize between the bedside monitor and the central monitor. • For example, if PR is set as the HR/PR alarm source on the DS-7200, HR alarm will be set to OFF on the central monitor.

⚠ CAUTION	In case of DS-LANII network, if the HR/PR source is ⌈ BP ⌋ (Or, if ⌈ Auto ⌋ selects BP for HR/PR source), the ECG waveform will not be transmitted on the network. On the central monitor, PR_IBP value will be displayed instead of HR. However, on some central monitor depending on the model type, the HR value from ECG will be displayed on the NIBP list and ST measurement list. Refer to the operation manual for the respective central monitor. In case of DS-LANIII network, refer to the operation manual for the central monitor.

NOTE	If ⌈ SpO$_2$ ⌋ is selected for "Pulse Tone" (ECG config.), the synchronized mark will be displayed inside the PR_SpO$_2$ numeric data box regardless of the HR/PR alarm source setup.

Automatic Lead Switching
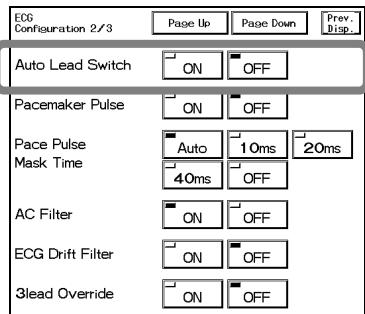
When the lead off condition occurs, the "Check Electrodes" message will be displayed and a new ECG lead will be automatically set if the Automatic Lead Switching is set to ON.
The automatic lead switching will be performed for ECG 1 and ECG 2.

Lead Switching

Lead Type	Electrode Off	Auto Lead Selected	
		ECG1	ECG2
4-electrode Lead	RA	III	III
	LA	II	II
5-electrode Lead	RA / RA+V	III	III
	LA / LA+V	II	II
	V	II	aVR
10-electrode Lead	RA / RA+V	III	III
	LA / LA+V	II	II
	V, V2 to V6	II	aVR

1 Press the | Config. | → | Page Down | keys.

The configuration menu for selecting the automatic lead switching will be displayed.

2 Select | ON | or | OFF |.
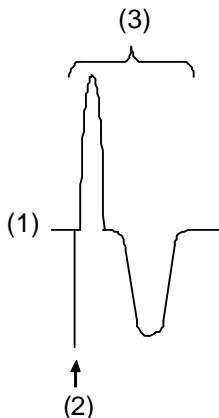
| OFF | will not switch the lead when an electrode comes off.
| ON | will automatically switch to another lead when an electrode comes off.

Pacemaker Pulse

The pacemaker pulse can be displayed in yellow superimposing on the ECG waveform.

Pacemaker Pulse Detection Algorithm

(3)

(1)

(2)

(1) ECG Signal Input
Inputs ECG signal.

(2) Suspension of Pacemaker Pulse and QRS Detection
Signals with high frequency and large amplitude will be detected as a pacemaker pulse. When a pacemaker pulse is detected, QRS detection will be suspended for a certain amount of time to prevent the pacemaker pulse to be erroneously detected as QRS.

(3) Canceling Arrhythmia Detection
Arrhythmia detection will be cancelled to avoid detecting the waveform succeeding the pacemaker pulse as an abnormal beat.
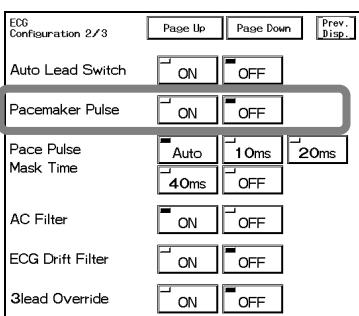
⚠WARNING	Rate meters may continue to count the pacemaker rate during occurrences of cardiac arrest or some arrhythmias. Do not rely entirely upon rate meter alarms. Keep pacemaker patients under close surveillance.

⚠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 (as in a fusion beat), QRS detection will be suspended and the heart rate will be reduced. ● If a pacemaker pulse is continuously detected due to AC frequency interference, QRS detection will be suspended and the heart rate will be reduced. Also arrhythmia detection will not be possible.

1 Press the ⎡Config.⎤ → ⎡Page Down⎤ key.

The configuration menu to select pacemaker pulse will be displayed.
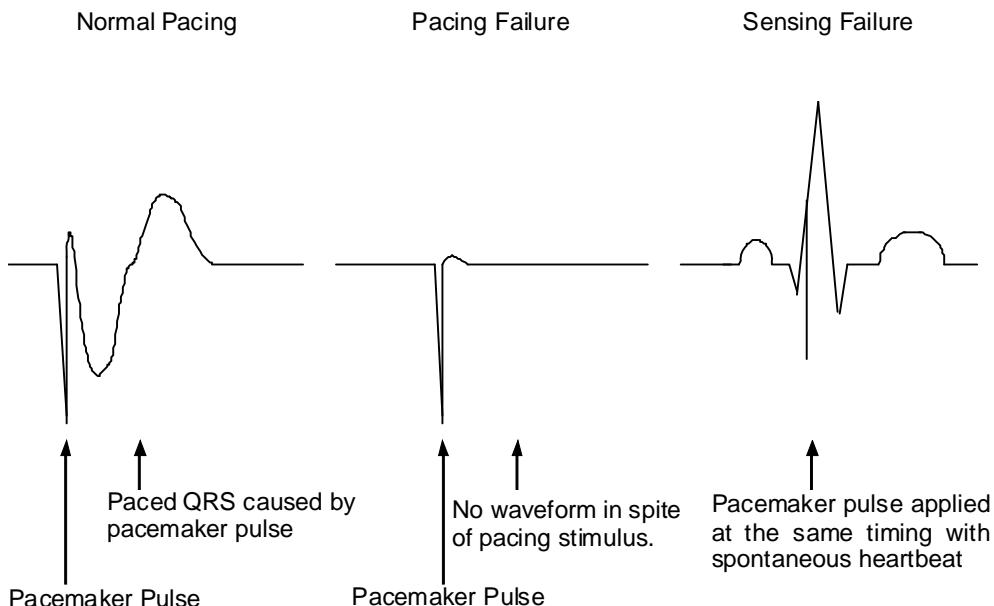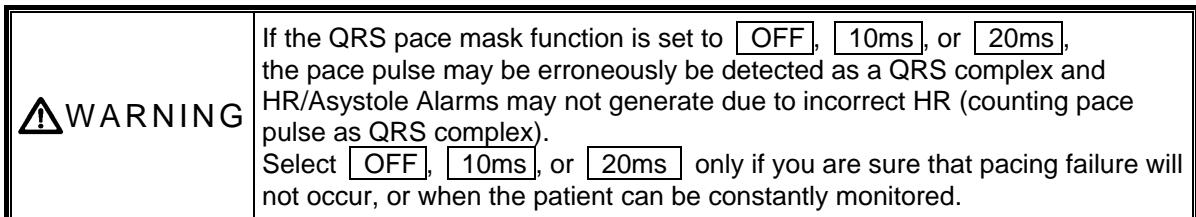
2 Select ⎡ON⎤ or ⎡OFF⎤.

⎡OFF⎤ will not display the pacemaker pulse.
⎡ON⎤ will display the pacemaker pulse in a different color from the ECG waveform. This will automatically set to ⎡ON⎤ when "Used" is selected for pacemaker use on the patient admit/discharge menu.
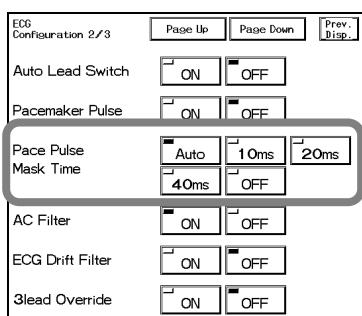
QRS Pace Pulse Mask

For patients using pacemakers, there are cases when the paced QRS may not occur in spite of the pacing stimulus. This condition is called "pacing failure", or "failure to capture". To avoid detecting pacemaker pulses as a QRS complex, the 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 time as the QRS, this "pace pulse 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, or 20ms for correct measurement of the heart rate. (Default setting : Auto)

⚠WARNING	If the QRS pace mask function is set to OFF, 10ms, or 20ms, 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, or 20ms only if you are sure that pacing failure will not occur, or when the patient can be constantly monitored.

Normal Pacing Pacing Failure Sensing Failure

Paced QRS caused by pacemaker pulse

No waveform in spite of pacing stimulus.

Pacemaker pulse applied at the same timing with spontaneous heartbeat

Pacemaker Pulse Pacemaker Pulse

1 Press the Config. → Page Down keys.

The configuration menu for selecting pace pulse mask time will be displayed.

2 Select the pace pulse mask time.
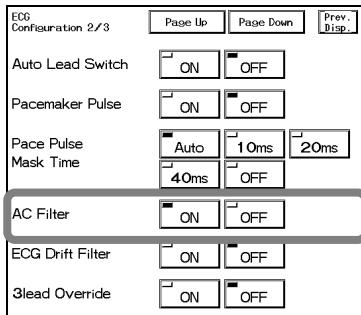
Select from 10ms, 20ms, 40ms depending on the pace pulse amplitude or presence of fusion beat.
Selecting Auto will automatically select the pace pulse mask time from 20ms, 30ms, or 40ms depending on the pace pulse amplitude.
Selecting OFF will set the mask time to 0ms.

AC Filter

1 **Press the** Config. → Page Down **keys.**

```
ECG
Configuration 2/3    [Page Up] [Page Down]  [Prev.
                                             Disp.]

Auto Lead Switch     [ ON ] [ OFF ]

Pacemaker Pulse      [ ON ] [ OFF ]

Pace Pulse           [ Auto ] [10ms] [20ms]
Mask Time            [40ms] [ OFF ]

AC Filter            [ ON ] [ OFF ]

ECG Drift Filter     [ ON ] [ OFF ]

3lead Override       [ ON ] [ OFF ]
```

The configuration menu for selecting the AC filter will be displayed.
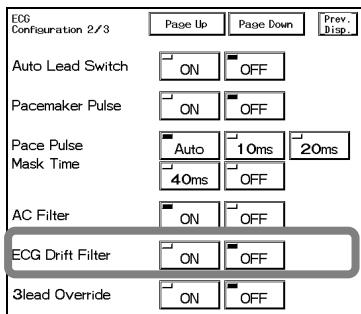
2 **Select** ON **or** OFF **for the AC filter.**

Selecting ON will set the AC filter which attenuates the AC noise (50 to 60Hz).
Selecting OFF will not set the AC filter.

ECG Drift Filter

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

1 **Press the** Config. → Page Down **keys.**

```
ECG
Configuration 2/3    [Page Up] [Page Down]  [Prev.
                                             Disp.]

Auto Lead Switch     [ ON ] [ OFF ]

Pacemaker Pulse      [ ON ] [ OFF ]

Pace Pulse           [ Auto ] [10ms] [20ms]
Mask Time            [40ms] [ OFF ]

AC Filter            [ ON ] [ OFF ]

ECG Drift Filter     [ ON ] [ OFF ]

3lead Override       [ ON ] [ OFF ]
```

The configuration menu to select the ECG drift filter will be displayed.

2 **Select** ON **or** OFF **for the ECG drift filter.**

Selecting ON will set the ECG drift filter and controls the baseline drift.
When the ECG drift filter is set, the waveform will be delayed about 0.5 seconds.
The message, "Drift-F ON" will be displayed on the home display.
Selecting OFF will not set the ECG drift filter.

```
BED-001  FUKUDA DENSHI          Adult      12/11  14:51
                                            M     Drift-F ON
```
— Message

> **Reference** Instead of "Drift-F ON" message, the enlarged time can be displayed depending on the setup.
> For procedures, refer to "8. System Configuration   Monitor Setup".

NOTE	● When the "ECG Drift Filter" is set to ON, the waveform display will be delayed about 0.5 seconds. ● When the defibrillation and electrosurgery-proof ECG relay cable (CI-700E-3 (FA), CI-700E-4 (FA), CI-700E-5 (FA)) is used, ECG Drift Filter will be always set to OFF.

3-lead Override
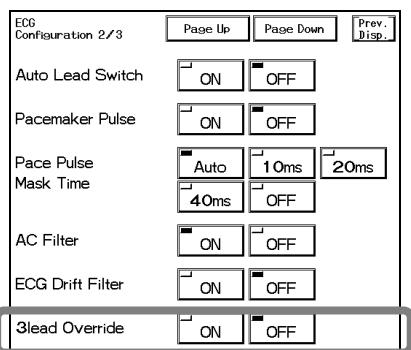
When a 5-lead or 10-lead relay cable is used with a 3-lead cable, the device will judge as lead-off condition and display the "LEAD OFF" message.
This can be avoided by selecting ON for "3-lead Override".

NOTE	If 4-lead, 5-lead, or 10-lead relay cable is used with all the lead cables and electrodes connected, but ON is selected for "3-lead Override", the device will aknowledge that only 3 electrodes are used and displays only one waveform. Also, artifact may interfere on the waveform, and lead-off condition cannot be correctly displayed. When setting ON for "3-lead Override", use only 3 electrodes of LA, RA, and LL.

1 Press the Config. → Page Down keys.

The configuration menu to set the "3-lead Override" will be displayed.
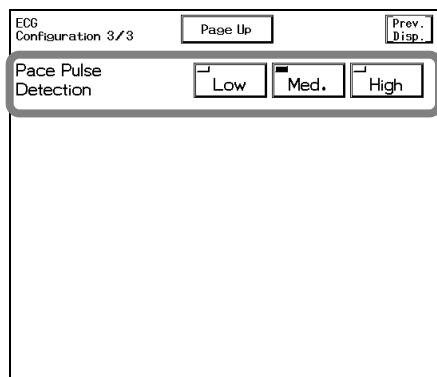
2 If using the 3-lead cable, select ON .

Pace Pulse Detection
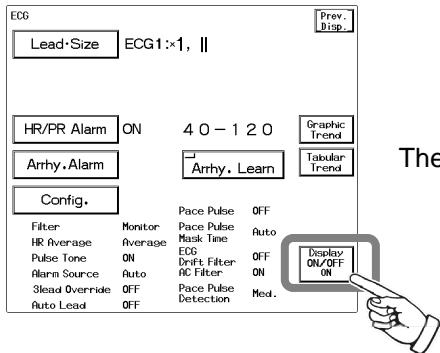
The pacemaker pulse detection sensitivity level can be selected from Low, Medium, and High.

1 Press the Config. → Page Down → Page Down keys.
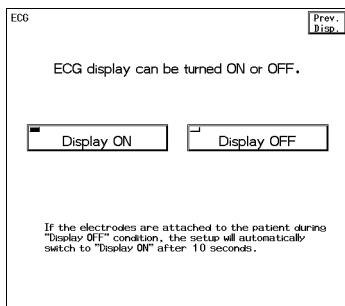
Select Low if pacemaker pulse output is large,
and select High if pacemaker pulse output is small.

ON/OFF of Parameter Display

1 **Press the** Display ON/OFF **key.**

The confirmation screen for ON/OFF of ECG display will appear.

2 **Select** Display ON **or** Display OFF **.**

Pressing the Display ON key will display the waveform and numeric data.
Pressing the Display OFF key will not display the waveform and numeric data.

The Disp. OFF message will be displayed inside the parameter key.
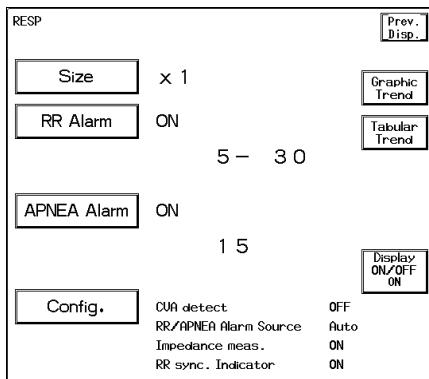
When ECG electrodes are attached to the patient with the ECG display set to OFF, the ECG waveform and numeric data will be automatically displayed after 10 seconds.
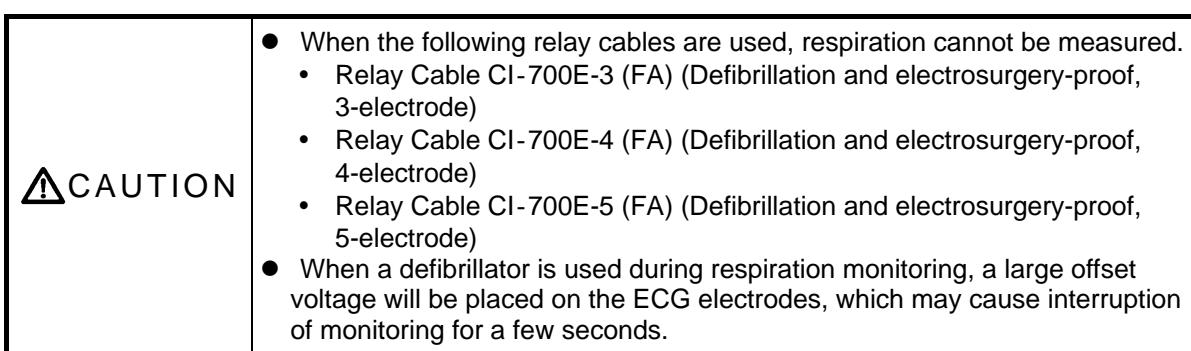
⚠CAUTION	When the waveform and numeric data display is set to OFF, the alarm generation and tabular/graphic trend input will also be suspended.

Respiration

This menu allows setting the impedance respiration measurement, CO_2 respiration measurement or ventilator respiration measurement.
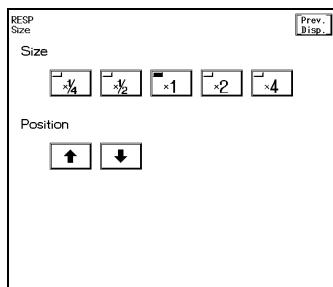
Size   : Selects the waveform size to display the impedance respiration.
RR Alarm   : Selects ON/OFF for respiration rate alarm, and sets the upper and lower alarm limits.
APNEA Alarm : Selects ON/OFF for apnea alarm and sets the upper alarm limit.
Configuration   : Sets the respiration monitoring configuration.

⚠CAUTION	● When the following relay cables are used, respiration cannot be measured.
	  • Relay Cable CI-700E-3 (FA) (Defibrillation and electrosurgery-proof, 3-electrode)
	  • Relay Cable CI-700E-4 (FA) (Defibrillation and electrosurgery-proof, 4-electrode)
	  • Relay Cable CI-700E-5 (FA) (Defibrillation and electrosurgery-proof, 5-electrode)
	● When a defibrillator is used during respiration monitoring, a large offset voltage will be placed on the ECG electrodes, which may cause interruption of monitoring for a few seconds.

Respiration Waveform Size

1 **Press the** Size **key to display the size setup menu.**

Select the waveform size and baseline position to display and record the impedance respiration waveform.

2 **Select the waveform size.**
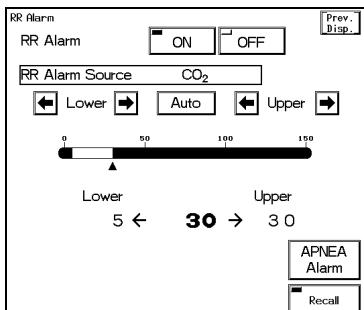
Select the size from $\times$1/4, $\times$1/2, $\times$1, $\times$2, $\times$4.

3 **Set the baseline position using the** ⬆ **,** ⬇ **keys.**

Adjust the baseline position for 0Ω if the waveform is hard to see due to the waveform amplitude.

RR Alarm

1 **Press the** RR Alarm **key to display the alarm setup menu.**

Set ON/OFF of the RR alarm and upper and lower alarm limit.
The alarm will be set common to RR measured from the impedance respiration waveform or RR measured from the CO_2 waveform.

The increment will be according to the "RR Alarm Increment" setting. (Normal / Small).

	Normal	Small
Adult	5Bpm increment	1Bpm increment
Child/Neonate	2Bpm increment	1Bpm increment

Reference For the RR alarm increment setup, refer to "8. System Configuration Monitor Setup".

NOTE	If the alarm is based on the RR measured from CO_2 waveform, RR alarm will not generate unless 2 or more respiration is detected within 30 seconds after power ON or after discharge.

Key	*Item*	*Description*
ON OFF	Individual Alarm	Selecting ON will generate the RR alarm. Selecting OFF will not generate the RR alarm.
← Lower →	Lower Alarm Limit	Sets the lower alarm limit (5 to 145Bpm / 2 to 148Bpm). Setting the value to 5Bpm/2Bpm or below will turn OFF the alarm.
← Upper →	Upper Alarm Limit	Sets the upper alarm limit (10 to 150Bpm / 4 to 150Bpm). Setting the value to 150Bpm or above will turn OFF the alarm.
Auto	Automatic Setup	Automatically sets the upper limit to +20Bpm, and the lower limit to –20Bpm from the current value.
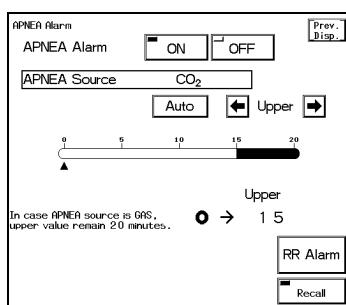
To maintain the alarm setting even after the power is turned OFF or after the discharge procedure, store the setting to one of the alarm modes, or select Backup for "Alarm" on the "Backup at Discharge" menu (Monitor Setup).

Reference For the alarm mode setup procedure, refer to "8. System Configuration Alarm Mode".

APNEA Alarm

1 **Press the** APNEA Alarm **key to display the alarm setup menu.**

Set ON/OFF of the apnea alarm and upper limit of apnea time.
Apnea will be set common to apnea time measured from the impedance respiration waveform or apnea time measured from the CO_2 waveform.
The upper limit can be set in 1-second increment. There is no lower limit.

⚠ WARNING	• The purpose of this apnea alarm is to alert the user to evaluate for the possible occurrence of apnea events by identifying the absence of respiration. It is not intended to be classified as an "Apnea Monitor" and will not identify the condition creating the possible event. (Central, Obstructive or Mixed.) • When PURITAN-BENNETT Ventilator is used, APNEA alarm will not generate if ventilator is selected for RR/APNEA Alarm Source.	

NOTE	If the alarm is based on the apnea time measured from CO_2 waveform, apnea alarm will not generate unless 2 or more respiration is detected within 30 seconds after power ON or after discharge.

Key	Item	Description
ON OFF	Individual Setup	Selecting ON will generate the apnea alarm. Selecting OFF will not generate the apnea alarm.
← Upper →	Upper Alarm Limit	Sets the upper alarm limit (5 to 20sec.). Setting the value equal to or above 20sec. will turn OFF the alarm.
Auto	Automatic Setup	Sets the apnea alarm value set for the currently selected alarm mode.

To maintain the alarm setting even after the power is turned OFF or after the discharge procedure, store the setting to one of the alarm modes, or select Backup for "Alarm" on the "Backup at Discharge" menu (Monitor Setup).
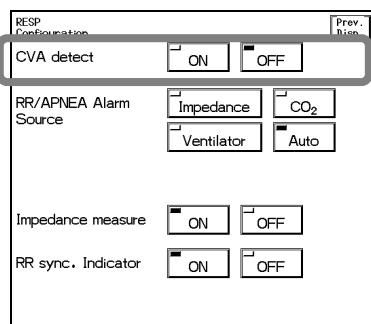
CVA Detection

When the amplitude of the respiration waveform decreases due to causes such as respiratory pause, the ECG waveform may be superimposed on to the respiration waveform, making the RR equal to the HR. This condition is called CVA (Cardio-Vascular Artifact), and is detected using the CVA detection function.
If the ECG waveform is superimposed on to the respiration waveform, with HR (RR) 30bpm, for 20 seconds or over (10 seconds or over for neonates) and the CVA detection function set to ON, the "CVA detected" message will be displayed, and an alarm sound will be generated.
This function will be effective only when Impedance is set as the RR/APNEA alarm source.

1 Press the Config. key on the RESP setup menu.

```
RESP                           Prev.
Configuration                  Disp.

CVA detect      [ ON ]  [ OFF ]

RR/APNEA Alarm  [ Impedance ] [ CO₂ ]
Source
                [ Ventilator ] [ Auto ]



Impedance measure  [ ON ]  [ OFF ]

RR sync. Indicator [ ON ]  [ OFF ]
```

The configuration menu to set the CVA detection will be displayed.
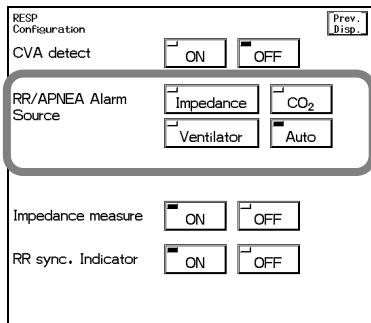
2 Select ON or OFF.

ON will generate an alarm and display a message when CVA is detected.
OFF will not perform CVA detection.

RR/APNEA Alarm Source

The parameter to display the RR synchronized mark and to generate the RR/APNEA alarm can be selected from impedance RR, CO_2 RR, and ventilator RR.

1 **Press the** Config. **key on the RESP setup menu.**

```
RESP                                    Prev.
Configuration                           Disp.
CVA detect           ON      OFF

RR/APNEA Alarm      Impedance    CO₂
Source
                    Ventilator   Auto


Impedance measure    ON      OFF

RR sync. Indicator   ON      OFF
```
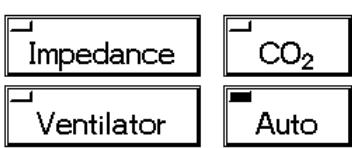
The configuration menu to select RR source, APNEA source will be displayed.

2 **Select the parameter.**

```
Impedance      CO₂

Ventilator     Auto
```

Selecting Impedance will generate RR alarm based on the impedance respiration curve. Impedance synchronized mark will be displayed.
Selecting CO_2 will generate RR alarm based on the CO_2 waveform. CO_2 synchronized mark will be displayed.
Selecting Ventilator will generate RR alarm based on RR measured by the ventilator. Ventilator synchronized mark will be displayed.
Selecting Auto will automatically select the measurable parameter in the priority of CO_2＞ventilator＞impedance, and generates alarm if the corresponding parameter key is displayed on the home display.

⚠WARNING	The RR/APNEA alarm will not be generated unless the parameter key corresponding to the selected RR/APNEA source is displayed. Be sure to display the parameter key for the RR/APNEA source.

⚠CAUTION	In case of DS-LANII network, if the RR/APNEA alarm source is other than Impedance (Or, if Auto selects a setting other than impedance for RR/APNEA alarm source), the respiration waveform will not be transmitted on the network. In addition, if the RR/APNEA alarm source is other than CO_2 (Or, if Auto selects a setting other than CO_2 for RR/APNEA alarm source), the CO_2 waveform will not be transmitted on the network. In case of DS-LANIII network, refer to the operation manual for the central monitor.

Impedance Respiration Measurement

The respiration measurement using the impedance method conducts high-frequency and weak current between the ECG electrodes attached to the patient, and measures the potential difference between the electrodes caused by thoracic movement using the synchronous rectification system. For a patient using the adaptive (minute ventilation) pacemaker, the pacemaker measurement signal and the high-frequency current of this equipment interferes with each other which causes incorrect respiration measurement.

If the patient is using an adaptive (minute ventilation) pacemaker, set the impedance respiration measurement OFF.

1 **Press the** [Config.] **key on the RESP setup menu.**

The configuration menu to set the impedance respiration measurement will be displayed.

2 **Select** [ON] **or** [OFF]**.**

[ON] will perform standard impedance respiration measurement.
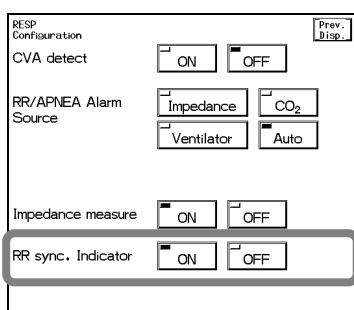
[OFF] will stop the impedance respiration measurement and will not display the impedance respiration waveform and RR. A high frequency electric discharge which is a measurement signal will be also ceased.

RR Synchronized Indicator

The RR mark synchronized to impedance respiration or CO_2 waveform will be displayed inside the parameter key.

NOTE	If PURITAN-BENNETT Ventilator is used, RR synchronized indicator will not be displayed when [Ventilator] is selected for "RR/APNEA Alarm Source".

1 **Press the** [Config.] **key on the RESP setup menu.**
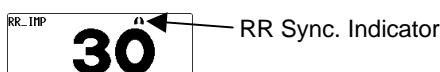
The configuration menu to set the RR synchronized indicator will be displayed.

2 **Select** [ON] **or** [OFF]**.**
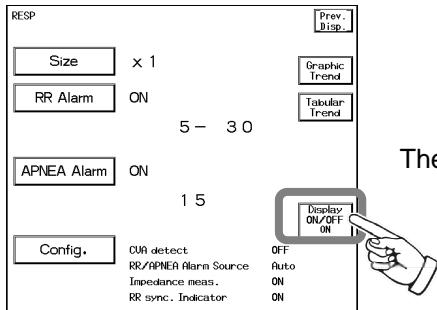
[OFF] will not display the RR synchronized indicator.
[ON] will display the RR synchronized indicator.
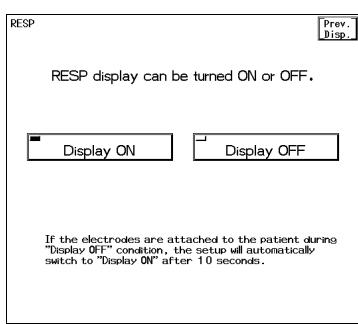
RR Sync. Indicator

ON/OFF of Parameter Display

1 **Press the** Display ON/OFF **key.**
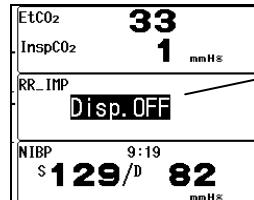
The confirmation screen for ON/OFF of RESP display will appear.

2 **Select** Display ON **or** Display OFF **.**

Pressing the Display ON key will display the waveform and numeric data.
Pressing the Display OFF key will not display the waveform and numeric data.

The Display OFF message will be displayed inside the parameter key.
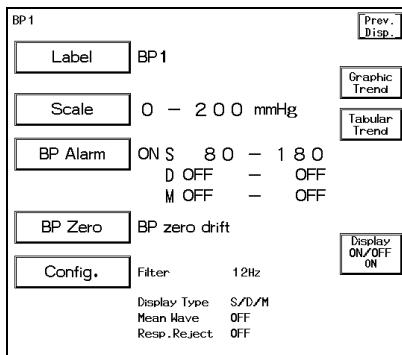
When ECG electrodes are attached to the patient with the respiration display set to OFF, the respiration waveform and numeric data will be automatically displayed after 10 seconds.

| ⚠ CAUTION | When the waveform and numeric data display is set to OFF, the alarm generation and tabular/graphic trend will also be suspended. |

Invasive Blood Pressure (BP1 to BP5)

This menu allows setting the measurement condition for BP1 to BP5.
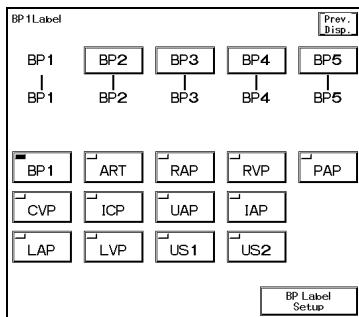
Scale : Selects the scale for BP waveform display.
BP Alarm : Sets the upper and lower alarm limit of systolic, diastolic, mean blood pressure and ON/OFF of the alarm.
BP Zero : Performs zero balance.
Configuration : Sets the BP monitoring condition.

⚠ CAUTION	The BP value will not be displayed until the zero balance is performed after discharging or when the main power is turned ON. If BP interface cable or transducer is not connected for 5 minutes or more, the zero balance information will be cleared. Make sure to perform the zero balance. However, if the power is turned ON within 5 minutes after the power is turned OFF, the previous zero balance information will be maintained, and the BP value will be displayed.

BP Label

1 **Press the ⎡Label⎤ key.**

The BP label setup menu will be displayed.
Select the BP label for display and recording.

2 **Select the label.**

Select from ⎡BP*⎤, ⎡ART⎤, ⎡RAP⎤, ⎡RVP⎤, ⎡PAP⎤, ⎡CVP⎤, ⎡ICP⎤, ⎡UAP⎤, ⎡IAP⎤, ⎡LAP⎤, ⎡LVP⎤, ⎡US1⎤, ⎡US2⎤.

【**The Description of Each Label**】

ART   (Arterial Pressure)
RAP   (Right Atrial Pressure)
RVP   (Right Ventricular Pressure)
PAP   (Pulmonary Artery Pressure)
CVP   (Central Venous Pressure)
ICP   (Intra-cranial Pressure)
UAP   (Umbilical Artery Pressure)
IAP   (Intra-aortic Balloon Pumping Pressure)
LAP   (Left Atrial Pressure)
LVP   (Left Ventricular Pressure)
US1   (BP User Label 1)
US2   (BP User Label 2)
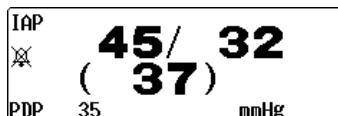
Reference	Refer to "8. System Configuration Label Setup" for procedure to set the BP user label.

●When the BP Label is IAP

When the BP label is IAP, PDP (Peak Diastolic Pressure) will be displayed in addition to systolic, diastolic, and mean pressure.
Please be aware that the Systolic Pressure (SYS) = Peak Systolic Pressure (PSP)
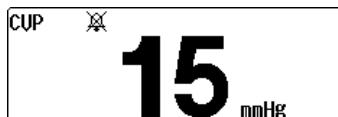
⚠CAUTION	● Note that the Systolic Pressure (SYS) ＝ Peak Systolic Pressure (PSP) for the graphic trend, data base, and alarm setup. ● When ECG is not measured, PDP cannot be calculated.

●When the BP Label is CVP

When the BP label is CVP, the measurement unit can be selected from "mmHg", "kPa" or "cmH$_2$O". The measurement unit can be selected on the preset menu. The selected unit will be displayed on the BP parameter key.

Reference	Refer to "8. System Configuration Hospital Setup" for CVP measurement unit setup.

●When the BP Label is ICP

When the BP label is ICP, labeling the artery pressure as ART will allow measuring the CPP (Cerebral Perfusion Pressure). CPP = Mean Arterial Pressure － Intracranial Pressure.
If CPP is a negative value, the value will not be displayed. Also, the alarm cannot be set for CPP.
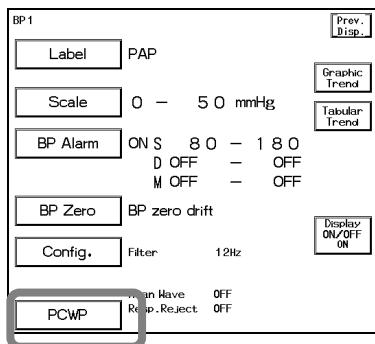
PCWP Measurement
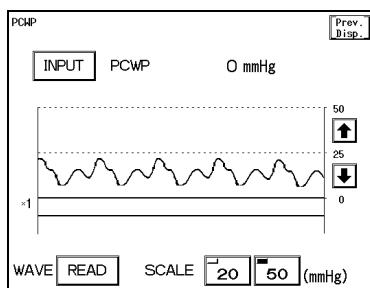
When PAP is set as BP label, the mean value can be displayed as PCWP (Pulmonary Capillary Wedge Pressure).

1 **Set the BP label to PAP, and display the BP menu.**

If the BP label is set to PAP, the ⌐PCWP⌐ key will be displayed on the BP menu.

2 **Press the** ⌐PCWP⌐ **key.**

The PCWP measurement display will appear.

3 **Press the WAVE** ⌐READ⌐ **key.**

PCWP waveform and respiration waveform will be displayed.
The cursor point indicates the current mean pressure.

4 **Use the** ⌐↑⌐, ⌐↓⌐ **keys to manually set the PCWP value.**

Move the cursor to manually set the PCWP value.
Select the waveform scale from 20 or 50mmHg.

5 **Press the** ⌐INPUT⌐ **key.**
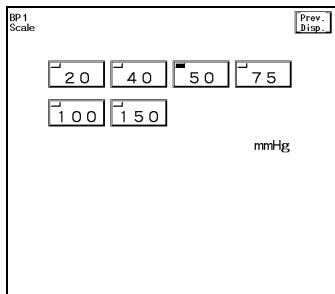
Press the ⌐INPUT⌐ key when the PCWP value is correctly set.
The PCWP value will be displayed inside the PAP (BP label) parameter box with the measurement time.
Also, the value will be input to the graphic trend.

BP Scale

1 **Press the** [Scale] **key**

The BP scale setup menu will be displayed.
Select the full scale for displaying and recording.
The scale selection will differ depending on the label.

BP Label	Scale
BP1 to BP5, UAP, User Label	20, 50, 75, 100, 150, 200, 250, 300 (mmHg)
	4, 8, 12, 16, 20, 24, 32, 40 (kPa)
ART, LVP, IAP	50, 75, 100, 150, 200, 250, 300 (mmHg)
	8, 12, 16, 20, 24, 32, 40 (kPa)
PAP, RVP	20, 40, 50, 75, 100, 150 (mmHg)
	4, 6, 8, 12, 16, 20 (kPa)
CVP, RAP, LAP	10, 20, 30, 40, 50 (mmHg)
	2, 4, 5, 6, 8 (kPa)
	20, 40 (cmH$_2$O) * only for CVP
ICP	5, 10, 15, 20, 50, 100 (mmHg)
	1, 2, 3, 4, 8, 16 (kPa)
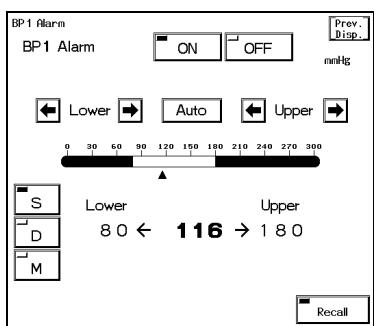
2 **Select one scale from the displayed selection.**

⚠CAUTION	The BP waveform with a scale above the programmed scale will not be properly transmitted on a wireless network. Select a proper scale for the waveform.

BP Alarm

1 **Press the** [BP Alarm] **key.**

The BP alarm setup menu will be displayed.
Select ON/OFF for BP alarm and set the upper and lower alarm limit for systolic (S), diastolic (D), and mean (M) BP.

The alarm value should be set for each unit. (mmHg / kPa)
The adjustable increment will be according to the "BP Alarm Increment" setting. (Normal / Small).
The adjustable increment for upper and lower limit changes from 50mmHg / 7kPa.

	"BP Alarm Increment" Setup	
	When [Normal]	When [Small]
0 to 50mmHg	2mmHg increment	1mmHg increment
50 to 300mmHg	5mmHg increment	
0 to 7kPa	0.2kPa increment	0.1kPa increment
7 to 40.0kPa	0.5kPa increment	

Key	Item	Description
`ON` `OFF`	Individual Alarm	Selecting `ON` will generate BP alarm. Selecting `OFF` will not generate BP alarm.

`S`
`D`
`M`
		Select from S (systolic BP), D (diastolic BP), M (mean BP).

`←` Lower `→`	Lower Alarm Limit	Sets the lower alarm limit (0 to 295mmHg / 0 to 39.5kPa). Setting the value equal to or below 0mmHg/0kPa will turn OFF the alarm.
`←` Upper `→`	Upper Alarm Limit	Set the upper limit (2 to 300 mmHg / 0.2 to 40.0kPa). Setting the value equal to or above 300 mmHg / 40.0kPa will turn OFF the alarm.
`Auto`	Automatic Setup	When the BP label is BP1/ART, the upper and lower limit will be automatically set to +40mmHg / +5kPa and −20mmHg / −3kPa respectively from the current value. When the BP label is other than BP1/ART, the upper and lower limit will be automatically set to the current value +20%, −20% respectively from the current value.

To maintain the alarm setting even after the power is turned OFF or after the discharge procedure, store the setting to one of the alarm modes, or select `Backup` for "Alarm" on the "Backup at Discharge" menu (Monitor Setup).
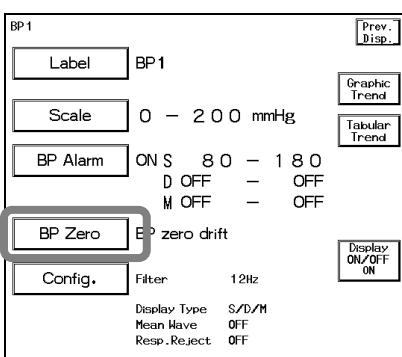
Zero Balance of Pressure Lines

1 **Open the three-way valve of the pressure transducer to air.**

2 **Press the `BP zero` key.**

Verify that the BP waveform is positioned at zero, and "0" is displayed for the BP value. A message, "BP zero complete" will be displayed when the procedure is completed. A message, "BP zero failed" will be displayed when the process fails. The three-way valve may not be opened to air, artifact is present, or the transducer may be defective. Check the cause and try the zero balance procedure again.
A message, "BP zero drift" will be displayed when the interface cable is not connected. Check if the cable is firmly connected.

3 **Close the three-way valve when the zero balance is completed.**
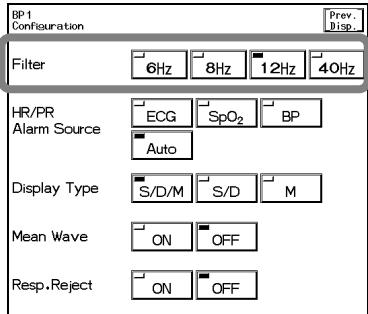
> ⚠ CAUTION　Each time the blood pressure transducer or tubing is replaced, the zero balance procedure is required to ensure accurate measurements.

6

Invasive Blood Pressure (BP1 to BP5)

Filter Selection

Noise may interfere on the BP waveform depending on the combination of BP measurement circuit. Select the appropriate filter from the low-pass filter of 6Hz, 8Hz, 12Hz, or 40Hz.

1 Press the ⌈ Config. ⌉ key.

The configuration menu to select the filter will be displayed.

2 Select the filter.

Select the appropriate filter from ⌈ 6Hz ⌉, ⌈ 8Hz ⌉, ⌈ 12Hz ⌉, ⌈ 40Hz ⌉.
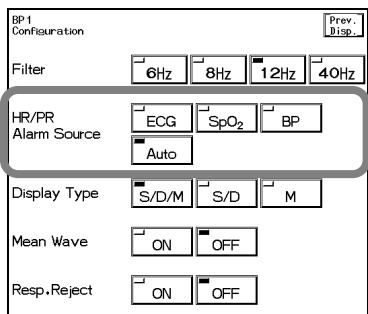
HR/PR Alarm Source (BP1 or ART)

The parameter to display the HR synchronized mark and to generate the HR/PR alarm can be selected from ECG, SpO$_2$, or BP (BP1 or ART). If BP1 and ART are measured simultaneously, ART will be prioritized.

NOTE	This setting will be displayed only when ⌈ ECG/SpO$_2$/BP ⌉ is selected for "HR/PR Alarm Source" on the Monitor Setup (2/4) menu.

1 Press the ⌈ Config. ⌉ key.
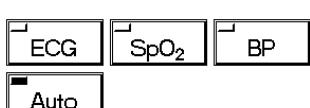
The configuration menu to select the HR/PR alarm source will be displayed.

2 Select a parameter.

⌈ ECG ⌉ will generate the alarm based on HR measured from ECG. HR synchronized mark will be displayed.
⌈ SpO$_2$ ⌉ will generate the alarm based on PR measured from SpO$_2$. SpO$_2$ synchronized mark will be displayed.
⌈ BP ⌉ will generate the alarm based on PR measured from BP (BP1 or ART). BP synchronized mark will be displayed.
However ⌈ BP ⌉ can be selected only when ⌈ ECG/SpO$_2$/BP ⌉ is selected for "HR/PR Alarm Source" of the monitor setup menu.
⌈ Auto ⌉ will automatically select the measurable HR source in the priority of ECG>SpO$_2$>BP. If the corresponding parameter key is displayed, alarm generation will be also effective.

⚠WARNING	• The HR/PR alarm will not be generated unless the parameter key corresponding to the selected HR/PR source is displayed. Be sure to display the parameter key for the HR/PR source.
	• The alarm for the parameter not selected for the "HR/PR Alarm Source" (ECG/SpO$_2$/BP) will be set to OFF on the DS-7600 Central Monitor.
	  • The "HR/PR Alarm Source" setting will synchronize between the bedside monitor and the central monitor.
	  • For example, if PR is set as the HR/PR alarm source on the DS-7200, HR alarm will be set to OFF on the central monitor.

⚠CAUTION	In case of DS-LANII network, if the HR/PR source is $\boxed{\text{BP}}$ (Or, if $\boxed{\text{Auto}}$ selects BP for HR/PR source), the ECG waveform will not be transmitted on the network. On the central monitor, PR_IBP value will be displayed instead of HR. However, on some central monitor depending on the model type, the HR value from ECG will be displayed on the NIBP list and ST measurement list. Refer to the operation manual for the respective central monitor. In case of DS-LANIII network, refer to the operation manual for the central monitor.

NOTE	• If the HR/PR alarm source is BP, the PR will be displayed as "---" if the corresponding BP (ART or BP1) is not measured. • If $\boxed{\text{SpO}_2}$ is selected for "Pulse Tone" (ECG config.), the synchronized mark will be displayed inside the PR_SpO$_2$ numeric data box regardless of the HR/PR alarm source setup.

Display Selection of Numeric Data

The display type of BP numeric data can be selected from systolic / diastolic / mean, systolic / diastolic, or mean BP. The BP alarm will not be generated unless the data is displayed.
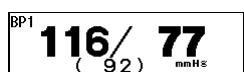
If the BP label is CVP, IAP, ICP or PAP, the display type is fixed. The selection is possible only for the BP labels other than above.

1 Press the $\boxed{\text{Config.}}$ key.
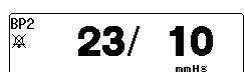
The display type selection will be displayed.

2 Select the display type.

  $\boxed{\text{S/D/M}}$ will display the systolic / diastolic / mean pressure.

  $\boxed{\text{S/D}}$ will display the systolic / diastolic pressure.

  $\boxed{\text{M}}$ will display only the mean pressure.
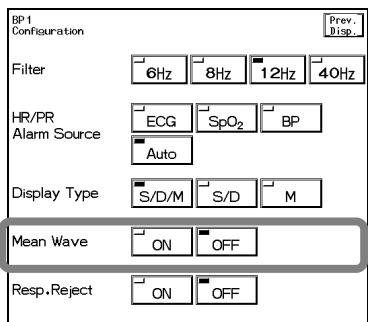
⚠ CAUTION	The undisplayed BP data (SYS/DIA/Mean) will not generate a BP alarm or be displayed in the tabular trend. Select the appropriate display type according to the monitoring purpose.

Mean BP Waveform Display

The mean BP waveform can be selected to be continuously displayed on the home display.

1 **Press the** **Config.** **key.**

The mean waveform display selection will be displayed.

2 **Select ON/OFF of mean BP waveform display.**
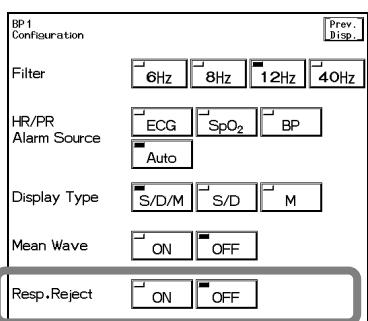
Selecting **ON** will display the mean BP waveform and "MEAN_WAVE" will be displayed inside the parameter key.

Respiration Rejection Filter

The BP waveform baseline drift caused by the respiration influence can be prevented by setting the respiration rejection filter ON.

1 **Press the** **Config.** **key.**
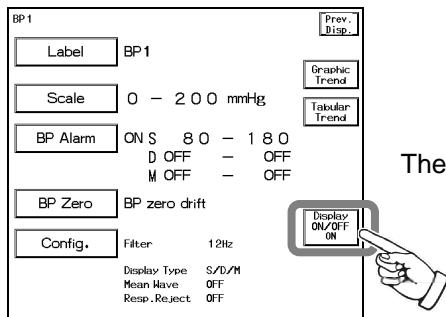
The respiration rejection filter selection will be displayed.
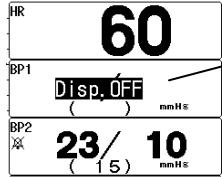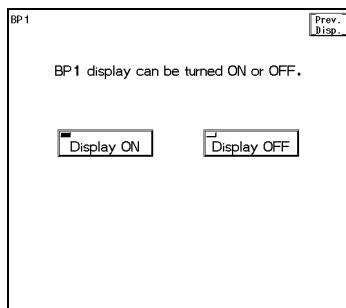
2 **Select** **ON** **or** **OFF** **for the respiration rejection filter.**

ON/OFF of Parameter Display

1 **Press the** Display ON/OFF **key.**

The confirmation screen for ON/OFF of BP display will appear.

2 **Select** Display ON **or** Display OFF **.**

Pressing the Display ON key will display the waveform and numeric data.
Pressing the Display OFF key will not display the waveform and numeric data.
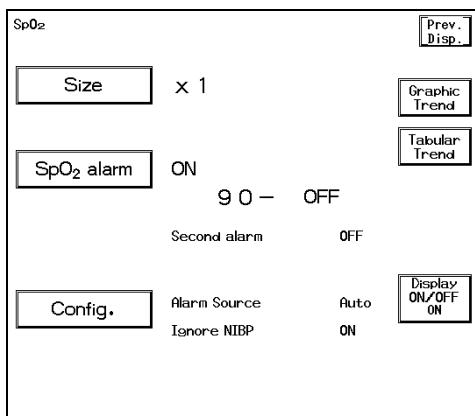
The Display OFF message will be displayed inside the parameter key.

⚠CAUTION	● When waveform and numeric data display is set to OFF, the alarm generation and tabular/graphic trend will be suspended. ● If the display of waveform / numeric data labeled as BP1 or ART is set to OFF, the pulse rate derived from BP will not be displayed either.

This menu allows setting the SpO$_2$ monitoring condition.

```
SpO2                                        Prev.
                                            Disp.

   Size            × 1                     Graphic
                                            Trend

                                            Tabular
   SpO2 alarm      ON                       Trend

                   90-    OFF

                 Second alarm    OFF

                                           Display
   Config.       Alarm Source    Auto      ON/OFF
                                             ON
                 Ignore NIBP     ON
```

Size   : Sets the SpO$_2$ waveform size.
SpO$_2$ Alarm   : Sets ON/OFF of the alarm, upper and lower alarm limit, and SEC alarm.
Configuration : Sets the SpO$_2$ monitoring configuration.
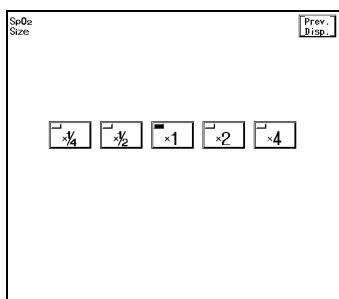
⚠CAUTION	• Take the following precautions when monitoring over a long period of time.
	  • To avoid skin rash or low-temperature burn, it is recommended to change the measurement position several times a day, which is specified for each SpO$_2$ sensor.
	    Be especially careful when continuously using on neonates, infants, or patients with peripheral circulatory disturbance.
	  • Excessive light may cause inaccurate measurements. In such cases, cover the sensor with opaque material.
	  • When not performing the measurement, unplug the relay cable and sensor from the SpO$_2$ connector. Otherwise, the measurement data may be erroneously displayed by the ambient light.
	  • The pulse wave is normalized for SpO$_2$ measurement. It does not indicate perfused blood volume. Check proper probe attachment by observing the pulse wave.
	• Precautions for Reusable Type Sensor (DS-100A)
	  • The DS-100A is intended for use on finger of adults weighing over 40 kg (approximate). Do not use them on children or neonates. Also do not apply them on the thumb or toe.
	  • The light-emitting part of the sensor should be over the root of the fingernail. Do not insert the finger too far into the sensor as it may hurt the patient.
	  • The DS-100A must be moved to a new site at least every 4 hours. Because individual skin condition affects the ability of the skin to tolerate sensor placement, it may be necessary to change the sensor site more frequently with some patients. If skin integrity changes, move the sensor to another site.
	• Precautions for Single-Patient-Use Type Sensors
	  • Do not wind the tape too strong. It may obstruct the blood flow.
	  • The sensor is contraindicated for use on patients who exhibit allergic reactions to the adhesive tape.
	  • The sensor can be reused on the same patient as long as the adhesive tape attaches without slippage. But do not reuse on other patients. It is intended for single patient use only.
	  • For the single patient use type sensors, the site must be inspected every 8 hours (MAX-FAST: 12 hours) to ensure adhesion, skin integrity, and correct optical alignment. If skin integrity changes, move the sensor to another site.
	  • Do not reuse the sensor by resterilizing it.
	  • Dispose the sensor after use. In the event of damage to the sterile packaging, do not use it.

<table>
<tr><td rowspan="3">⚠ C A U T I O N</td><td>● Measuring on a limb with NIBP cuff, arterial catheter, or intracatheter may result in incorrect measurement.</td></tr>
<tr><td>● For additional warnings, cautions, or contraindications when using sensors with the DS-7210 Nellcor® model, refer to each SpO₂ sensor instruction manual.</td></tr>
<tr><td>● If measurement failure occurs due to the reason such as sensor detachment from the patient, measurement data will be displayed as "– – –". Be cautious as numeric data alarm will not generate in such case.</td></tr>
</table>

SpO₂ Waveform Size

1 **Press the** ⟨ Size ⟩ **key.**

The SpO₂ waveform size setup menu will be displayed.
Select the waveform size for displaying and recording.

2 **Select the waveform size.**
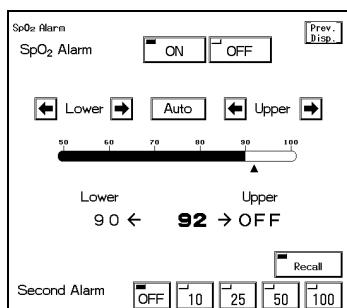
Select the size from ⟨ ×1/4 ⟩, ⟨ ×1/2 ⟩, ⟨ ×1 ⟩, ⟨ ×2 ⟩, ⟨ ×4 ⟩.

SpO₂ Alarm

1 **Press the** ⟨ SpO₂ Alarm ⟩ **key to display the alarm setup menu.**

Select ON/OFF of SpO₂ alarm, and set the upper and lower alarm limit.
Also, when the SpO₂ value is unstable around the lower alarm limit, the frequently generated alarm can be corrected by setting the SEC (second) alarm function.

Reference: Refer to "4. Monitoring Setup   SpO₂ SEC Alarm Setup" for details of SEC alarm setup procedure.

The upper and lower limits can be set in 1% increment.

Key	Item	Description
⟨ ON ⟩ ⟨ OFF ⟩	Individual Alarm	Selecting ⟨ ON ⟩ will generate the SpO₂ alarm. Selecting ⟨ OFF ⟩ will not generate the SpO₂ alarm.
⟨ ← Lower → ⟩	Lower Alarm Limit	Sets the lower alarm limit (50 to 99%). Setting the value below 50% will turn OFF the alarm.
⟨ ← Upper → ⟩	Upper Alarm Limit	Sets the upper alarm limit (51 to 100%). Setting the value above 100% will turn OFF the alarm.
⟨ Auto ⟩	Automatic Setup	Automatically sets the upper limit to OFF, and the lower limit to 90%.

<table>
<tr><td>⚠ C A U T I O N</td><td>Whether to use the SEC (second) alarm function and its threshold selection should be based on the patient's clinical indication and medical evaluation.</td></tr>
</table>

To maintain the alarm setting even after the power is turned OFF or after the discharge procedure, store the setting to one of the alarm modes, or select Backup for "Alarm" on the "Backup at Discharge" menu (Monitor Setup).

| Reference | For the alarm mode setup procedure, refer to "8. System Configuration   Alarm Mode". |

HR/PR Alarm Source

The parameter to display the HR synchronized mark and to generate the HR/PR alarm can be selected from ECG, SpO$_2$, and BP (BP1 or ART).

| NOTE | The BP key will be displayed only when ECG/SpO$_2$/BP is selected for "HR/PR Alarm Source" on the Monitor Setup (2/4) menu. |

1 **Press the Config. key.**

```
SpO₂                              Prev.
Configuration                     Disp.

HR/PR Alarm Source   ┌─┐      ┌─┐      ┌─┐
                     │ECG│    │SpO₂│   │ BP │
                     └──┘     └──┘     └──┘
                     ┌──┐
                     │Auto│
                     └──┘

Ignore NIBP          ┌──┐     ┌──┐
                     │ON│     │OFF│
                     └──┘     └──┘
```

The configuration menu to select the HR/PR source will be displayed.

2 **Select a parameter.**

┌─┐   ┌─┐   ┌─┐
│ECG│ │SpO₂│ │ BP │
└──┘   └──┘   └──┘
┌──┐
│Auto│
└──┘

Selecting ECG will generate the alarm based on HR measured from ECG. HR synchronized mark will be displayed.

Selecting SpO$_2$ will generate the alarm based on PR measured from SpO$_2$. SpO$_2$ synchronized mark will be displayed.

Selecting BP will generate the alarm based on PR measured from BP (BP1 or ART). BP synchronized mark will be displayed.

 BP can be selected only when ECG/SpO$_2$/BP is selected for "HR/PR Alarm Source" of the monitor setup menu.

Selecting Auto will automatically select the measurable HR source in the priority of ECG>SpO$_2$>BP. If the corresponding parameter key is displayed, alarm generation will be also effective.

| ⚠ WARNING | ● The HR/PR alarm will not be generated unless the parameter key corresponding to the selected HR/PR source is displayed. Be sure to display the parameter key for the HR/PR source.
● The alarm for the parameter not selected for the "HR/PR Alarm Source" (ECG/SpO$_2$/BP) will be set to OFF on the DS-7600 Central Monitor.
• The "HR/PR Alarm Source" setting will synchronize between the bedside monitor and the central monitor.
• For example, if PR is set as the HR/PR alarm source on the DS-7200, HR alarm will be set to OFF on the central monitor. |

	In case of DS-LANII network, if the HR/PR source is ⎡BP⎤ (Or, if ⎡Auto⎤ selects BP for HR/PR source), the ECG waveform will not be transmitted on the network. On the central monitor, PR_IBP value will be displayed instead of HR. However, on some central monitor depending on the model type, the HR value from ECG will be displayed on the NIBP list and ST measurement list. Refer to the operation manual for the respective central monitor. In case of DS-LANIII network, refer to the operation manual for the central monitor.
⚠CAUTION	

NOTE	If ⎡SpO₂⎤ is selected for "Pulse Tone" (ECG config.), the synchronized mark will be displayed inside the PR_SpO₂ numeric data box regardless of the HR/PR alarm source setup.

SpO$_2$ Alarm during NIBP Measurement

This setup is to be made when the SpO$_2$ sensor and NIBP cuff is placed on the same limb for measurement.
During the NIBP measurement, the cuff inflation restricts the blood flow which disables the correct detection of the SpO$_2$ value and PR, and may generate an improper alarm.
Selecting ⎡OFF⎤ will not generate the alarm until the NIBP measurement is complete. Similarly, when the HR source is set as ⎡SpO₂⎤, the PR alarm will not be generated during NIBP measurement.

1 **Press the ⎡Config.⎤ key.**

The configuration menu to set "Ignore NIBP" will be displayed.
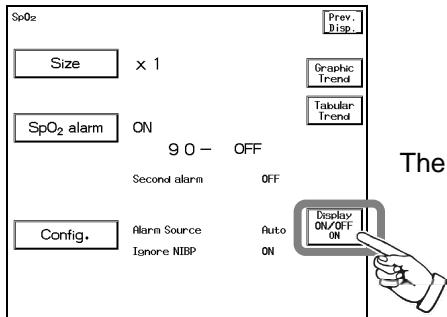
2 **Select ⎡ON⎤ or ⎡OFF⎤.**

⎡ON⎤ will generate the alarm during NIBP measurement.
⎡OFF⎤ will not generate the SpO$_2$/PR alarm during NIBP measurement.
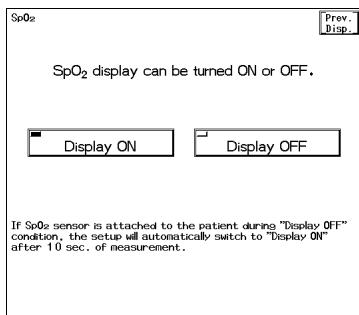
ON/OFF of Parameter Display

1 **Press the** Display ON/OFF **key.**

SpO₂
Prev. Disp.

Size   × 1

Graphic Trend

Tabular Trend

SpO₂ alarm   ON
90 –   OFF
Second alarm   OFF

Config.   Alarm Source   Auto
Ignore NIBP   ON
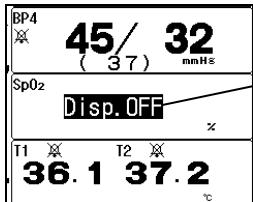
Display ON/OFF ON

The confirmation display for ON/OFF of SpO₂ display will appear.

2 **Select** Display ON **or** Display OFF **.**

SpO₂
Prev. Disp.

SpO₂ display can be turned ON or OFF.

Display ON   Display OFF

If SpO₂ sensor is attached to the patient during "Display OFF" condition, the setup will automatically switch to "Display ON" after 10 sec. of measurement.

Pressing the Display ON key will display the waveform and numeric data.
Pressing the Display OFF key will not display the waveform and numeric data.

BP4
45/ 32
(37)   mmHg
SpO₂
Disp.OFF
%
T1   T2
36.1 37.2
℃
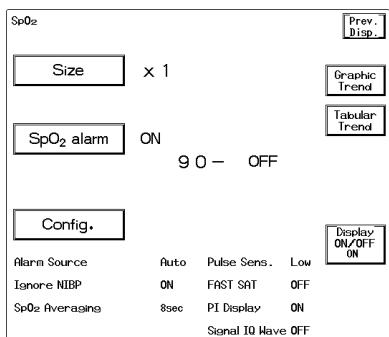
The Disp. OFF message will be displayed inside the parameter key.

When SpO₂ sensor is attached to the patient with the SpO₂ display set to OFF, and SpO₂ is measured for 10 seconds, the SpO₂ waveform and numeric data will be automatically displayed.

| ⚠ CAUTION | ● When the waveform and numeric data display is set to OFF, the alarm generation and tabular/graphic trend input will also be suspended. |
| | ● When the waveform and numeric data display is set to OFF, the pulse rate derived from SpO₂ will not be displayed either. |

This menu allows the setup of SpO$_2$ monitoring condition for DS-7210M (Masimo© Model).

SpO₂	Prev. Disp.
Size × 1	Graphic Trend
	Tabular Trend
SpO₂ alarm ON 9 0 — OFF	
Config.	Display ON/OFF ON

Alarm Source   Auto   Pulse Sens.   Low
Ignore NIBP   ON   FAST SAT   OFF
SpO₂ Averaging   8sec   PI Display   ON
                             Signal IQ Wave OFF

Size   : Sets the pulse wave size
SpO$_2$ Alarm   : Sets ON/OFF of SpO$_2$ alarm, upper and lower alarm limit.
Configuration   : Sets the SpO$_2$ monitoring condition.
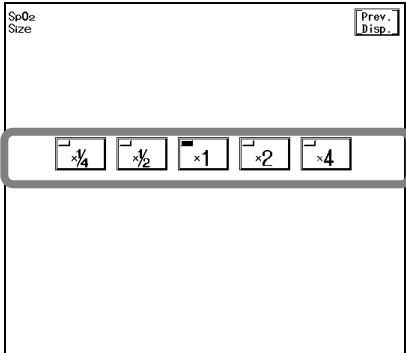
⚠ CAUTION	- Take the following precautions when monitoring over long periods of time. - To avoid skin rash or low-temperature burn, it is recommended to change the measurement position several times a day, which is specified for each SpO$_2$ sensor. Be especially careful when continuously using on neonates, infants, or patients with peripheral circulatory disturbance. - Excessive light may cause inaccurate measurements. In such cases, cover the sensor with opaque material. - When not performing the measurement, unplug the relay cable and sensor from the SpO$_2$ connector. Otherwise, the measurement data may be erroneously displayed by the ambient light. - The pulse wave is normalized for SpO$_2$ measurement. It does not indicate perfused blood volume. Check proper probe attachment by observing the pulse wave. - Precautions for Reusable Type Sensor (LNOP® DCI) - The light-emitting part of the sensor should be over the root of the fingernail. Do not insert the finger too far into the sensor as it may hurt the patient. - Precautions for Single-Patient-Use Type Sensors - Do not wind the tape too strong. It may obstruct the blood flow. - The sensor is contraindicated for use on patients who exhibit allergic reactions to the adhesive tape. - The Masimo® LNOP sensor can be reused on the same patient as long as the light emitting and receiving part is clean, and if it is still adhesive to the skin. But do not reuse it on other patients. It is intended for single patient use only. - Do not reuse the sensor by resterilizing it. - Dispose the sensor after use. In the event of damage to the sterile packaging, do not use it. - Change the sensor attachment site every 4 hours for the reusable sensor, and every 8 hours for the single patient use type sensor. Exercise extreme caution with poorly perfused patients; skin erosion and pressure necrosis can be caused when the sensor is not frequently moved. Assess site at least every 2 hours with poorly perfused patients. - Measuring on a limb with NIBP cuff, arterial catheter, or intracatheter may result in incorrect measurement. - For additional warnings, cautions, or contraindications when using sensors with the DS-7210M Masimo® model, refer to each SpO$_2$ sensor instruction manual. - The measurable pulse rate range is 25 to 240bpm. However, "xxx" will be displayed if 25bpm and below or 240bpm and above is measured. - If measurement failure occurs due to the reason such as sensor detachment from the patient, measurement data will be displayed as "– – –". Be cautious as numeric data alarm will not generate in such case.

NOTE	The pulse wave for the Masimo® model (DS-7210M) will be displayed with approximately 630msec delay from the actual pulse.

Pulse Wave Size

1 **Press the** ⎡Size⎤ **key.**
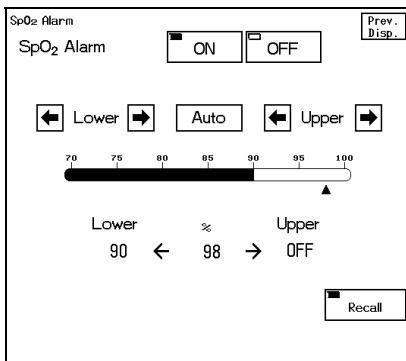
Select the waveform size for displaying and recording from ⎡×1/4⎤, ⎡×1/2⎤, ⎡×1⎤, ⎡×2⎤, ⎡×4⎤.

SpO2
Size   ⎡Prev.⎤
        ⎣Disp.⎦

⎡×¼⎤ ⎡×½⎤ ⎡×1⎤ ⎡×2⎤ ⎡×4⎤

SpO₂ Alarm

1 **Press the** ⎡SpO₂ Alarm⎤ **key to display the alarm setup menu.**

Select ON/OFF of SpO₂ alarm, and set the upper and lower alarm limit.

SpO2 Alarm   ⎡Prev.⎤
                              ⎣Disp.⎦
  SpO₂ Alarm   ⎡■ ON⎤ ⎡ OFF⎤

  ⎡←⎤ Lower ⎡→⎤   ⎡ Auto ⎤   ⎡←⎤ Upper ⎡→⎤

  70   75   80   85   90   95   100
  ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▭▭▭▭▭▭
                        ▲

  Lower   %   Upper
   90   ←   98   →   OFF

                        ⎡ Recall ⎤

The upper and lower limits can be set in 1% increment.

Key	Item	Description
⎡■ ON⎤ ⎡ OFF⎤	Individual Alarm	Selecting ⎡ON⎤ will generate the SpO₂ alarm. Selecting ⎡OFF⎤ will not generate the SpO₂ alarm.
⎡←⎤ Lower ⎡→⎤	Lower Alarm Limit	Sets the lower alarm limit (50 to 99%). Setting a value 50% or below will turn OFF the alarm.
⎡←⎤ Upper ⎡→⎤	Upper Alarm Limit	Sets the upper alarm limit (51 to 100%). Setting a value above 100% will turn OFF the alarm.
⎡ Auto ⎤	Automatic Setup	Automatically sets the upper limit to OFF, and the lower limit to 90%.

To maintain the alarm setting even after the power is turned OFF or after the discharge procedure, store the setting to one of the alarm modes, or select ⎡Backup⎤ for "Alarm" on the "Backup at Discharge" menu (Monitor Setup).

Reference	For the alarm mode setup procedure, refer to "8. System Configuration Alarm Mode".

SpO$_2$ Monitoring Condition Setup

Pressing the ⌐Config.⌐ key on the SpO$_2$ setup menu will allow to set the SpO$_2$ measurement condition.
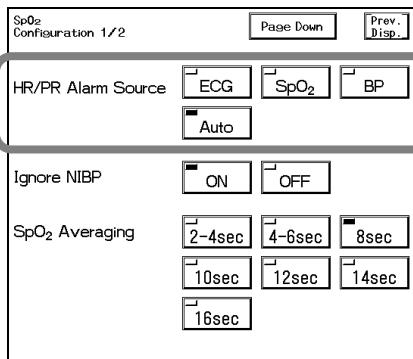
●HR/PR Alarm Source

The parameter to display the HR synchronized mark and to generate the HR/PR alarm can be selected from ECG, SpO$_2$, and BP (BP1 or ART).

NOTE	The ⌐BP⌐ key will be displayed only when ⌐ECG/SpO$_2$/BP⌐ is selected for "HR/PR Alarm Source" on the Monitor Setup (2/4) menu.

1 **Press the ⌐Config.⌐ key.**

Selecting ⌐ECG⌐ will generate the alarm based on HR measured from ECG. HR synchronized mark will be displayed.
Selecting ⌐SpO$_2$⌐ will generate the alarm based on PR measured from SpO$_2$. SpO$_2$ synchronized mark will be displayed.
Selecting ⌐BP⌐ will generate the alarm based on PR measured from BP (BP1 or ART). BP synchronized mark will be displayed.
⌐BP⌐ can be selected only when ⌐ECG/SpO$_2$/BP⌐ is selected for "HR/PR Alarm Source" of the monitor setup menu.
Selecting ⌐Auto⌐ will automatically select the measurable HR source in the priority of ECG＞SpO$_2$＞BP. If the corresponding parameter key is displayed, alarm generation will be also effective.

⚠WARNING	● The HR/PR alarm will not be generated unless the numeric data box corresponding to the selected HR/PR source is displayed. When HR/PR source selection is changed, be sure to display the numeric data box corresponding to the selected HR/PR source. ● The alarm for the parameter not selected for the "HR/PR Alarm Source" (ECG/SpO$_2$/BP) will be set to OFF on the DS-7600 Central Monitor. • The "HR/PR Alarm Source" setting will synchronize between the bedside monitor and the central monitor. • For example, if PR is set as the HR/PR alarm source on the DS-7200, HR alarm will be set to OFF on the central monitor.

⚠CAUTION	In case of DS-LANII network, if the HR/PR source is ⌐BP⌐ (Or, if ⌐Auto⌐ selects BP for HR/PR source), the ECG waveform will not be transmitted on the network. On the central monitor, PR_IBP value will be displayed instead of HR. However, on some central monitor depending on the model type, the HR value from ECG will be displayed on the NIBP list and ST measurement list. Refer to the operation manual for the respective central monitor. In case of DS-LANIII network, refer to the operation manual for the central monitor.

NOTE	● If PR source is set to BP, make sure to measure the corresponding BP (BP1 or ART). Otherwise PR will be displayed as "－－－". ● If ⌐SpO$_2$⌐ is selected for "Pulse Tone" (ECG config.), the synchronized mark will be displayed inside the PR_SpO$_2$ numeric data box regardless of the HR/PR alarm source setup.

●SpO$_2$ Alarm during NIBP Measurement (Ignore NIBP)

This setup can be used when the SpO$_2$ sensor and the NIBP cuff is placed on the same limb for measurement. During the NIBP measurement, the cuff inflation restricts the blood flow which disables the correct detection of SpO$_2$ and may generate an improper alarm.
Selecting   OFF   for "Ignore NIBP" will not generate a SpO$_2$ alarm until the NIBP measurement is complete. Similarly, when the PR source is SpO$_2$, the PR alarm will not be generated during NIBP measurement.

1 **Press the   Config.   key.**

SpO$_2$
Configuration 1/2   [Page Down]   [Prev. Disp.]

HR/PR Alarm Source   [ECG] [SpO$_2$] [BP]
                     [Auto]

Ignore NIBP   [ON] [OFF]

SpO$_2$ Averaging   [2-4sec] [4-6sec] [8sec]
                     [10sec] [12sec] [14sec]
                     [16sec]
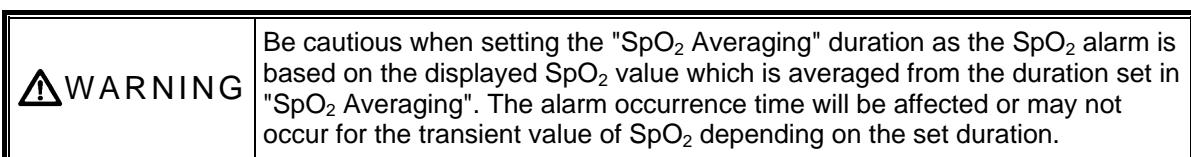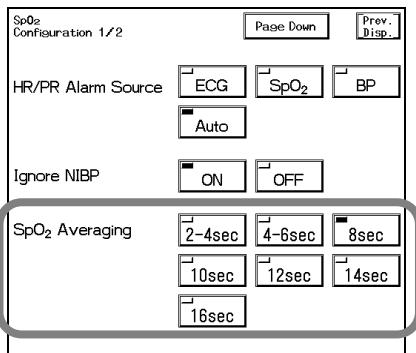
  ON   will generate an alarm during NIBP measurement.
  OFF   will not generate a SpO$_2$/PR alarm during NIBP measurement.

●SpO$_2$ Averaging

The averaging time for SpO$_2$ value can be selected.

$\triangle$WARNING	Be cautious when setting the "SpO$_2$ Averaging" duration as the SpO$_2$ alarm is based on the displayed SpO$_2$ value which is averaged from the duration set in "SpO$_2$ Averaging". The alarm occurrence time will be affected or may not occur for the transient value of SpO$_2$ depending on the set duration.

1 **Set the SpO$_2$ averaging time.**

SpO$_2$
Configuration 1/2   [Page Down]   [Prev. Disp.]

HR/PR Alarm Source   [ECG] [SpO$_2$] [BP]
                     [Auto]

Ignore NIBP   [ON] [OFF]

SpO$_2$ Averaging   [2-4sec] [4-6sec] [8sec]
                     [10sec] [12sec] [14sec]
                     [16sec]
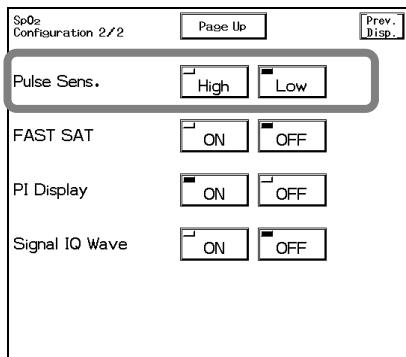
Select the averaging time from   2-4sec   /   4-6sec   /   8sec   /   10sec   /   12sec   /   14sec   /   16 sec .

●Pulse Wave Detection Sensitivity

The sensitivity to detect the pulse wave can be selected from high or low.

1 **Press the** ⸢ **Config.** ⸥ **→** ⸢ **Page Down** ⸥ **key.**

```
SpO₂
Configuration 2/2      Page Up         Prev.
                                        Disp.

Pulse Sens.         ⌐      ▪
                    │High  │Low

FAST SAT            ▪      ⌐
                    │ON    │OFF

PI Display          ▪      ⌐
                    │ON    │OFF

Signal IQ Wave      ⌐      ▪
                    │ON    │OFF
```

For standard use, select ⸢ Low ⸥.
To improve the low perfusion condition, or to perform fast tracking when the SpO₂ value changes abruptly, select ⸢ High ⸥.
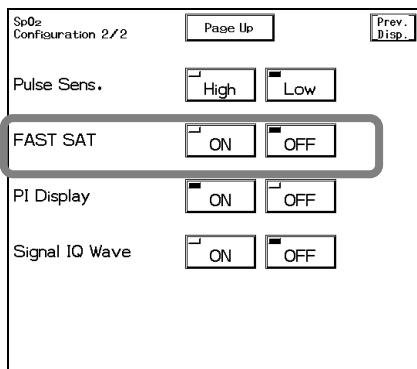
⚠ CAUTION	If ⸢ High ⸥ is selected for pulse wave sensitivity, sensor-detached detection will become somewhat inaccurate.

●FAST SAT Setup

By selecting ON for "FAST SAT", abrupt change of the SpO₂ value can be monitored.

NOTE	To pick up the abrupt change of the value sooner, and to take advantage of the qualities of FAST SAT mode, it is recommended to set ⸢ 2-4sec ⸥ for SpO₂ averaging time when FAST SAT is set ON.

1 **Select ON/OFF for "FAST SAT".**

```
SpO₂
Configuration 2/2      Page Up         Prev.
                                        Disp.

Pulse Sens.         ⌐      ▪
                    │High  │Low

FAST SAT            ⌐      ▪
                    │ON    │OFF

PI Display          ▪      ⌐
                    │ON    │OFF

Signal IQ Wave      ⌐      ▪
                    │ON    │OFF
```

Select from ⸢ ON ⸥ or ⸢ OFF ⸥.

●PI Display

Whether or not to display the PI (Perfusion Index) data can be selected.
The perfusion index is calculated by pulsatile signal ÷ apulsatile signal ×100, and indicates patient's circulation condition. This can be used to find a good perfusion site to attach the sensor. Also, it can be used as diagnosis index to predict the patient's critical condition when at low perfusion.

1 Select ON/OFF of PI Display.

```
SpO₂
Configuration 2/2     Page Up              Prev.
                                           Disp.

Pulse Sens.        ⌐ High   ┌ Low

FAST SAT           ⌐ ON     ┌ OFF

PI Display         ⌐ ON     ┌ OFF

Signal IQ Wave     ⌐ ON     ┌ OFF
```

The setup menu to set the PI display will be displayed.

2 Select from ☐ ON ☐ or ☐ OFF ☐.

```
SpO₂
          92 %
PI  7.00
```

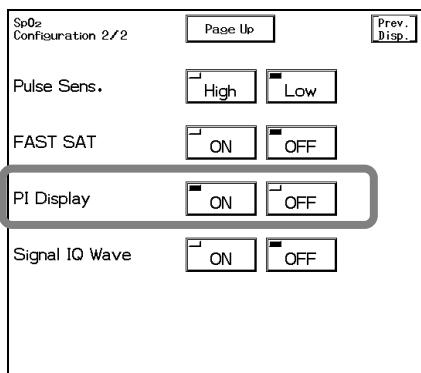☐ ON ☐ will display the perfusion index.

```
SpO₂
          92 %
```

☐ OFF ☐ will not display the perfusion index.

> ⚠ CAUTION | If ☐ OFF ☐ is selected, "SpO₂ Low Perfusion" alarm will be indicated by message display only. The alarm sound will not be generated.

●Signal IQ Wave Display

Whether or not to display the signal IQ wave can be selected.
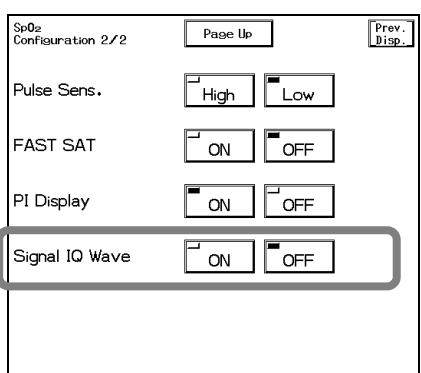
The signal IQ wave indicates the signal force and pulse wave timing.
The vertical length indicates the signal quality. A low vertical line indicates a bad signal quality.

> NOTE | The signal IQ wave cannot be recorded.
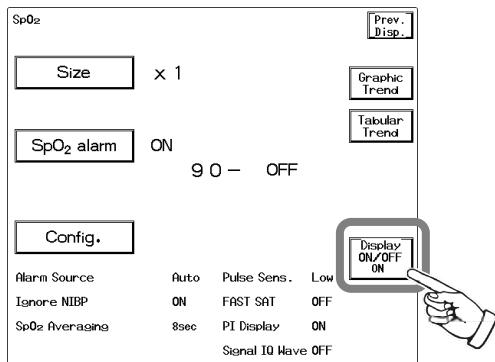
1 Set ON/OFF of Signal IQ Wave display.

```
SpO₂
Configuration 2/2     Page Up              Prev.
                                           Disp.

Pulse Sens.        ⌐ High   ┌ Low

FAST SAT           ⌐ ON     ┌ OFF

PI Display         ⌐ ON     ┌ OFF

Signal IQ Wave     ⌐ ON     ┌ OFF
```
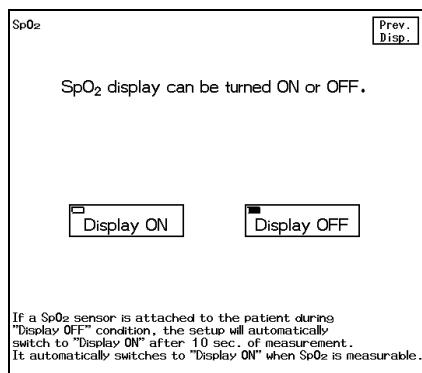
Select ☐ ON ☐ (display) or ☐ OFF ☐ (not display).

ON/OFF of Parameter Display
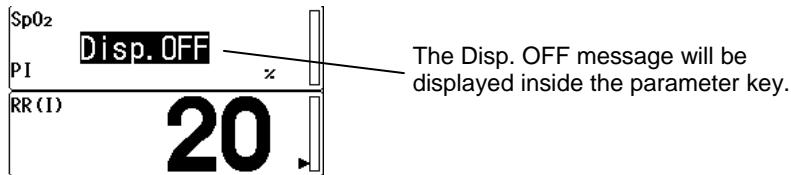
1 **Press the** [Display ON/OFF] **key.**

2 **Select** [Display ON] **or** [Display OFF].

Pressing the [Display ON] key will display the waveform and numeric data.
Pressing the [Display OFF] key will not display the waveform and numeric data.

The Disp. OFF message will be displayed inside the parameter key.
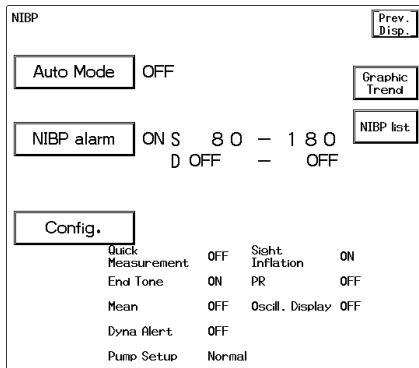
When SpO$_2$ sensor is attached to the patient with the SpO$_2$ display set to OFF, and SpO$_2$ is measured for 10 seconds, the pulse wave and numeric data will be automatically displayed.

⚠ CAUTION	● When the waveform and numeric data display is set to OFF, the alarm generation and list/trend input will also be suspended. ● When the waveform and numeric data display is set to OFF, the pulse rate derived from SpO$_2$ will not be displayed either.

Non-Invasive Blood Pressure

This menu allows setting the NIBP monitoring condition.

NIBP	Prev. Disp.
Auto Mode OFF	Graphic Trend
NIBP alarm ON S 80 — 180	NIBP list
D OFF — OFF	
Config.	

Quick Measurement   OFF   Sight Inflation   ON
End Tone   ON   PR   OFF
Mean   OFF   Oscill. Display   OFF
Dyna Alert   OFF
Pump Setup   Normal

Auto Mode   : Sets the automatic interval measurement and starts the 1-minute interval measurement and quick measurement.
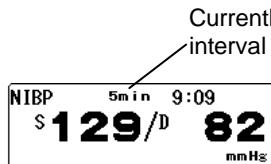NIBP Alarm   : Sets ON/OFF of the NIBP alarm and upper / lower limit of systolic, diastolic, and mean value of NIBP.
Configuration : Sets the NIBP monitoring configuration.

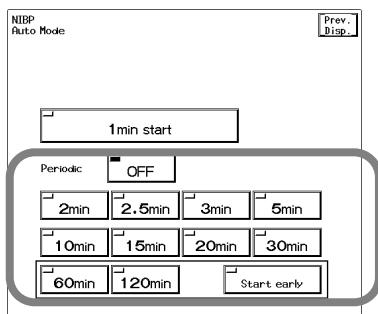| ⚠CAUTION	● Pay attention when measuring the NIBP of patient with bleeding disorders or hypercoagulation. The cuff inflation constricting the arm may cause petechia or circulatory failure with blood clot. ● Check the patient's condition constantly while measuring over a long period of time with interval of 2.5 minutes or less. Also, periodically check the blood circulation while performing periodic measurement over a long period of time. Congestion or rash may occur at the measuring site. ● For the following situation, measurements will be terminated. 　• When the measurement time has exceeded 160 seconds for adult and child, 80 seconds for neonate. 　• When the inflation value has exceeded 300mmHg for adult, 210mmHg for child, and 150mmHg for neonate. ● If used with the incorrect patient type, it will not only cause erroneous measurement, but the inflating level for the adult may be applied to child causing a dangerous situation to the patient.

NIBP Automatic Measurement

Non-invasive blood pressure can be measured automatically at selected time intervals. If Quick measurement is performed during the NIBP automatic measurement, the automatic measurement will automatically resume when Quick measurement completes.

Currently selected time interval

```
NIBP    5min   9:09
 $129/D  82
              mmHg
```

When NIBP automatic measurement is set, the set interval time will be displayed inside the parameter key.

1 **Press the** ⎡Auto Mode⎤ **key.**

The measurement interval setup menu for the automatic measurement will be displayed.

2 **Select the interval time.**

Select from ⎡2min⎤ / ⎡2.5min⎤ / ⎡3min⎤ / ⎡5min⎤ / ⎡10min⎤ / ⎡15min⎤ / ⎡20min⎤ / ⎡30min⎤ / ⎡60min⎤ / ⎡120min⎤.
Select ⎡OFF⎤ if not performing interval measurement.

The measurement starting time will be the integral multiple of the selected interval time beginning with 0 minute.
Ex.) If the present time is 13:14, the measurement starting time will be as follows for each interval time.

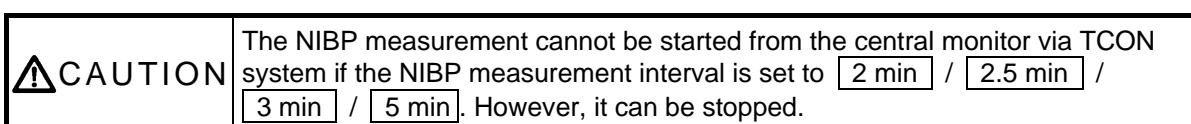   2 min.   : 13:16, 13:18, 13:20, . . .
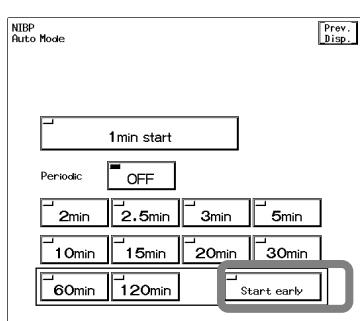   2.5 min. : 13:15, 13:17:30, 13:20, . . .
        3 min.   : 13:15, 13:18, 13:21, . . .
        5 min.   : 13:15, 13:20, 13:25, . . .
        120 min. : 14:00, 16:00, 18:00, . . . (The measurement will start at every even hours.)

⚠CAUTION	The NIBP measurement cannot be started from the central monitor via TCON system if the NIBP measurement interval is set to ⎡2 min⎤ / ⎡2.5 min⎤ / ⎡3 min⎤ / ⎡5 min⎤. However, it can be stopped.

3 **Press** ⎡Start early⎤ **to start the measurement 5 minutes early.**

If ⎡60min⎤ or ⎡120min⎤ is selected for interval time, the measurement will start 5 minutes early.
If outputting the data to PC or other external equipment using the PC communication function of this device, an error may be generated to the NIBP measurement time depending on the input interval of the external equipment. As this device outputs the data at completion of NIBP measurement, if the external equipment inputs the data at 60 minutes interval, 60 minutes time lag will occur. By starting the measurement 5 minutes early, this time lag between the external equipment can be minimized.

NOTE	When using the DS-LANIII network or TCON system and if "Timer" is selected for NIBP measurement on the central monitor, NIBP auto mode will be set OFF on the DS-7200, but the measurement will start at fixed time according to the central monitor setting.
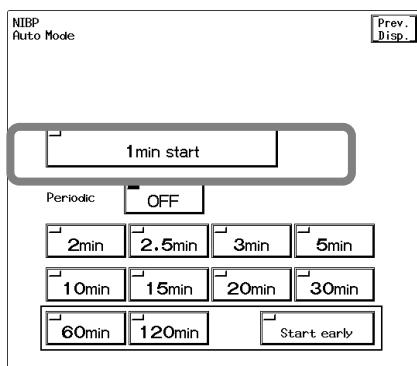
NIBP 1-Minute Interval Measurement

The 1-minute interval measurement will automatically stop after 12 minutes and returns to the previous interval mode setup.

1 Press the | Auto Mode | key.

The NIBP auto mode menu will be displayed.

2 Press the | 1min Start | key to start the 1-minute interval measurement.
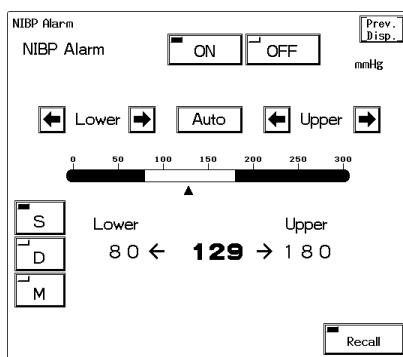
Pressing the | NIBP START/STOP | key will not stop the 1-minute interval measurement. To cancel the measurement, press the | 1min Start | key again.

⚠CAUTION	● The 1-minute interval measurement will always start from 00 second. Pressing the	1min Start	key will start the measurement from the next 00 second. ● The 1-minute interval measurement will automatically stop after 12 minutes and returns to the previous interval mode setup. ● The NIBP measurement cannot be started from the central monitor via TCON system during the 1-minute interval measurement. However, it can be stopped.

NIBP Alarm

1 Press the | NIBP Alarm | key.

The alarm setup menu will be displayed.
Set ON/OFF of the NIBP alarm, upper and lower alarm limits of systolic (S), diastolic (D), mean (M) NIBP.

Set the alarm value for each measurement unit (mmHg / kPa). The upper and lower limit can be set in 5mmHg / 0.5kPa increment.

Key	Item	Description
☐ON ☐OFF	Individual Alarm	Selecting ☐ON☐ will generate a NIBP alarm. Selecting ☐OFF☐ will not generate a NIBP alarm.
☐S ☐D ☐M		Select from S (systolic), D (diastolic), or M (mean).
← Lower →	Lower Alarm Limit	Sets the lower alarm limit (10 to 295mmHg/1.5 to 39.5kPa). Setting the value 10mmHg/1.5kPa or below will turn OFF the alarm.
← Upper →	Upper Alarm Limit	Sets the upper limit (15 to 300mmHg/2.0 to 40.0kPa). Setting a value 300bpm/40.0kPa or above will turn OFF the alarm.
Auto	Automatic Setup	Automatically sets the upper limit to +40mmHg/+5kPa from the current value, and the lower limit to −20mmHg/3kPa from the current value.

⚠CAUTION	NIBP alarm will not generate if the alarm limit outside the NIBP measurement range (10 to 280mmHg) is set.

To maintain the alarm setting even after the power is turned OFF or after a discharge procedure, store the setting to one of the alarm modes, or select ☐Backup☐ for "Alarm" on the "Backup at Discharge" menu (Monitor Setup).
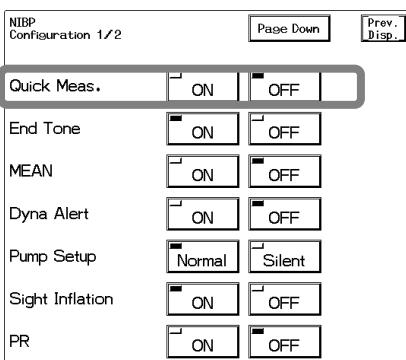
Reference	For the alarm mode setup procedure, refer to "8. System Configuration Alarm Mode". Whether or not to generate an alarm at NIBP measurement failure can be set. (Default: OFF) For details, refer to "4. Monitoring Setup Alarm Setup ON/OFF of Alarm Occurrence at NIBP Failure".

Quick Measurement

The duration of quick measurement can be selected from 3 min., 5 min., or 10 min.
The long duration of continuous measurement may congest the blood stream of the measured location.
Set the duration according to the patient condition.

1 **Press the ☐Config.☐ key.**

```
NIBP
Configuration 1/2          Page Down    Prev.
                                         Disp.

Quick Meas.      ☐ ON    ☐ OFF

End Tone         ☐ ON    ☐ OFF

MEAN             ☐ ON    ☐ OFF

Dyna Alert       ☐ ON    ☐ OFF

Pump Setup       ☐ Normal  ☐ Silent

Sight Inflation  ☐ ON    ☐ OFF

PR               ☐ ON    ☐ OFF
```

The NIBP configuration menu to set the Quick Measurement will be displayed.

2 **Select the measurement duration.**
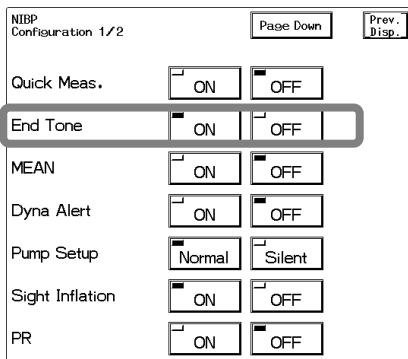
Select ☐ON☐, ☐OFF☐ for quick measurement.
☐ON☐ will perform the measurement in duration of about 20 to 25 seconds in case of adult patient.

NOTE	The quick measurement setting will be effective only when the patient classification is adult or child. If the patient classification is neonate, standard NIBP measurement will be performed regardless of the quick measurement setting.

End of Measurement Tone

By selecting ON for the "End Tone", a tone will be generated when the NIBP measurement completes.

1 **Press the** **Config.** **key.**

```
NIBP
Configuration 1/2         Page Down    Prev.
                                       Disp.

Quick Meas.      □ ON    ■ OFF

End Tone         ■ ON    □ OFF

MEAN             □ ON    ■ OFF

Dyna Alert       □ ON    ■ OFF

Pump Setup       ■ Normal □ Silent

Sight Inflation  ■ ON    □ OFF

PR               □ ON    ■ OFF
```

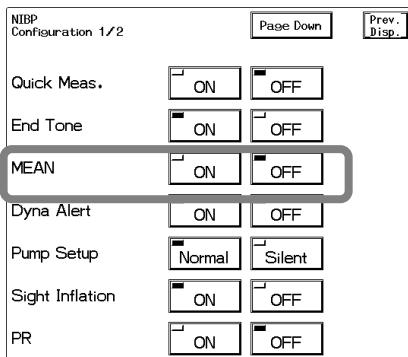The NIBP configuration menu to set the "End Tone" will be displayed.

2 **Select** **ON** **or** **OFF.**

ON will generate a tone when the measurement completes.
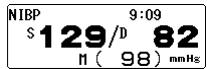**OFF** will not generate a tone when the measurement completes.

Mean BP Display

The ON/OFF of mean BP display can be selected.
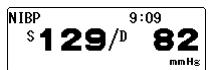
1 **Press the** **Config.** **key.**

```
NIBP
Configuration 1/2         Page Down    Prev.
                                       Disp.

Quick Meas.      □ ON    ■ OFF

End Tone         ■ ON    □ OFF

MEAN             □ ON    ■ OFF

Dyna Alert       □ ON      OFF

Pump Setup       ■ Normal □ Silent

Sight Inflation  □ ON    □ OFF

PR               □ ON    ■ OFF
```

The NIBP configuration menu for setting the mean BP display will be displayed.

2 **Select** **ON** **or** **OFF.**

```
NIBP         9:09
S129/D  82
    M ( 98) mmHg
```

ON will display the mean BP.

```
NIBP         9:09
S129/D  82
         mmHg
```

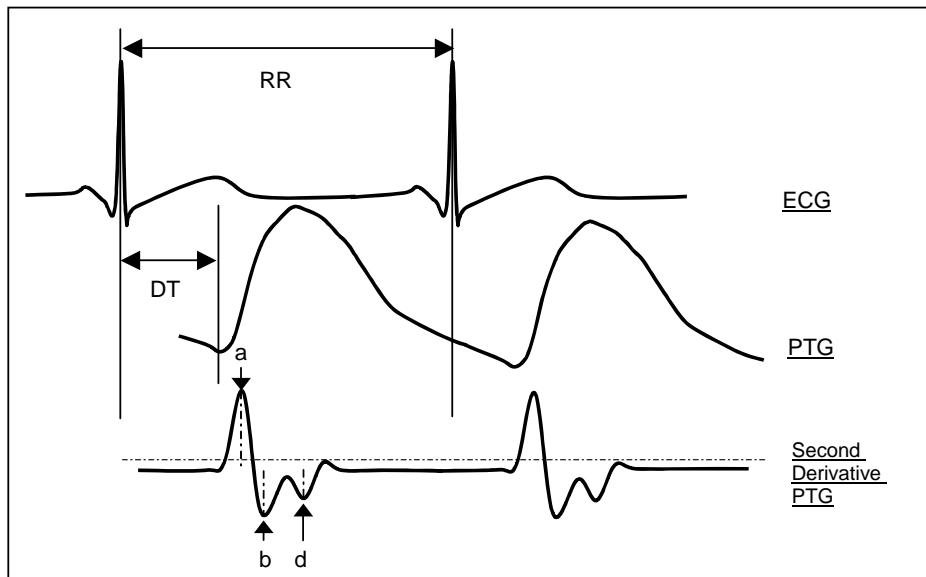**OFF** will not display the mean BP.

⚠CAUTION	If the mean BP display is set to OFF, the mean BP alarm will not be generated. Also, the mean BP will not be displayed for the tabular trend or the NIBP list function if the display is set to OFF.

Dyna Alert Function

Using a cuff allows to measure the blood pressure noninvasively, but on the other hand, there is a demerit of not being able to perform the measurement continuously. Therefore, there is always a risk of sudden blood pressure change in between the periodic measurements.

The Dyna Alert function is a technology to prevent accidents which may occur by this sudden BP change during the non-measured duration by estimating the variation of circulatory dynamics using the parameters obtained from ECG and PTG (photoplethysmograph), and initiating a new NIBP measurement if a change in the circulatory dynamics is detected.

Parameters used for Dyna Alert Function

The Dyna Alert function will operate on the following measurement condition.

Patient Classification   : Adult (20kg or above)
Cuff Applied Site   : Upper arm
SpO_2 Sensor Applied Site : Fingertip
NIBP Measurement Interval : 5 to 60 minutes

⚠ CAUTION	When a PTG (SpO_2) sensor is applied to the toe or forehead, the Dyna Alert may not function depending on the patient's condition.

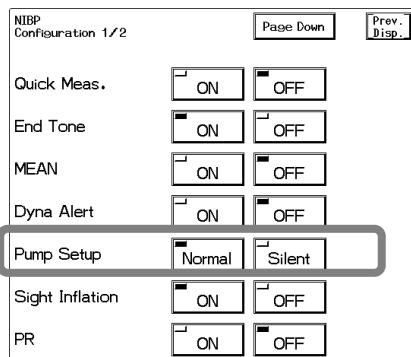**1** **Select ON/OFF of Dyna Alert function.**

ON   will set the Dyna Alert function ON.
OFF will set the Dyna Alert function OFF.

Pump Setup

The pump inflation operation can be selected from normal or silent operation.

1 Display the second page of the NIBP setup menu, and set the "Pump Setup".

NIBP Configuration 1/2		Page Down	Prev. Disp.
Quick Meas.	ON	OFF	
End Tone	ON	OFF	
MEAN	ON	OFF	
Dyna Alert	ON	OFF	
Pump Setup	Normal	Silent	
Sight Inflation	ON	OFF	
PR	ON	OFF	

Silent will inflate with decreased speed to reduce the pump inflating sound.
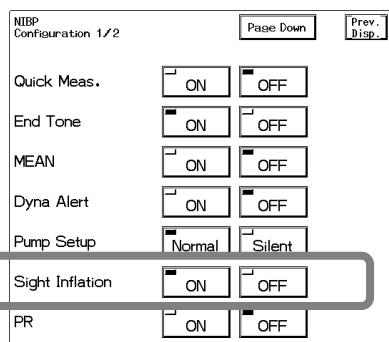
Sight Inflation

When "Sight Inflation" is set to ON, the maximum blood pressure level will be estimated during the inflation process, then 35mmHg will be added and the measurement will start. The inflation speed is slow but allows to detect any sudden increase of blood pressure to prevent re-inflation and discomfort for the patient.
When "Sight Inflation" is set to OFF, it will inflate to the target level set according to the previous measurement result.

NOTE	● The "Sight Inflation" will not function if the patient classification is "Neonate". ● The "Sight Inflation" will not function during 1-minute measurement.

1 Select ON/OFF for "Sight Inflation".

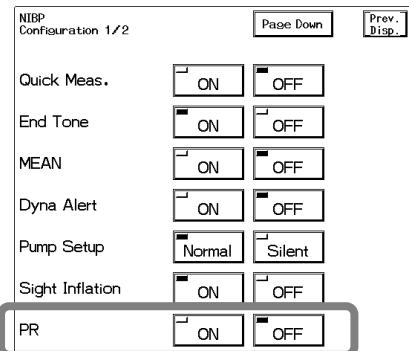| NIBP Configuration 1/2		Page Down	Prev. Disp.
Quick Meas.	ON	OFF	
End Tone	ON	OFF	
MEAN	ON	OFF	
Dyna Alert	ON	OFF	
Pump Setup	Normal	Silent	
Sight Inflation	ON	OFF	
PR	ON	OFF	

ON will set the Sight Inflation ON.
OFF will set the Sight Inflation OFF.
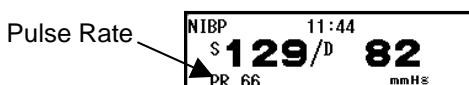
Pulse Rate Display

The pulse rate measured during NIBP measurement can be displayed. This pulse rate is only for display. It will not generate alarm, or be displayed for the list function.

1 **Press the** Config. **keys.**

NIBP Configuration 1/2			Page Down	Prev. Disp.
Quick Meas.	ON	OFF		
End Tone	ON	OFF		
MEAN	ON	OFF		
Dyna Alert	ON	OFF		
Pump Setup	Normal	Silent		
Sight Inflation	ON	OFF		
PR	ON	OFF		

The configuration menu to set the pulse rate display will appear.

2 **Select** ON **or** OFF **.**
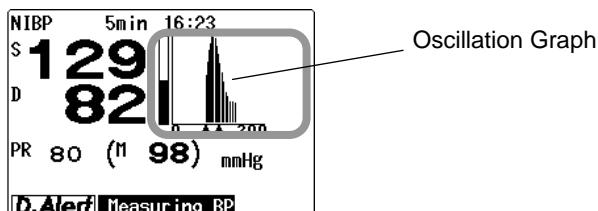
Pulse Rate

NIBP 11:44
^{S}**129**/^{D} **82**
▲ PR 66   mmHg

ON will display the pulse rate.
OFF will not display the pulse rate.

Oscillograph Display
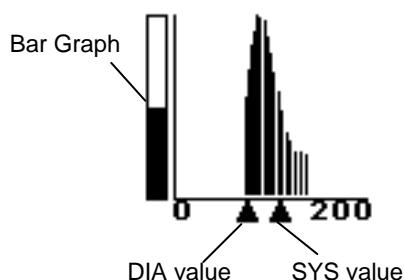
When the NIBP numeric data box size is 2-box size or larger, and "Oscillograph" is set to ON on the NIBP setup menu, the oscillation graph will be displayed inside the NIBP numeric data box.

NIBP 5min 16:23
^{S}**129**
^{D}**82**
PR 80 (^{M} **98**) mmHg
D.Alert Measuring BP

Oscillation Graph

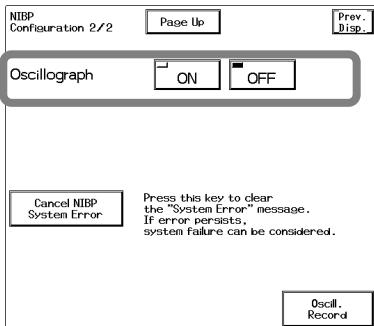The horizontal axis shows the cuff pressure, and vertical axis shows the pulse amplitude with reference to maximum pulse amplitude.
The bar graph shown at left indicates the size of maximum pulse amplitude compared with the reference value. For example, if the maximum pulse amplitude at measurement is 1/2 of the reference value, the bar graph will be half filled in.

Bar Graph

0 ▲ ▲ 200

DIA value   SYS value

1 **Press the** Config. → Page Down **keys.**

```
┌─────────────────────────────────────┐
│ NIBP              ┌────────┐   ┌──────┐│
│ Configuration 2/2 │ Page Up│   │Prev. ││
│                   └────────┘   │Disp. ││
│                                └──────┘│
│ Oscillograph    ┌──────┐┌──────┐       │
│                 │  ON  ││  OFF │       │
│                 └──────┘└──────┘       │
│                                        │
│                                        │
│                                        │
│  ┌─────────┐  Press this key to clear  │
│  │Cancel   │  the "System Error" message.│
│  │NIBP     │  If error persists,       │
│  │System   │  system failure can be considered.│
│  │Error    │                           │
│  └─────────┘                           │
│                            ┌──────┐    │
│                            │Oscill.│    │
│                            │Record │    │
│                            └──────┘    │
└─────────────────────────────────────┘
```
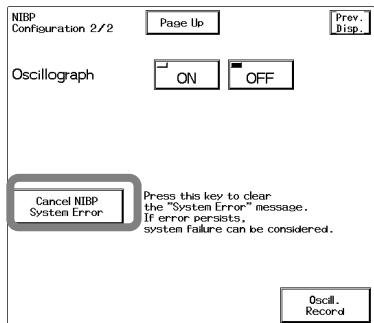
ON will display the oscillation graph inside the NIBP numeric data box and will display Oscill. Record key at lower right of the NIBP configuration menu. Pressing this key will print the displayed oscillation graph on the built-in recorder.

OFF will not display the oscillation graph.

Cancelling the NIBP System Error Message

The displayed NIBP system error message can be cleared.

1 **Press the** Config. → Page Down **key.**

```
┌─────────────────────────────────────┐
│ NIBP              ┌────────┐   ┌──────┐│
│ Configuration 2/2 │ Page Up│   │Prev. ││
│                   └────────┘   │Disp. ││
│                                └──────┘│
│ Oscillograph    ┌──────┐┌──────┐       │
│                 │  ON  ││  OFF │       │
│                 └──────┘└──────┘       │
│                                        │
│                                        │
│                                        │
│  ┌─────────┐  Press this key to clear  │
│  │Cancel   │  the "System Error" message.│
│  │NIBP     │  If error persists,       │
│  │System   │  system failure can be considered.│
│  │Error    │                           │
│  └─────────┘                           │
│                            ┌──────┐    │
│                            │Oscill.│    │
│                            │Record │    │
│                            └──────┘    │
└─────────────────────────────────────┘
```

Pressing the Cancel NIBP System Error key will clear the displayed message.
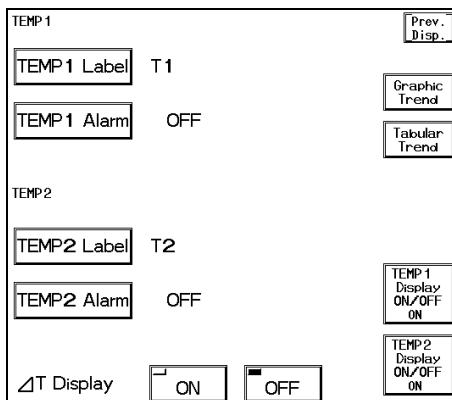
NOTE	After resolving the cause of NIBP system error message, verify that NIBP can be properly measured.

Reference Refer to "10. Maintenance　Troubleshooting" for the cause of air hose check.

Temperature (T1 to T3)

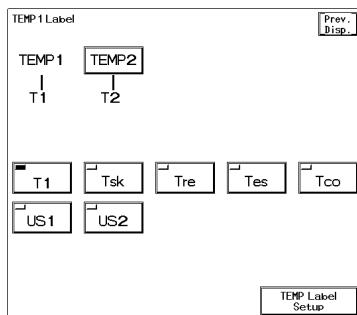This menu allows setting the monitoring condition for TEMP 1 to TEMP 3.

TEMP✳ Alarm : Sets ON/OFF of the temperature alarm, and upper and lower alarm limits.
TEMP✳ Label   : Set the temperature measuring location.
(✳ indicates T1 to T3)

Temperature Label

1 **Press the** ⎰**TEMP✳ Label**⎱ **key.**

The temperature label setup menu will be displayed.

2 **Select a label.**

Select from ⎰T✳⎱, ⎰Tsk⎱, ⎰Tre⎱, ⎰Tes⎱, ⎰Tco⎱, ⎰US1⎱, ⎰US2⎱.

【**Description of Each Label**】
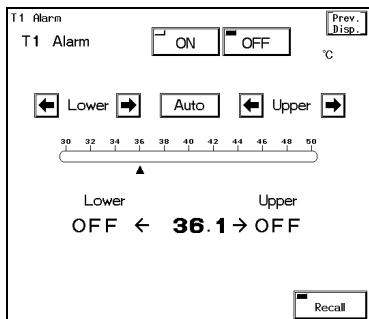
T1-T3	(Default)
Tsk	(Skin Temperature)
Tre	(Rectal Temperature)
Tes	(Esophageal Temperature)
Tco	(Core Temperature))
US1	(Temperature User Label 1)
US2	(Temperature User Label 2)

Reference   Refer to "8. System Configuration   Label Setup" for temperature user label setup.

Temperature Alarm

1 **Press the** ⎡ TEMP＊ Alarm ⎤ **key.**

The alarm setup menu for temperature will be displayed.
Select ON/OFF of the temperature alarm, and set the upper and lower alarm limit.

The alarm limit can be set for each measurement unit (°C / °F).
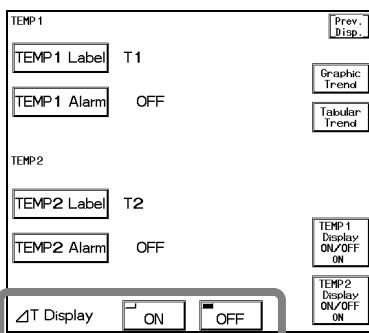The upper and lower limit can be set in increments of 0.5°C / 1.0°F.

Key	Item	Description
⎡ON ⎡OFF	Individual Alarm	Selecting ⎣ON⎦ will generate a TEMP alarm. Selecting ⎣OFF⎦ will not generate a TEMP alarm.
◀ Lower ▶	Lower Alarm Limit	Sets the lower alarm limit (30.0 to 49.0°C / 86.0 to 120.0°F). Setting the value 30.0°C / 86.0°F or below will turn the alarm OFF.
◀ Upper ▶	Upper Alarm Limit	Sets the upper alarm limit (31.0 to 50.0°C / 88.0 to 122.0°F). Setting the value 50.0°C / 122.0°F or above will turn the alarm OFF.
Auto	Automatic Setup	Automatically sets the upper limit to +2.0°C / +4.0°F from the current value, and lower limit to −2°C / −4.0°F from the current value.

To maintain the alarm setting even after the power is turned OFF or after a discharge procedure, store the setting to one of the alarm modes, or select ⎣ Backup ⎦ for "Alarm" on the "Backup at Discharge" menu (Monitor Setup).

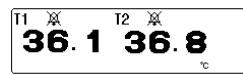*Reference*   For the alarm mode setup procedure, refer to "8. System Configuration   Alarm Mode".

∆T Display

The difference between the TEMP 1 and TEMP 2 can be displayed in an absolute value.

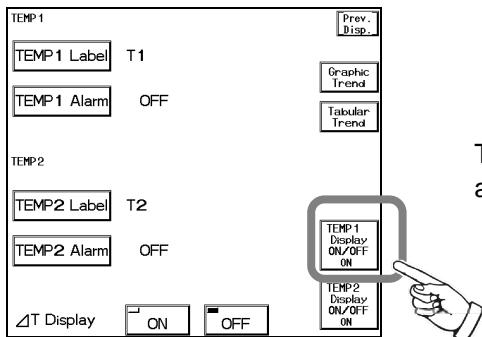**1** **Select** ⎣ ON ⎦ **or** ⎣ OFF ⎦**.**

⎣ ON ⎦ will display the ⊿T value.

⎣ OFF ⎦ will not display the ⊿T value.
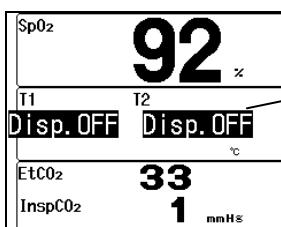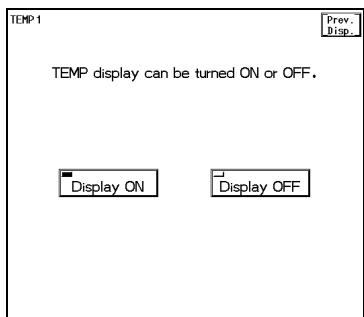
NOTE	● The temperature difference of TEMP1 and TEMP3, TEMP2 and TEMP3 cannot be displayed for ⊿T.
	● The alarm cannot be set for ⊿T.

ON/OFF of Parameter Display

1 **Press the ⎸Display ON/OFF⎸ key.**

The confirmation screen for ON/OFF of TEMP display will appear.

2 **Select ⎸Display ON⎸ or ⎸Display OFF⎸.**

Pressing the ⎸Display ON⎸ key will display the numeric data.
Pressing the ⎸Display OFF⎸ key will not display the numeric data.

The Display OFF message will be displayed inside the parameter key.

⚠ CAUTION	When the waveform and numeric data display is set to OFF, the alarm generation and tabular/graphic trend input will also be suspended.
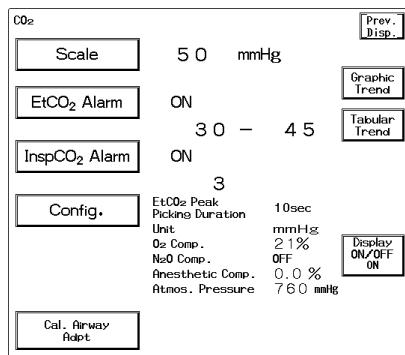
CO$_2$ Concentration (Option Unit: MGU-721)

This menu allows to set the monitoring condition of CO$_2$ concentration when mainstream CO$_2$ unit (MGU-721) is used.
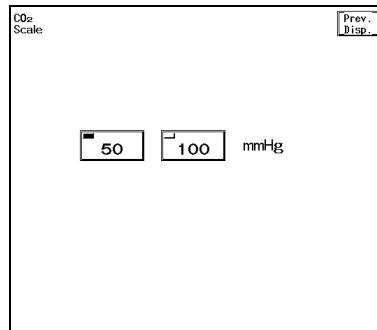
> Reference ・ For parameter setup of the microstream CO2 unit (MGU-722), refer to P6-63 "CO$_2$ Concentration (MGU-722)".

Scale	: Sets the CO$_2$ waveform scale.
EtCO$_2$ Alarm	: Sets ON/OFF of the EtCO$_2$ alarm, and upper and lower alarm limits.
InspCO$_2$ Alarm	: Sets ON/OFF of the InspCO$_2$ alarm and upper alarm limit.
Configuration	: Sets the CO$_2$ monitoring conditions.

CO$_2$ Scale

1 Press the ⌐Scale¬ key.

The scale setup menu will be displayed.

<Scale setup menu for the unit in mmHg>

2 Select the CO$_2$ waveform scale for displaying and recording.

For the measurement unit in mmHg, select the scale from ⌐50¬, ⌐100¬.
For the measurement unit in kPa and %, select the scale from ⌐4¬, ⌐8¬, ⌐10¬.

EtCO$_2$ (End-Tidal CO$_2$) Alarm

1 **Press the** $\boxed{\text{EtCO}_2\text{ Alarm}}$ **key.**

The alarm setup menu will be displayed.
Select ON/OFF of EtCO$_2$ alarm, and set the upper and lower alarm limits.
 Alarm condition should be set for each measurement unit (mmHg / kPa / %).
Upper and lower alarm limits can be set in increments of 1mmHg, 0.1kPa, and 0.1%.

NOTE	EtCO$_2$ alarm will not generate unless 2 or more respiration is detected within 30 seconds after power ON or after discharge.

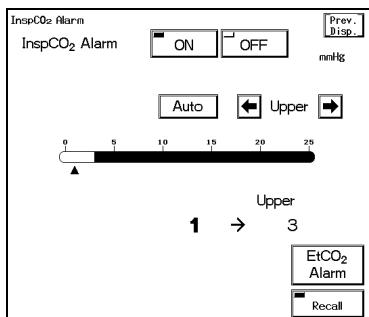| Key	Item	Description
$\boxed{\text{ON}}$ $\boxed{\text{OFF}}$	Individual Alarm	Selecting $\boxed{\text{ON}}$ will generate the EtCO$_2$ alarm. Selecting $\boxed{\text{OFF}}$ will not generate the EtCO$_2$ alarm.
$\boxed{\leftarrow}$ Lower $\boxed{\rightarrow}$	Lower Alarm Limit	Sets the lower alarm limit (1 to 98mmHg, 0.1 to 13.1kPa, 0.1 to 13.1%). Setting a value equal to or below 1mmHg, 0.1kPa, 0.1% will turn the alarm OFF.
$\boxed{\leftarrow}$ Upper $\boxed{\rightarrow}$	Upper Alarm Limit	Sets the upper alarm limit (3 to 115mmHg, 0.3 to 15.0kPa, 0.3 to 15.0%). Setting a value equal to or above 115mmHg, 15.0kPa, 15.0% will turn the alarm OFF.
$\boxed{\text{Auto}}$	Automatic Setup	Automatically sets the upper alarm limit to +10mmHg, +1.3kPa, +1.3% to the current value, and the lower alarm limit to −10mmHg, −1.3kPa, −1.3% to the current value.

To maintain the alarm setting even after the power is turned OFF or after the discharge procedure, store the setting to one of the alarm modes, or select $\boxed{\text{Backup}}$ for "Alarm" on the "Backup at Discharge" menu (Monitor Setup).
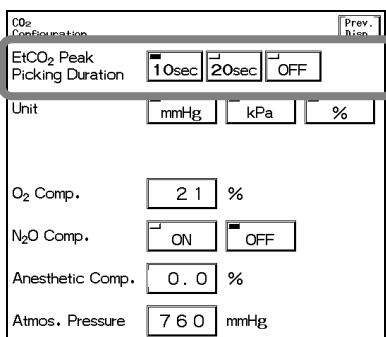
Reference	For the alarm mode setup procedure, refer to "8. System Configuration Alarm Mode".

InspCO$_2$ (Inspiratory CO$_2$) Alarm

1 **Press the** InspCO$_2$ Alarm **key.**

The alarm setup menu will be displayed.
Select ON/OFF of InspCO$_2$ alarm, and set the upper alarm limit.
Set the alarm condition for each measurement unit (mmHg / kPa / %).
Upper alarm limit can be set in increments of 1mmHg, 0.1kPa, 0.1%.
Lower alarm limit cannot be set.

NOTE	InspCO$_2$ alarm will not generate unless 2 or more respiration is detected within 30 seconds after power ON or after discharge.

Key	*Item*	*Description*
ON OFF	Individual Alarm	Selecting ON will generate the InspCO$_2$ alarm. Selecting OFF will not generate the InspCO$_2$ alarm.
← Upper →	Upper Alarm Limit	Sets the upper alarm limit (1 to 24mmHg, 0.1 to 3.0kPa, 0.1 to 3.0%). Setting a value equal to or above 24mmHg, 3.0kPa, 3.0% will turn the alarm OFF.
Auto	Automatic Setup	Automatically sets the upper alarm limit to 3mmHg, 0.4kPa, 0.4% to the current measurement.

To maintain the alarm setting even after the power is turned OFF or after the discharge procedure, store the setting to one of the alarm modes, or select Backup for "Alarm" on the "Backup at Discharge" menu (Monitor Setup).

Reference   For the alarm mode setup procedure, refer to "8. System Configuration   Alarm Mode".

EtCO$_2$ Peak Picking Duration

The duration to pick the EtCO$_2$ maximum value can be selected from 10 sec., 20 sec., or OFF.

1 **Press the** Config. **key.**

The CO$_2$ configuration menu to select EtCO$_2$ peak picking duration will be displayed.

2 **Select the duration.**

10sec , 20sec will display the maximum EtCO$_2$ value for the selected duration.
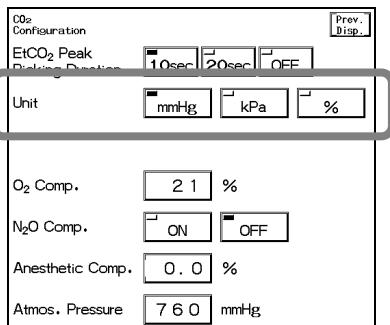If OFF is selected, EtCO$_2$ value for each respiration will be displayed.
As the EtCO$_2$ value display is updated each second, EtCO$_2$ value for each respiration cannot be displayed if respiration rate is above 60 Bpm.

Measurement Unit

The measurement unit can be selected from mmHg, kPa, or %.

NOTE	● If the measurement unit is changed frequently, the continuity of the graphic trend and tabular trend may be lost. ● The alarm setup is necessary for each measurement unit. When a measurement unit is changed, make sure to set the alarm condition for the changed unit.

1 **Press the** Config. **key.**

The CO_2 configuration menu to select the measurement unit will be displayed.

2 **Select the measurement unit from** mmHg **,** kPa **,** % **.**

The graphic trend and tabular trend will be displayed with the selected measurement unit.

EtCO2 **33**
InspCO2 **1**
mmHg ◄——— Unit

O₂ Compensation

By inputting the O_2 concentration value, compensation can be made to display more accurate value.
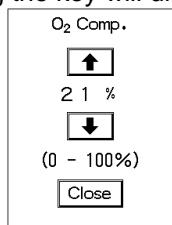
1 **Press the** Config. **key.**

The CO_2 configuration menu to set the O_2 compensation will be displayed.

2 **Set the O₂ compensation.**

Pressing the key will display the tool box to set the value.

Use the ↑ ↓ keys to adjust the O_2 compensation (O_2 concentration).
The O_2 compensation can be set in 1% increment for the value up to 30%, and 5% increment for the value above 30%.
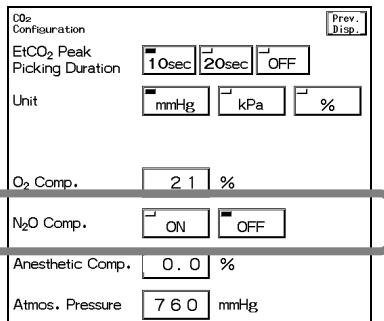Press the Close key after setting the O_2 compensation.

NOTE	The value cannot be changed if the total value of O_2 compensation and anesthetic gas compensation exceeds 100%. In such case, change the O_2 compensation value after changing the anesthetic gas compensation value.

N$_2$O Compensation

If N$_2$O is present in the respiration circuit, the CO$_2$ value tends to be displayed higher than the actual value. By setting the N$_2$O compensation ON, this can be adjusted.
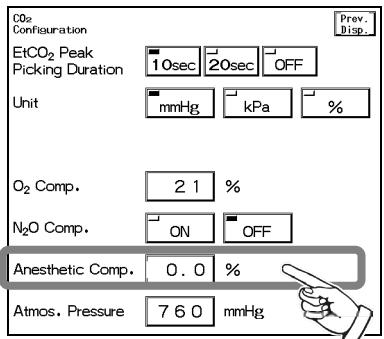
1 **Press the** Config. **key.**

The CO$_2$ configuration menu to set the N$_2$O compensation will be displayed.

2 **Select ON/OFF for "N$_2$O Comp".**

Anesthetic Gas Compensation

By inputting the anesthetic gas concentration value, compensation can be made to display more accurate value.
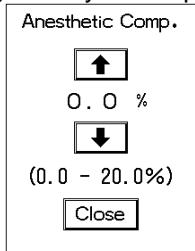
1 **Press the** Config. **key.**

The CO$_2$ configuration menu to set the anesthetic gas compensation will be displayed.

2 **Set the anesthetic gas compensation.**

Pressing the key will display the tool box to set the value.

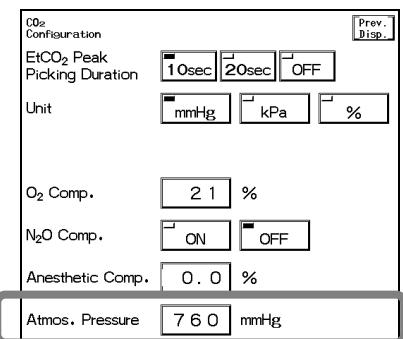Use the ↑ ↓ keys to adjust the anesthetic gas compensation (anesthetic gas concentration), and press the Close key.

NOTE	The value cannot be changed if the total value of O$_2$ compensation and anesthetic gas compensation exceeds 100%. In such case, change the O$_2$ compensation value after changing the anesthetic gas compensation value.

Atmospheric Pressure Compensation

The atmospheric pressure can be adjusted to compensate for pressure differences.
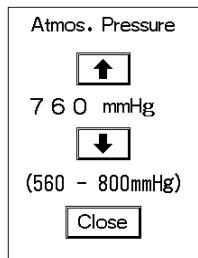
1 **Press the** [Config.] **key.**

The CO_2 configuration menu to set the atmospheric pressure will be displayed.
Pressing the key will display the tool box to set the atmospheric pressure.
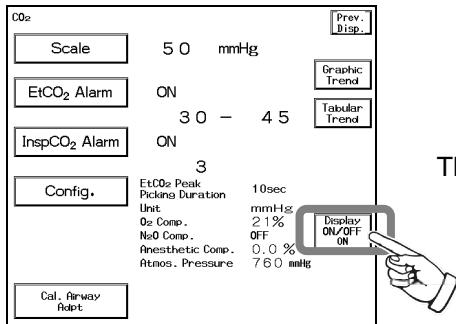
2 **Set the atmospheric pressure.**

Pressing the key will display the tool box to set the value.

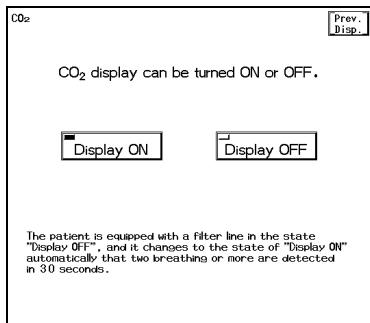Use the [↑], [↓] keys to adjust the atmospheric pressure (mmHg), and press the [Close] key.

ON/OFF of Parameter Display

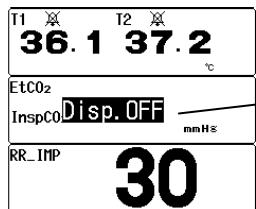**1** **Press the** | Display ON/OFF | **key.**

```
CO₂                                    Prev.
                                       Disp.
   ┌─────────┐
   │  Scale  │      5 0   mmHg
   └─────────┘                         Graphic
                                        Trend
   ┌──────────────┐
   │  EtCO₂ Alarm │     ON             Tabular
   └──────────────┘                     Trend
                       3 0  −   4 5
   ┌────────────────┐
   │  InspCO₂ Alarm │   ON
   └────────────────┘
                        3
   ┌─────────┐     EtCO₂ Peak
   │  Config.│     Picking Duration  10sec
   └─────────┘     Unit              mmHg      ┌────────┐
                   O₂ Comp.          21%       │ Display│
                   N₂O Comp.         OFF       │ ON/OFF │
                   Anesthetic Comp.  0.0 %     │   ON   │
                   Atmos. Pressure   760 mmHg  └────────┘
   ┌──────────┐
   │ Cal.Airway│
   │   Adpt    │
   └──────────┘
```

The confirmation display for ON/OFF of CO_2 display will appear.

2 **Select** | Display ON | **or** | Display OFF |.

```
CO₂                                    Prev.
                                       Disp.

      CO₂ display can be turned ON or OFF.


   ┌────────────┐       ┌─────────────┐
   │ Display ON │       │ Display OFF │
   └────────────┘       └─────────────┘


   The patient is equipped with a filter line in the state
   "Display OFF", and it changes to the state of "Display ON"
   automatically that two breathing or more are detected
   in 30 seconds.
```

Pressing the | Display ON | key will display the waveform and numeric data.
Pressing the | Display OFF | key will not display the waveform and numeric data.

```
T1  ☒       T2  ☒
36.1  37.2
                    ℃
EtCO₂
InspCO  Disp.OFF
                  mmHg
RR_IMP
  30
```

The Display OFF message will be displayed inside the parameter key.

If the filter line is applied to the patient and more than 2 respirations are detected in 30 seconds during "Display OFF" condition, the display will automatically return.

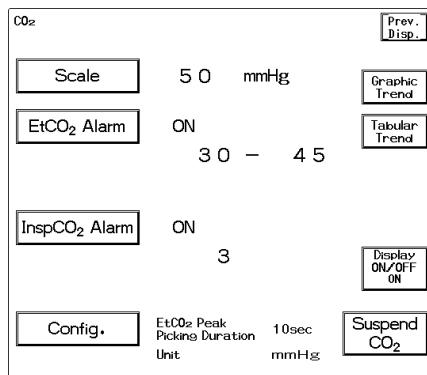| ⚠ CAUTION	● When the waveform and numeric data display is set to OFF, the alarm generation and tabular/graphic trend will also be suspended. ● Whe the waveform and numeric data display is set to OFF, the respiration rate measured by CO_2 will not be displayed either.

CO$_2$ Concentration   (Option Unit: MGU-722)

This menu allows to set the monitoring condition of CO$_2$ concentration when Microstream$^®$ CO$_2$ unit (MGU-722) is used.

Reference   · For parameter setup of the mainstream CO$_2$ unit (MGU-721), refer to P6-56 "CO$_2$ Concentration (MGU-721)".

Scale   : Sets the CO$_2$ waveform scale.
EtCO$_2$ Alarm   : Sets ON/OFF of EtCO$_2$ alarm, and upper and lower alarm limits.
InspCO$_2$ Alarm : Sets ON/OFF of InspCO$_2$ alarm and upper alarm limit.
Configuration   : Sets CO$_2$ monitoring conditions.
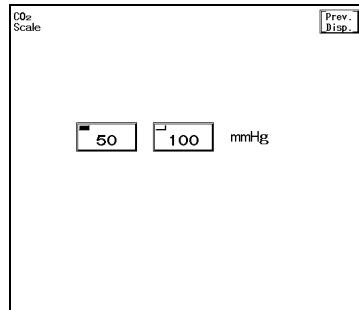
CO$_2$ Scale

1 **Press the** Scale **key.**

The scale setup menu will be displayed.

<Scale setup menu for the unit in mmHg>

2 **Select the CO$_2$ waveform scale for displaying and recording.**

For the measurement unit in mmHg, select the scale from 50 , 100 .
For the measurement unit in kPa and %, select the scale from 4 , 8 , 10 .

EtCO$_2$ (End-Tidal CO$_2$) Alarm

1 Press the [EtCO$_2$ Alarm] key.

The alarm setup menu will be displayed.
Select ON/OFF of EtCO$_2$ alarm, and set the upper and lower alarm limits.
Alarm condition should be set for each unit (mmHg / kPa / %).
Upper and lower alarm limits can be set in increments of 1mmHg, 0.1kPa, and 0.1%.

NOTE	EtCO$_2$ alarm will not generate unless 2 or more respiration is detected within 30 seconds after power ON or after discharge.

Key	Item	Description
[ON] [OFF]	Individual Alarm	Selecting [ON] will generate the EtCO$_2$ alarm. Selecting [OFF] will not generate the EtCO$_2$ alarm.
[←] Lower [→]	Lower Alarm Limit	Sets the lower alarm limit (1 to 98mmHg, 0.1 to 13.1kPa, 0.1 to 13.1%). Setting a value equal to or below 1mmHg, 0.1kPa, 0.1% will turn the alarm OFF.
[←] Upper [→]	Upper Alarm Limit	Sets the upper alarm limit (3 to 115mmHg, 0.3 to 15.0kPa, 0.3 to 15.0%). Setting a value equal to or above 115mmHg, 15.0kPa, 15.0% will turn the alarm OFF.
[Auto]	Automatic Setup	Automatically sets the upper alarm limit to +10mmHg, +1.3kPa, +1.3% to the current value, and the lower alarm limit to −10mmHg, −1.3kPa, −1.3%.

⚠ CAUTION	For MGU-722, the upper EtCO$_2$ alarm will not generate if the upper limit is set to 100mmHg/13.4kPa and above as the measurement range is 0 to 99mmHg / 0 to 13.3kPa.

To maintain the alarm setting even after the power is turned OFF or after the discharge procedure, store the setting to one of the alarm modes, or select [Backup] for "Alarm" on the "Backup at Discharge" menu (Monitor Setup).
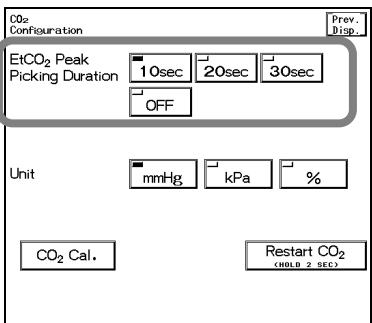
Reference	For the alarm mode setup procedure, refer to "8. System Configuration Alarm Mode".

InspCO$_2$ (Inspiratory CO$_2$) Alarm

1 **Press the** [**InspCO$_2$ Alarm**] **key.**

The alarm setup menu will be displayed.
Select ON/OFF of InspCO$_2$ alarm, and set the upper alarm limit.
Set the alarm condition for each measurement unit (mmHg / kPa / %).
Upper alarm limit can be set in increments of 1mmHg, 0.1kPa, 0.1%.
Lower alarm limit cannot be set.

NOTE	InspCO$_2$ alarm will not generate unless 2 or more respiration is detected within 30 seconds after power ON or after discharge.

Key	*Item*	*Description*
[ON] [OFF]	Individual Alarm	Selecting [ON] will generate the InspCO$_2$ alarm. Selecting [OFF] will not generate the InspCO$_2$ alarm.
[←] Upper [→]	Upper Alarm Limit	Sets the upper alarm limit (1 to 24mmHg, 0.1 to 3.0kPa, 0.1 to 3.0%). Setting a value equal to or above 24mmHg, 3.0kPa, 3.0% will turn the alarm OFF.
[Auto]	Automatic Setup	Automatically sets the upper alarm limit to 3mmHg, 0.4kPa, 0.4%.

To maintain the alarm setting even after the power is turned OFF or after the discharge procedure, store the setting to one of the alarm modes, or select [Backup] for "Alarm" on the "Backup at Discharge" menu (Monitor Setup).

> *Reference* For the alarm mode setup procedure, refer to "8. System Configuration Alarm Mode".

EtCO$_2$ Peak Picking Duration

The duration to pick the EtCO$_2$ maximum value can be selected from 10 sec., 20 sec., 30 sec., or OFF.

1 **Press the** [**Config.**] **key.**

The CO$_2$ configuration menu to select EtCO$_2$ peak picking duration will be displayed.

2 **Select the duration.**

Select the duration to display the maximum EtCO$_2$ value from [10sec], [20sec], [30sec].
If [OFF] is selected, EtCO$_2$ value for each respiration will be displayed.
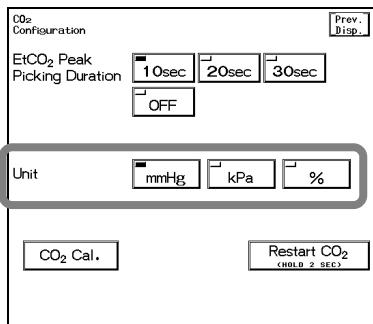As the EtCO$_2$ value display is updated each second, EtCO$_2$ value for each respiration cannot be displayed if respiration rate is above 60 Bpm.

Measurement Unit

The measurement unit can be selected from mmHg, kPa, or %.

NOTE	● If the measurement unit is changed frequently, the continuity of the graphic trend and tabular trend may be lost. ● The alarm setup is necessary for each measurement unit. When a measurement unit is changed, make sure to set the alarm condition for the changed unit.

1 Press the Config. key.

The CO_2 configuration menu to select the measurement unit will be displayed.

2 Select the measurement unit from mmHg , kPa , % .

The graphic trend and tabular trend will be displayed with the selected measurement unit.

  ◄——— Measurement Unit

CO_2 Calibration

CO_2 calibration can be performed using calibration gas. Calibration should be conducted every specified period or when any measurement error is found.
Perform calibration when 1 year has elapsed from the last calibration, or accumulated $EtCO_2$ measurement time exceeds 4000 hours, or any measurement error is found.
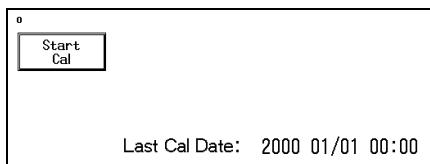
⚠ CAUTION	If the CO_2 gas calibration is not performed at a specified interval, CO_2 measurement accuracy may be affected and also subsequent gas calibration may not be possible.

1 Press the Config. key.
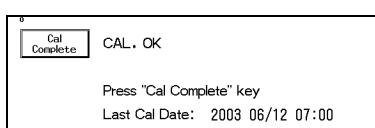
The CO_2 configuration menu with the CO_2 Cal. key will be displayed.

2 Press the CO_2 Cal. key to display the calibration menu.

```
0
┌─────────┐
│  Start  │
│  Cal    │
└─────────┘



        Last Cal Date:  2000 01/01 00:00
```
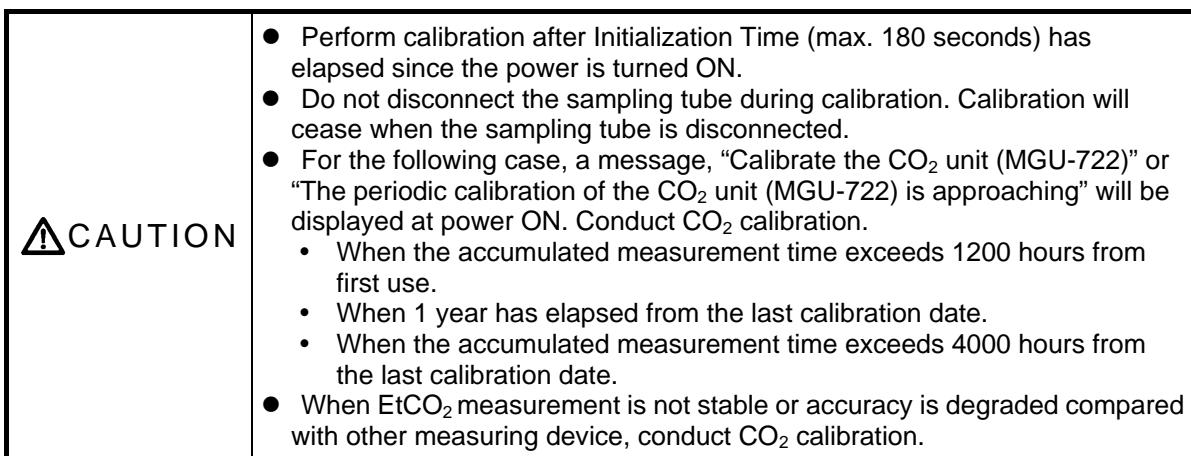
3 Press the ☐ Start Cal ☐ key and conduct calibration according to the displayed messages.

4 The message, "Feed CAL. GAS" will be displayed. Press the injection button to inject the calibration gas.

5 The message, "Cal. Gas can be removed" will be displayed. Stop pressing the injection button to cease the injection.

6 The message, "CAL. OK" will be displayed. "Last Cal. Date" will be updated to the current date.

If any of the following messages is displayed, start the procedure again from step 2.
"CAL. error", "CAL GAS error", "Auto Zero fail", "No stable gas flow", "CAL. failure"

```
0
┌─────────┐
│   Cal   │  CAL. OK
│Complete │
└─────────┘
            Press "Cal Complete" key
            Last Cal Date:  2003 06/12 07:00
```
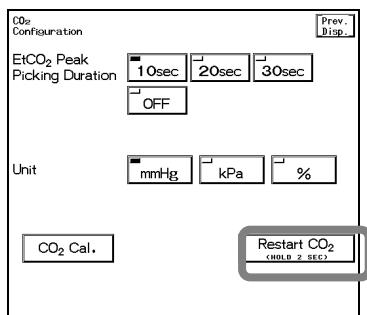
7 Press the ☐ Cal Complete ☐ key to end the calibration.

⚠CAUTION	● Perform calibration after Initialization Time (max. 180 seconds) has elapsed since the power is turned ON.
	● Do not disconnect the sampling tube during calibration. Calibration will cease when the sampling tube is disconnected.
	● For the following case, a message, "Calibrate the CO_2 unit (MGU-722)" or "The periodic calibration of the CO_2 unit (MGU-722) is approaching" will be displayed at power ON. Conduct CO_2 calibration.
	  • When the accumulated measurement time exceeds 1200 hours from first use.
	  • When 1 year has elapsed from the last calibration date.
	  • When the accumulated measurement time exceeds 4000 hours from the last calibration date.
	● When EtCO2 measurement is not stable or accuracy is degraded compared with other measuring device, conduct CO_2 calibration.

Restarting the CO_2 Unit

The sampling tube will cease functioning when erroneous condition such as blocking of exhaust tube, sampling tube or nasal prong is detected. When the pump ceases functioning, "Check CO_2 unit" message will be displayed. After resolving the problem, press the ☐ Restart CO_2 ☐ key and restart the measurement.

1 Press the ☐ Config. ☐ key.

The CO_2 configuration menu with the ☐ Restart CO_2 ☐ key will be displayed.

2 Press the ☐ Restart CO_2 ☐ key for 2 seconds.

If the "Check CO_2 unit" message is not displayed, the ☐ Restart CO_2 ☐ key will not function.
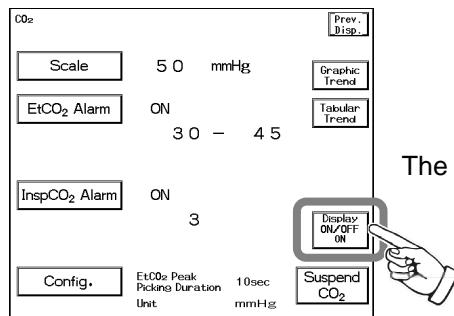
3 **Check that the unit is restarted.**

The sampling pump will start to function, and the "Check CO_2 unit" message will disappear. Check that the message has disappeared and the measurement data is displayed.

NOTE	If the "Check Sample Line", "Check CO_2 Exhaust Port", "Check CO_2 unit", CO_2 Unit Error" message does not disappear after restarting the unit, equipment failure can be considered, or parts replacement of CO_2 unit may be necessary. Contact our service representative.

ON/OFF of Parameter Display

1 **Press the | Display ON/OFF | key.**

The confirmation display for ON/OFF of CO_2 display will appear.

2 **Select | Display ON | or | Display OFF |.**

Pressing the | Display ON | key will display the waveform and numeric data.
Pressing the | Display OFF | key will not display the waveform and numeric data.

The Display OFF message will be displayed inside the parameter key.

If the filter line is applied to the patient and more than 2 respirations are detected in 30 seconds during "Display OFF" condition, the display will automatically return.

⚠ CAUTION	● When the waveform and numeric data display is set to OFF, the alarm generation and tabular/graphic trend will also be suspended. ● Whe the waveform and numeric data display is set to OFF, the respiration rate measured by CO_2 will not be displayed either.

Suspending CO_2 Measurement
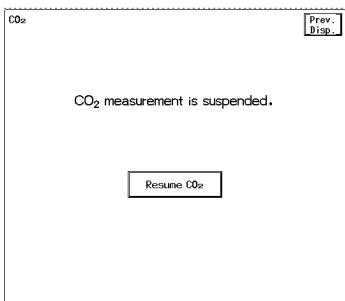
1 **Press the** $\boxed{\text{Suspend } CO_2}$ **key.**

The Suspend message will be displayed inside the parameter key.
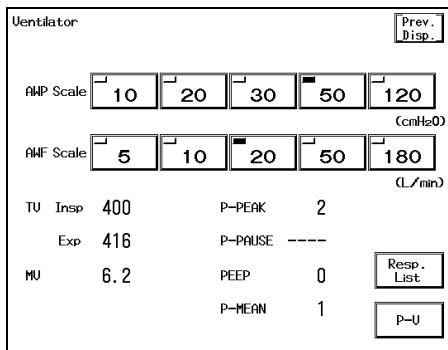
2 **To resume the CO_2 monitoring, press the** $\boxed{\text{Resume } CO_2}$ **key.**

Pressing the $\boxed{\text{Resume } CO_2}$ key will display the waveform and numeric data.

Ventilator

This menu allows to set the ventilator monitoring condition.

```
Ventilator                                    ┌─────┐
                                              │Prev.│
                                              │Disp.│
                                              └─────┘
           ┌──┐  ┌──┐  ┌──┐  ■──┐  ┌───┐
AWP Scale  │10│  │20│  │30│  │50│  │120│
           └──┘  └──┘  └──┘  └──┘  └───┘
                                          (cmH₂O)
           ┌──┐  ┌──┐  ■──┐  ┌──┐  ┌───┐
AWF Scale  │ 5│  │10│  │20│  │50│  │180│
           └──┘  └──┘  └──┘  └──┘  └───┘
                                          (L/min)
TV  Insp  400         P-PEAK    2

    Exp   416         P-PAUSE  ----
                                          ┌─────┐
MV        6.2         PEEP      0         │Resp.│
                                          │List │
                     P-MEAN     1         └─────┘
                                          ┌───┐
                                          │P-V│
                                          └───┘
```

AWP Scale : Sets the scale for AWP (airway pressure) waveform.
AWF Scale : Sets the scale for AWF (airway flow) waveform.
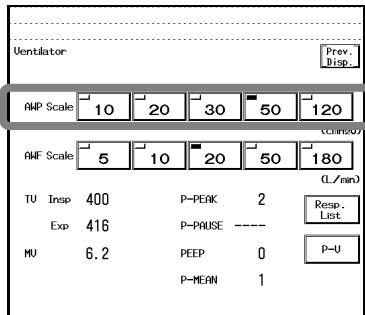
⚠ CAUTION | For PURITAN-BENNETT Ventilator, AWP and AWF waveform cannot be displayed or recorded. Only the numeric data will be displayed.

AWP Scale

1 **Select the scale.**

```
Ventilator                          ┌─────┐
                                    │Prev.│
                                    │Disp.│
                                    └─────┘
AWP Scale ┌10┐┌20┐┌30┐■50┐┌120┐
          └──┘└──┘└──┘└──┘└───┘
                               (cmH₂O)
AWF Scale ┌ 5┐┌10┐■20┐┌50┐┌180┐
          └──┘└──┘└──┘└──┘└───┘
                               (L/min)
TV Insp 400    P-PEAK   2    ┌────┐
                             │Resp│
   Exp  416    P-PAUSE ----  │List│
MV     6.2     PEEP     0    ┌───┐
               P-MEAN   1    │P-V│
                             └───┘
```
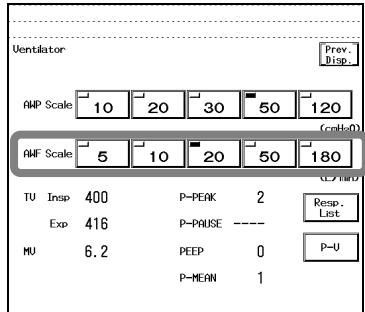
Select the appropriate scale from ⟨10⟩, ⟨20⟩, ⟨30⟩, ⟨50⟩, or ⟨120⟩.

AWF Scale

1 **Select the scale.**

```
Ventilator                          ┌─────┐
                                    │Prev.│
                                    │Disp.│
                                    └─────┘
AWP Scale ┌10┐┌20┐┌30┐■50┐┌120┐
          └──┘└──┘└──┘└──┘└───┘
                               (cmH₂O)
AWF Scale ┌ 5┐┌10┐■20┐┌50┐┌180┐
          └──┘└──┘└──┘└──┘└───┘
                               (L/min)
TV Insp 400    P-PEAK   2    ┌────┐
                             │Resp│
   Exp  416    P-PAUSE ----  │List│
MV     6.2     PEEP     0    ┌───┐
               P-MEAN   1    │P-V│
                             └───┘
```
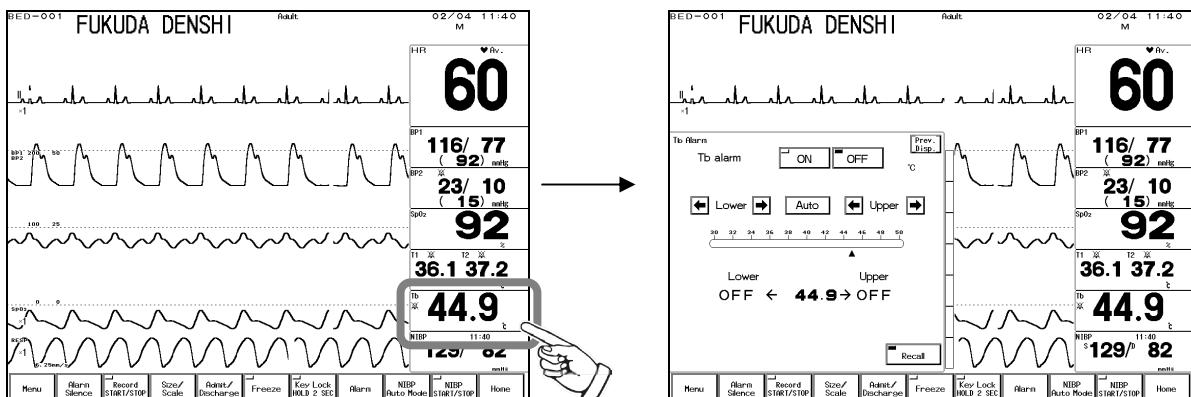
Select the appropriate scale from ⟨5⟩, ⟨10⟩, ⟨20⟩, ⟨50⟩, or ⟨180⟩.

Tb (Blood Temperature)
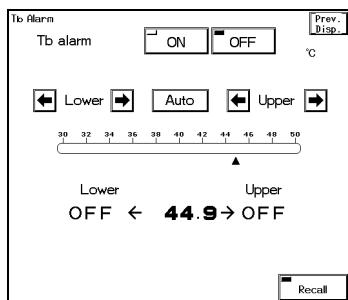
When thermodilution catheter is used to measure the cardiac output, the blood temperature can be monitored.

Tb Alarm   : Sets ON/OFF of blood temperature alarm and upper and lower alarm limits.

Tb Alarm

1 **Select ON/OFF of blood temperature alarm and set upper and lower alarm limits.**

The alarm setup should be performed for each measurement unit (°C / °F).
The upper and lower limit can be set in increments of 0.5°C / 1.0°F.

Key	Item	Description
☐ON ☐OFF	Individual Alarm	Selecting ☐ON☐ will generate the TEMP alarm. Selecting ☐OFF☐ will not generate the TEMP alarm.
⬅ Lower ➡	Lower Alarm Limit	Sets the lower alarm limit (30.0 to 44.0°C / 86.0 to 111.0°F). Setting a value 30.0°C / 86.0°F or below will turn the alarm OFF.
⬅ Upper ➡	Upper Alarm Limit	Sets the upper alarm limit (31.0 to 45.0°C / 88.0 to 113.0°F). Setting a value 45.0°C / 113.0°F or above will turn the alarm OFF.
Auto	Automatic Setup	Automatically sets the upper limit to +2.0°C / +4.0°F to the current value, and lower limit to −2°C / −4.0°F to the current value.

To maintain the alarm setting even after the power is turned OFF or after the discharge procedure, store the setting to one of the alarm modes, or select ☐Backup☐ for "Alarm" on the "Backup at Discharge" menu (Monitor Setup).

> *Reference* For the alarm mode setup procedure, refer to "8. System Configuration   Alarm Mode".

6
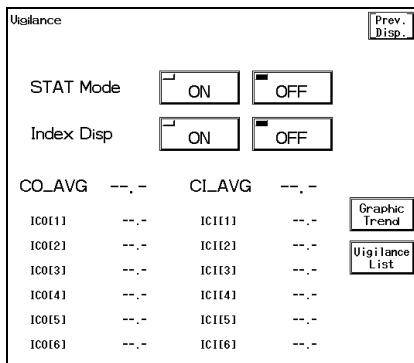
Tb (Blood Temperature)

Vigilance Data

When Vigilance, Vigilance CEDV, VigilanceII, or Vigileo (oximeter/CCO measurement device manufactured by Baxter) is used, Vigilance data display can be selected from several modes.

【ICO Mode】

Vigilance			Prev. Disp.
STAT Mode	ON	OFF	
Index Disp	ON	OFF	
CO_AVG	--.-	CI_AVG	--.-
ICO[1]	--.-	ICI[1]	--.-	Graphic Trend
ICO[2]	--.-	ICI[2]	--.-	Vigilance List
ICO[3]	--.-	ICI[3]	--.-	
ICO[4]	--.-	ICI[4]	--.-	
ICO[5]	--.-	ICI[5]	--.-	
ICO[6]	--.-	ICI[6]	--.-	

STAT Mode : When Vigilance is in CCO mode, STAT mode display can be set ON or OFF.
Index Disp. : When Vigilance is in CCO mode, Index display can be set ON or OFF.

When the Vigilance is in ICO mode, the 6 latest data of ICO (Intermittent Cardiac Output) and ICI (Intermittent Cardiac Index) will be displayed.

STAT Mode / Index Display

1 **ON** / **OFF** of STAT Mode and **ON** / **OFF** of Index display can be selected on the Vigilance display.

【STAT Mode **OFF**, Index Display **OFF**】

SvO_2	83	%
CCO	5.0	L/min
EDV	160	mL
BT	38.5	℃

SvO_2 (or $ScvO_2$), CCO, EDV, BT data will be displayed inside the SvO_2+CO numeric data box.

【STAT Mode **OFF**, Index Display **ON**】

SvO_2	83	%
CCI	2.5	L/min/m²
EDVI	80	mL/m²
BT	38.5	℃

By setting the Index display ON, CCI, EDVI data will be displayed instead of CCO and EDV.

【STAT Mode **ON**, Index Display **OFF**】

SvO_2	83	%
CCO_STAT	5.0	L/min
EDV_STAT	160	mL
BT	38.5	℃

By setting the STAT mode ON, CCO_STAT, EDV_STAT data will be displayed instead of CCO and EDV.

【STAT Mode **ON**, Index Display **ON**】

SvO_2	83	%
CCI_STAT	2.5	L/min/m²
EDVI_STAT	80	mL/m²
BT	38.5	℃

By setting the STAT mode and Index display ON, CCI_STAT, EDVI_STAT will be displayed instead of CCO and EDV.

Stopwatch

By setting a stopwatch key on the home display, a stopwatch function can be used.

```
STOPWATCH                                    Prev.
                                             Disp.

TIMER1      00:00:00    START    STOP    RESET


TIMER2      00:00:00    START    STOP    RESET


          LABEL1    LABEL2
```
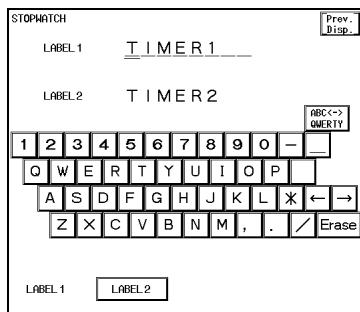
TIMER1, 2 : Starts/stops the stopwatch function.
LABEL1, 2 : A label can be set for each timer.
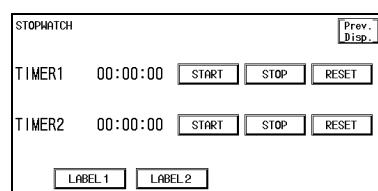
Label Setup

1 **Press the** [**LABEL**] **key.**

```
STOPWATCH                            Prev.
                                     Disp.
    LABEL1      T I M E R 1

    LABEL2      T I M E R 2
                                    ABC<->
                                    QWERTY
  1  2  3  4  5  6  7  8  9  0  −
   Q  W  E  R  T  Y  U  I  O  P
    A  S  D  F  G  H  J  K  L  *  ←  →
     Z  X  C  V  B  N  M  ,  .  /  Erase

  LABEL1    LABEL2
```

The stopwatch label setup menu will be displayed.
Enter 8 characters using alphanumeric keypad.

START/STOP of Stopwatch

```
STOPWATCH                      Prev.
                               Disp.

TIMER1  00:00:00  START  STOP  RESET

TIMER2  00:00:00  START  STOP  RESET

    LABEL1    LABEL2
```

[START] will start the stopwatch.
[STOP] will suspend the counting and pressing [START] again will resume the counting.
[RESET] will reset the stopwatch time display to "00:00:00".
If [RESET] is pressed during the counting, the couting will restart from "00:00:00".

NOTE	● If discharge procedure is performed during stopwatch operation, the counting will stop and the stopwatch time will be reset to "00:00:00". ● The stopwatch will continue counting even when the monitoring is suspended.

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Chapter 7

Function

This chapter describes the function such as arrhythmia analysis, trend, and recall.

7

Function

This section explains the arrhythmia analysis, alarm setup procedure, etc.

Arrhythmia Definition

The arrhythmia detection is performed by learning the normal waveform of the patient and by determining VPC by comparing the waveform (QRS pattern) and R-R interval for each heartbeat.
A pattern matching is performed with each VPC detected from R-R interval, QRS amplitude, QRS area, QRS polarity, etc., and determines as VPC after discriminating the noise from VPC.

```
BED-001  FUKUDA DENSHI          Adult          02/01  14:14
                                                       M
Check Electrodes                              FREQUENT
                                              HR        ♥ Av.
```

●QRS Classification

The QRS analysis is performed by comparing with the learned waveform and QRS pattern matching.

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

●Arrhythmia Type

The alarm is generated according to the arrhythmia classification of a normal QRS and VPC.

Type	Meaning	Detection Criteria
ASYSTOLE	Cardiac Arrest	Cardiac arrest is detected for more than the preprogrammed time.
VF	Ventricular Fibrillation	A random, rapid electrical activity of the heart is detected.
VT	Ventricular Tachycardia	HR is same or above the preprogrammed value (140bpm or 120bpm), and 9 or more continuous ventricular beats are detected.
SLOW_VT		9 or more continuous ventricular beats are detected. (HR: below 140bpm / 120bpm)
TACHY	Tachycardia	HR is over the upper alarm limit.
BRADY	Bradycardia	HR is below the lower alarm limit.
RUN	Consecutive VPC	HR is same or above the preprogrammed value, and continuous VPC exceeding the preprogrammed value (2 to 8beats) is detected.
COUPLET	Couplet Ventricular Extrasystole	2 continuous VPC beats are detected.
PAUSE		Cardiac arrest is detected for more than the preprogrammed time.
BIGEMINY	Ventricular Bigeminy	3 or more continuous QRS pattern of V-N is detected.
TRIGEMINY	Ventricular Trigeminy	3 or more continuous QRS pattern of V-N-N is detected.
FREQUENT	Frequent VPC	VPC exceeding the preprogrammed value is detected within 1 minute.
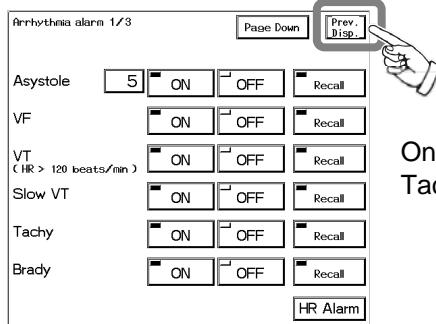
> **Reference** For details of Arrhythmia Alarm Setup, refer to " 4.Monitoring Setup   Alarm Setup ●To Set the Arrhythmia Detection Level".

⚠ WARNING	Objective and constant arrhythmia detection is possible through the fixed algorithm incorporated in this monitor. However, excessive waveform morphology change, motion artifact, or the inability to determine the waveform pattern may cause an error, or fail to make adequate detection. Therefore, physicians should make final decisions using manual recording, alarm recording and recall waveform for evaluation.

⚠ CAUTION	For proper arrhythmia detection and ECG monitoring, verify proper electrode placement, lead selection, and ECG waveform size. If necessary, turn ON the AC filter. Improper electrode placement, lead selection, and ECG waveform size can cause errors in detection.
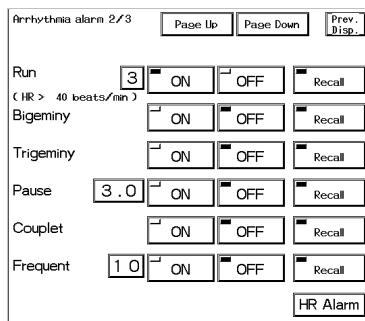
To Set the Arrhythmia Alarm

ON/OFF of arrhythmia alarm and reference of arrhythmia analysis can be set.
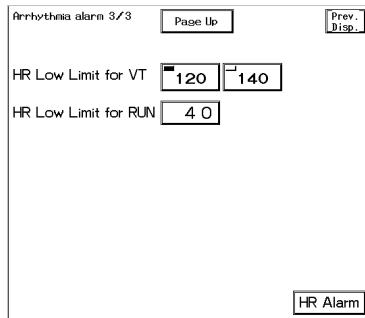
1 Press the | Menu | → | Alarm | → | Arrhy. | keys.

On page 1/3, the alarm setup menu of Asystole, VF, VT, Slow_VT, Tachy, and Brady will be displayed.

On page 2/3, the alarm setup menu of Run, Bigeminy, Trigeminy, Pause, Couplet, and Frequent will be displayed.
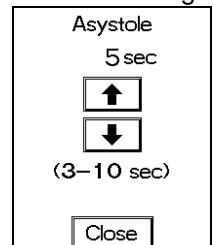
On page 3/3, the analysis condition (HR Low Limit) setup menu for VT and RUN will be displayed.

Page	Arrhythmia
Page 1/3	ASYSTOLE, VF, VT, SLOW_VT, TACHY, BRADY
Page 2/3	RUN, COUPLET, BIGEMINY, TRIGEMINY, PAUSE, FREQUENT
Page 3/3	HR Low Limit for VT, HR Low Limit for RUN

2 Set the reference range.

Asystole [5] [■ ON] [⌐ OFF] [■ Recall]

Pressing the reference value key will display the [↑] [↓] keys.

```
┌─────────────┐
│  Asystole   │
│   5 sec     │
│   ┌───┐     │
│   │ ↑ │     │
│   └───┘     │
│   ┌───┐     │
│   │ ↓ │     │
│   └───┘     │
│  (3-10 sec) │
│             │
│  ┌───────┐  │
│  │ Close │  │
│  └───────┘  │
└─────────────┘
```

Use the [↑] [↓] keys to set the reference value.
After setting the reference value, press the [Close] key.

<Arrhythmia Reference Range>

Arrhythmia	Reference Range	Default
ASYSTOLE	3 to 10 sec.	5 sec.
RUN	2 to 8 beats	3 beats
PAUSE	1.5 to 5 sec.	3 sec.
FREQUENT	1 to 50 beats/min.	10 beats/min.

On the 3rd page, HR low limit to perform the arrhythmia analysis for VT and RUN can be set.

Arrhythmia	HR Low Limit	Default
VT	120bpm, 140bpm	120bpm
RUN	0 to 100bpm	40bpm

> **Reference** For details of Arrhythmia Alarm Setup, refer to " 4.Monitoring Setup   Alarm Setup ●To Set the Arrhythmia Detection Level".

3 Select ON or OFF for the alarm.

Asystole [5] [■ ON] [⌐ OFF] [■ Recall]

Alarm will generate.   Alarm will not generate.

> **Reference** For details of Arrhythmia Alarm Setup, refer to " 4.Monitoring Setup   Alarm Setup ●To Set ON/OFF of Arrhythmia Alarm".

4 Select ON or OFF for recall factor.

ON/OFF of recall factor can be set on the alarm setup menu.

[■ Recall] ——— Indicates the parameter is selected as recall factor.

[⌐ Recall] ——— Indicates the parameter is not selected as recall factor.

Pressing the [Recall] key will switch the ON/OFF selection.
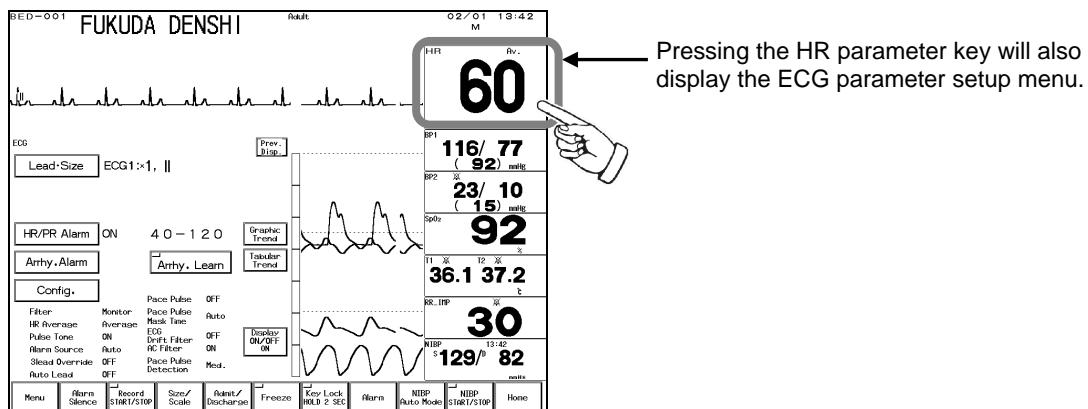
To Perform Arrhythmia Learning

Learning of normal ECG largely affects the accuracy of arrhythmia analysis.
If any error occurs in arrhythmia detection and QRS judgment, performing arrhythmia learning will recover the original analyzing 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 arrhythmia learning, arrhythmia alarm other than ASYSTOLE, TACHY, BRADY will not be generated.
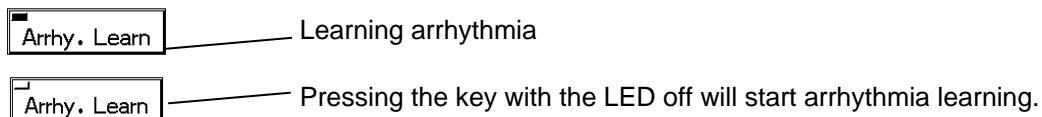
1 **Press the Menu → Parameter → ECG keys.**

Pressing the HR parameter key will also display the ECG parameter setup menu.

2 **Start arrhythmia learning.**

Arrhy. Learn ——————— Learning arrhythmia
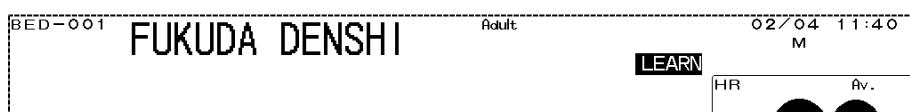
Arrhy. Learn ——————— Pressing the key with the LED off will start arrhythmia learning.

Pressing the key while learning arrhythmia will not stop the learning.

3 **During arrhythmia learning, a message will be displayed.**
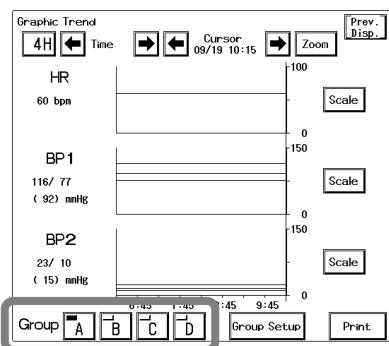
NOTE	If Used is selected for "Pacemaker" on the Admit menu, LED on the Arrhy. Learn key will not light and the "LEARN" message will not be displayed although the arrhythmia learn procedure is performed.

This section explains the graphic trend function and recording procedure.

To Display the Graphic Trend

The graphic trend menu can be accessed from the menu, or from the preprogrammed user key.
If the data is displayed on the home display, the 24 hours of graphic trend data in 1-minute interval will be automatically stored and displayed.
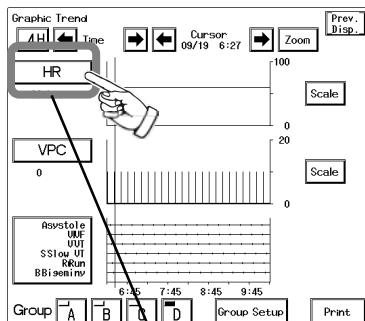
1 **Press the** | **Menu** | → | **Function** | → | **Graphic Trend** | **keys.**
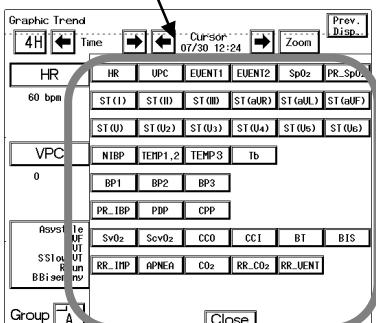
The graphic trend menu will be displayed.
The display will switch by pressing the | A |, | B |, | C |, | D | keys.

2 **The Group D display will allow selecting the parameter for numeric data on the trend menu.**

Pressing the parameter selection key will display the selection for display.
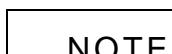
Select a parameter and press the | Close | key.

Parameter	Description
HR	Heart Rate
VPC	VPC beats
EVENT1	ASYSTOLE, VF, VT, SLOW_VT, RUN, BIGEMINY
EVENT2	TRIGEMINY, PAUSE, COUPLET, TACHY, BRADY, FREQUENT
SpO_2	SpO_2 value
PR_ SpO_2	SpO_2 pulse rate
ST(I), ST(II), ST(III), ST(aVR), ST(aVL), ST(aVF), ST(V1), ST(V2), ST(V3), ST(V4), ST(V5), ST(V6)	ST level
NIBP	Noninvasive Blood Pressure (Systolic/Mean/Diastolic)※
TEMP1,2, TEMP3	Temperature
Tb	Blood Temperature (Cardiac Output Measurement)
BP1, BP2, BP3, BP4, BP5	Blood Pressure (Systolic/Mean/Diastolic)
PR_IBP	Blood Pressure Pulse Rate (BP1 or ART)
PDP	Peak Diastolic Pressure of IABP
CPP	Cerebral Perfusion Pressure
SvO_2	Mixed Venous Oxygen Saturation
$ScvO_2$	Central Venous Oxygen Saturation
CCO	Continuous Cardiac Output
CCI	Continuous Cardiac Index
BT	Blood Temperature
RR_IMP	Impedance Respiration Rate
APNEA	Apnea Time (Impedance, CO_2, ventilator)
CO_2	$EtCO_2$ / $InspCO_2$
RR_ CO_2	CO_2 Respiration Rate
RR_VENT	Ventilator Respiration Rate
BIS	BIS Monitor Data
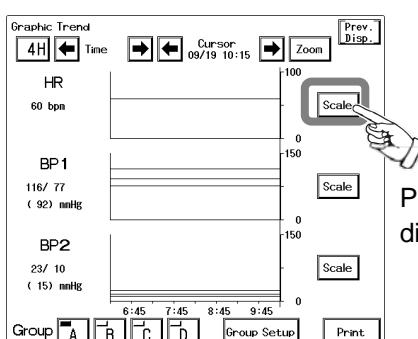
⚠CAUTION	※ If the mean BP display is set to OFF on the NIBP configuration setup, the mean BP will not be displayed for the tabular trend or the NIBP list.

NOTE	The apnea time will be stored when it exceeds the alarm threshold level. If lower than the alarm threshold level, it will be stored as "0 (zero)".
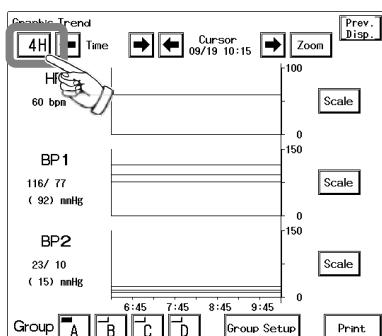
3 **Select the scale for display.**
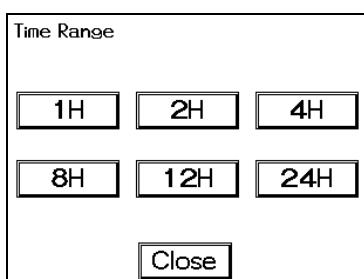
Pressing the Scale key will switch the scale according to the displayed parameter as shown below.

Parameter	Scale	Unit
HR	100, 200, 300	bpm
VPC	20, 50, 100	beat
EVENT	none	
SpO_2	0–100, 50–100, 80–100	%
PR_ SpO_2	100, 200, 300	bpm
ST	$\pm0.2, \pm0.5, \pm1.0, \pm2.0$	mV
	$\pm2, \pm5, \pm10, \pm20$	mm
NIBP	100, 150, 200, 300	mmHg
	16, 20, 24, 40	kPa
TEMP1,2, TEMP3	20–45, 30–40	°C
	68–113, 86–104	°F
Tb	20–45, 30–40	°C
	68–113, 86–104	°F
BP1, BP2, BP3, BP4, BP5	20, 50, 100, 150, 200, 300	mmHg
	4, 8, 16, 20, 24, 40	kPa
PR_IBP	100, 200, 300	bpm
PDP	20, 50, 100, 150, 200, 300	mmHg
	4, 8, 16, 20, 24, 40	kPa
CPP	20, 50, 100, 150, 200, 300	mmHg
	4, 8, 16, 20, 24, 40	kPa
SvO_2	0–100, 50–100, 80–100	%
$ScvO_2$	0–100, 50–100, 80–100	%
CCO	6.0, 12.0, 20.0	L/min
CCI	6.0, 12.0, 20.0	$L/min/m^2$
BT	20–45, 30–40	°C
RR_IMP	50, 100, 150	bpm
APNEA	15, 30	
CO_2	50, 100	mmHg
	4.0, 8.0, 10.0	kPa
RR_ CO_2	50, 100, 150	bpm
RR_VENT	50, 100, 150	bpm
BIS	0–100 fixed	(no unit)

4 Select the display time range.
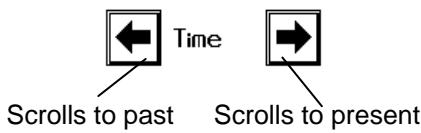
Pressing the display time range key will display the time range selection tool.

Select the time range for the graphic trend.

Time Range	Resolution
1 hour	1 min.
2 hour	1 min.
4 hour	1 min.
8 hour	2 min.
12 hour	3 min.
24 hour	6 min.

5 **Select the time span.**

Scrolls to past   Scrolls to present
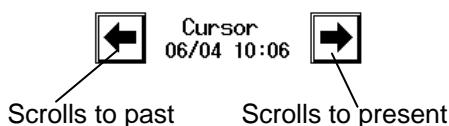
Scrolls the graphic trend display to past or present data with the selected time range.

Pressing the $\leftarrow$ key will scroll the display to the past data with the selected time range.

Pressing the $\rightarrow$ key will scroll to the present data with the selected time range.

6 **Move the cursor.**

Cursor
06/04 10:06

Scrolls to past   Scrolls to present
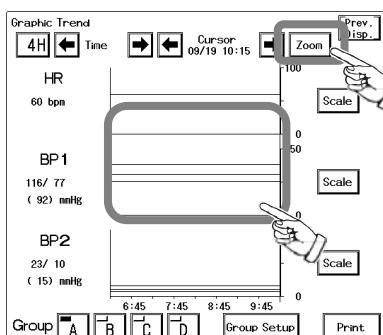
The data of selected time can be displayed by moving the cursor.

Pressing the $\leftarrow$ key will scroll to the past data

Pressing the $\rightarrow$ key will scroll to the present data.

7 **Enlarge the display.**

Pressing the Zoom key will display the 1-hour data with the cursor time in center.

Directly pressing the graph area will move the cursor position.

8 **Print the graphic trend data.**
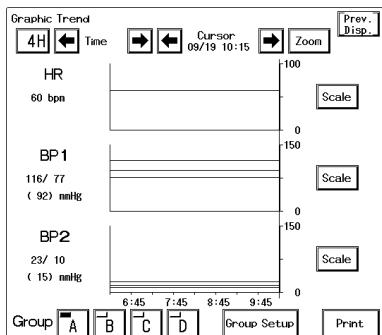
Print

The displayed graphic trend data will be printed.
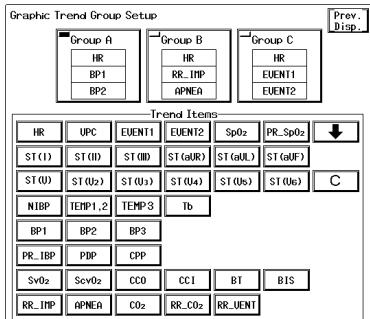
NOTE	The following graphic trend data cannot be printed on the central monitor recorder. • BP trend, NIBP trend, PDP trend, CPP trend when the BP measurement unit is kPa. • TEMP trend, Tb trend when the temperature measurement unit is °F.

7

Graphic Trend

Graphic Trend Group Setup

Each trend group displays combination of 3 parameters simultaneously. 3 types of trend group can be programmed.

1 **Press the** $\boxed{\text{Menu}}$ → $\boxed{\text{Function}}$ → $\boxed{\text{Graphic Trend}}$ → $\boxed{\text{Group Setup}}$ **keys.**

The graphic trend group setup menu will be displayed.
On this menu, parameters to display for Group A, Group B, and Group C can be selected.

2 **Select the trend group to set the parameters.**

Select the trend group by pressing the $\boxed{\text{Group A}}$, $\boxed{\text{Group B}}$, or $\boxed{\text{Group C}}$ key.

Select the parameter by pressing the displayed parameter keys.
Pressing the parameter key will sequentially set the 3 (three) parameters from the top.

The Description of the Display

The measured data will be compressed for the 8-hour / 12-hour / 24-hour display.

Parameter	Compressed Form
HR	Mean Value
VPC	Maximum Value
EVENT	Logical Sum
SpO_2	Mean Value
PR_ SpO_2	Mean Value
ST	Mean Value
NIBP	Current Value
TEMP	Mean Value
BP	Mean Value
PR_IBP	Mean Value
PDP	Mean Value
CPP	Mean Value
SvO_2	Mean Value
$ScvO_2$	Mean Value
CCO	Mean Value
CCI	Mean Value
BT	Mean Value
RR_IMP	Mean Value
APNEA	Maximum Value
CO_2	Mean Value
RR_ CO_2	Mean Value
RR_VENT	Mean Value
BIS	Mean Value

7

Graphic Trend

This section explains the tabular trend function and recording procedure.

To Display the Tabular Trend

The tabular trend menu can be accessed from the menu, or from the preprogrammed user key.
The 24 hours of data in 1-minute interval will be automatically stored and displayed if the data is displayed on the home display.

1 Press the Menu → Function → Tabular Trend keys.
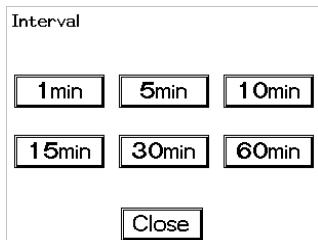
Tabular Trend ← Shift →	Interv.10M	← Page →	Prev. Disp.

09/19	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10
HR	60	60	60	60	60	60	60	60
VPC/min	0	0	0	0	0	0	0	0
ST(I) mm	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
ST(II) mm	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
BP1_S mmHg	116	116	116	116	116	116	116	116
_D mmHg	77	77	77	77	77	77	77	77
_M mmHg	92	92	92	92	92	92	92	92
BP2_S mmHg	23	23	23	23	23	23	23	23
_D mmHg	10	10	10	10	10	10	10	10
_M mmHg	15	15	15	15	15	15	15	15
Sp02	92	92	92	92	92	92	92	92
RR_IMP	30	30	30	30	30	30	30	30
EtC02 mmHg	33	33	33	33	33	33	33	33
RR_C02	30	30	30	30	30	30	30	30
APNEA	10	10	10	10	10	10	10	10
T1 ℃	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1
T2 ℃	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.2

List setup   Print

The tabular trend of 17 parameters will be displayed.

2 Select the time interval.

Interv.60M

Pressing the time interval key will display the time interval selection tool.

Interval

| 1min | 5min | 10min |
| 15min | 30min | 60min |

Close
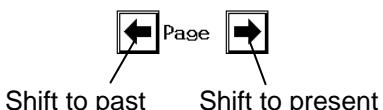
Select the time interval for the tabular trend display.

Selecting 5M will display the data in real time such as 10:00, 10:05, 10:25.
Selecting 60M will display the data in real time such as 10:00, 11:00, 12:00.
If the list is displayed at 10:35, the data from 10:00 will be displayed.

3 Shift the page.

← Page →
Shift to past   Shift to present

The page can be shifted past or present by page with the displayed time interval.
Pressing the ← key will shift one page to the past data.
Pressing the → key will shift one page to the present data.
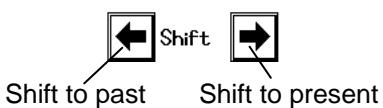
The data will be listed in 8 columns.
If 5-minute time range is selected and the starting time on the list is 10:00, 35 minutes from 10:00 to 9:25 will be listed in 1 page.
Pressing the ← key will display the list from 9:20 to 8:45.

4 Shift the displayed column.

← Shift →
Shift to past   Shift to present

The tabular trend data can be shifted.
Pressing the ← key will shift the display to past.
Pressing the → key will shift the display to present.

5 **Print the list data.**

Print

The displayed tabular trend data will be printed.

NOTE	The following tabular trend data cannot be recorded on the central monitor recorder. • BP trend, NIBP trend, PDP trend, CPP trend, PCWP trend when the BP measurement unit is kPa. • TEMP trend, Tb trend when the temperature measurement unit is °F.

The Description of the Display

Latest Date

Latest Time

For the data when the measurement was not performed (before admittance) or when the monitoring was suspended, the time will be displayed as "—:——". Also, if the data is not displayed on the home display, or the BP is not zero balanced, the data will be displayed as "- - -".

Parameter Setup for Tabular Trend

1 **Press the** List Setup **key on the tabular trend menu to display the tabular trend setup menu.**
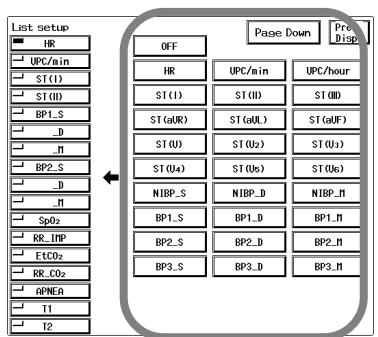
2 **Select the position on the list.**

Select the position.
There are 17 positions on the list to set the parameter.

3 Select the parameter for display.

Select the parameter to display for the previously selected position. The position will automatically shift downward to allow consecutive parameter selection.

NOTE	The apnea time will be stored when it exceeds the alarm threshold level. If lower than the alarm threshold level, it will be stored as "0 (zero)".
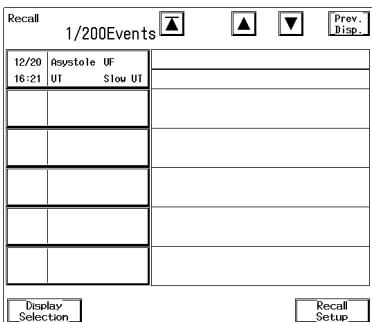
This section explains the recall menu function and recording procedure.

To Display the Recall Menu

The recall menu can be accessed from the menu, or from the preprogrammed user key.

When the assigned alarm factor occurs, the waveform (12 seconds) and numeric data at alarm occurence will be stored for up to 200 data.
The recall data to be displayed can be selected on the display selection menu.
On the recall list display, 5 compressed recall waveform will be displayed. Pressing one of the compressed recall waveform will enlarge the waveform.
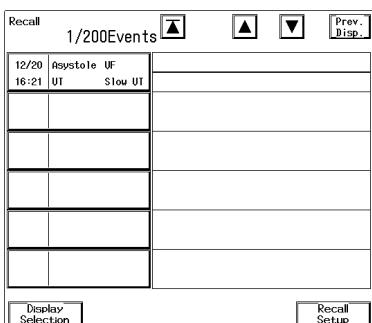
Time at Alarm Occurrence   Recall Factor   Recall Waveform (Compressed: 7sec.)

If the recall data exceeds 200, the data will be erased from the oldest one.

●Recall List Display

1 **Press the** **Menu** → **Function** → **Recall** **keys.**
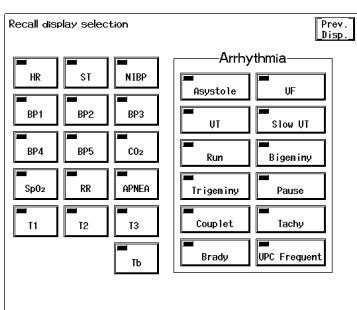
The recall list will be displayed.
The compressed waveform of about 7 seconds will be displayed.
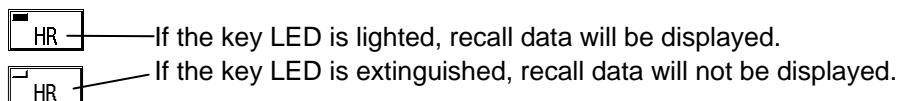
The alarm occurrence time, the recall factor occurred at the same time, and the compressed waveform of recall waveform 1 will be displayed.

2 **Select the recall factor to display on the recall list.**
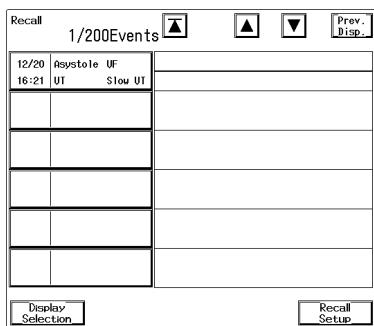
Press the **Display Selection** key and select the recall factor.

Select the numeric data, arrhythmia to display as recall factor.

HR —— If the key LED is lighted, recall data will be displayed.

HR —— If the key LED is extinguished, recall data will not be displayed.
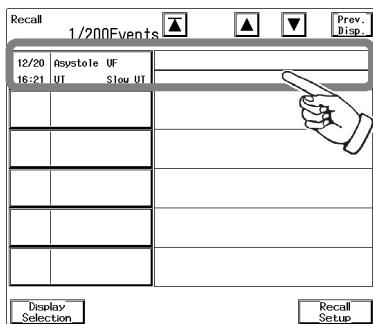
3 **Shift the recall list display.**

The newest 6 data will be displayed from the recall list.

Shifts the recall list to newer data by 1 page (6 data).

Shifts the recall list to older data by 1 page (6 data).
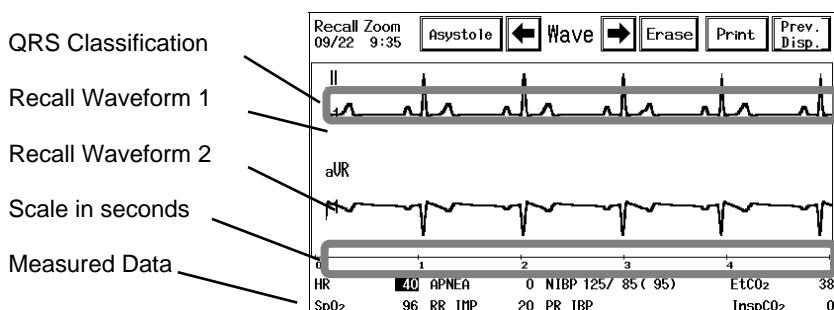
To Display and Record the Enlarged Recall Waveform

On the recall list display, pressing one of the recall factor will display the enlarged recall waveform.
On the enlarged recall waveform display, the recall waveform will be displayed in 25mm/s and by using the cursor, the data before and after the alarm occurrence can be checked.
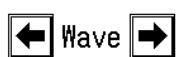
Press one of the recall factors on the recall list.

1 **Pressing one of the recall factors will display the enlarged recall waveform.**

QRS Classification

Recall Waveform 1

Recall Waveform 2

Scale in seconds

Measured Data
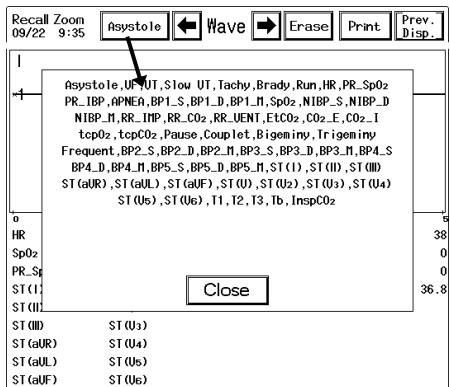
2 **Shift the waveform left or right.**

The recall waveform display can be shifted to left or right.

← key will shift to the older data.

→ key will shift to the newer data.

3 **The alarm factor occurred at the same time will be displayed.**

```
Recall Zoom    Asystole  ← Wave →  Erase  Print  Prev.
09/22  9:35                                       Disp.
I
   ┌──────────────────────────────────────────┐
   │ Asystole,VF,VT,Slow VT,Tachy,Brady,Run,HR,PR_SpO2 │
   │ PR_IBP,APNEA,BP1_S,BP1_D,BP1_M,SpO2,NIBP_S,NIBP_D │
   │ NIBP_M,RR_IMP,RR_CO2,RR_VENT,EtCO2,CO2_E,CO2_I │
   │ tcpO2,tcpCO2,Pause,Couplet,Bigeminy,Trigeminy │
   │ Frequent,BP2_S,BP2_D,BP2_M,BP3_S,BP3_D,BP3_M,BP4_S │
   │ BP4_D,BP4_M,BP5_S,BP5_D,BP5_M,ST(I),ST(II),ST(III) │
   │ ST(aVR),ST(aVL),ST(aVF),ST(V),ST(V2),ST(V3),ST(V4) │
   │      ST(V5),ST(V6),T1,T2,T3,Tb,InspCO2 │
   │                                            │
   │                                            │
0  │                                            │
HR │                ┌─────────┐                 │ 38
SpO2│               │  Close  │                 │ 0
PR_S│               └─────────┘                 │ 0
ST(I)                                            36.8
ST(II)
ST(III)    ST(V3)
ST(aVR)    ST(V4)
ST(aVL)    ST(V5)
ST(aVF)    ST(V6)
```

Pressing the recall factor key will display the recall factor occurred at the same time.

4 **Print the recall waveform.**

Pressing the ⎮Print⎮ key will print the displayed recall waveform and numeric data.
The output recorder for recall recording can be selected from the output recorder of graphic recording or manual recording.

5 **Erase the recall waveform.**
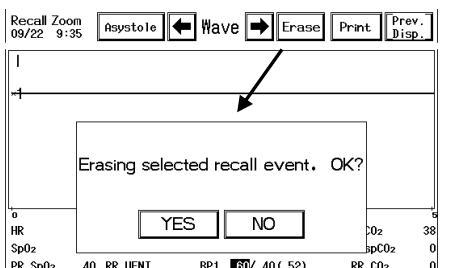
Erase the unnecessary recall waveform.

Pressing the ⎮Erase⎮ key will display the confirmation message.
⎮YES⎮ will erase the waveform and displays the recall list display.
⎮NO⎮ will return to the previous display.

```
Recall Zoom    Asystole  ← Wave →  Erase  Print  Prev.
09/22  9:35                                       Disp.
I
   ┌──────────────────────────────────────────┐
   │                                            │
   │                                            │
   │ Erasing selected recall event.  OK?        │
   │                                            │
   │         ┌──────┐   ┌──────┐                │
0  │         │ YES  │   │  NO  │                │ 5
HR │         └──────┘   └──────┘           CO2  │ 38
SpO2│                                      pCO2 │ 0
PR_SpO2  40  RR_VENT   BP1 60/ 40( 52)   RR_CO2 │ 0
```
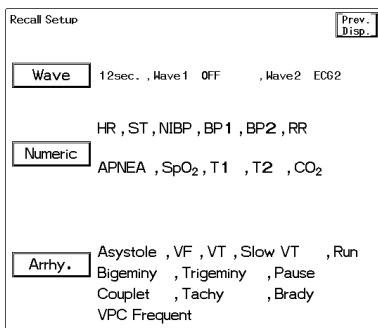
To Set the Recall Condition

On the recall menu, the storing condition at alarm occurrence can be set.
The recall waveform and recall factor (numeric data, arrhythmia) can be selected.
The displayed parameters will differ depending on the used option unit.

```
Recall Setup                          Prev.
                                      Disp.

  ⎮ Wave ⎮  12sec.,Wave1 OFF      ,Wave2 ECG2


           HR,ST,NIBP,BP1,BP2,RR
 ⎮Numeric⎮
           APNEA ,SpO2,T1 ,T2 ,CO2


           Asystole ,VF ,VT ,Slow VT   ,Run
 ⎮ Arrhy.⎮  Bigeminy ,Trigeminy ,Pause
           Couplet ,Tachy    ,Brady
           VPC Frequent
```
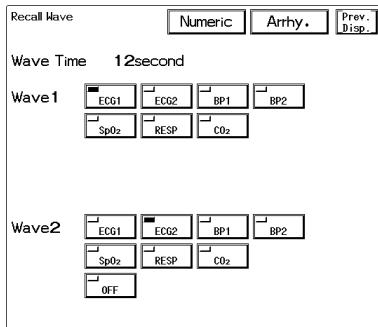
NOTE	By setting "Store all alarms to Recall" (Monitor Setup) to ON, all alarms (numeric and arrhythmia alarm) will be stored regardless of this Recall Setup. (Default: OFF) At this time, ⎮Numeric⎮, ⎮Arrhy.⎮ keys will not be displayed on the "Recall Setup" menu.

1 **Select the recall waveform.**

Wave

Pressing the ⎣ Wave ⎦ key will display the menu to select the recall waveform.

Recall Wave ⎣ Numeric ⎦ ⎣ Arrhy. ⎦ ⎣Prev. Disp.⎦

Wave Time   12second

Wave1 ⎣ECG1⎦ ⎣ECG2⎦ ⎣BP1⎦ ⎣BP2⎦
⎣SpO2⎦ ⎣RESP⎦ ⎣CO2⎦

Wave2 ⎣ECG1⎦ ⎣ECG2⎦ ⎣BP1⎦ ⎣BP2⎦
⎣SpO2⎦ ⎣RESP⎦ ⎣CO2⎦
⎣OFF⎦
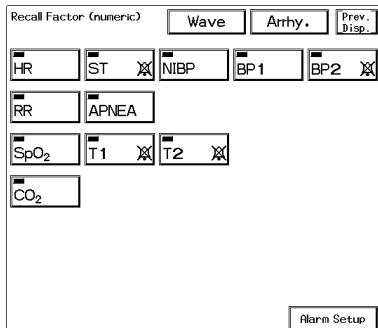
Up to 2 waveforms can be selected for recall waveform.
Select the recall waveform from Wave 1 and Wave 2.
The key with the LED lighted is the selected waveform.

2 **Select the recall factor (numeric data).**

Numeric

Pressing the ⎣ Numeric ⎦ key will display the menu to select the numeric data recall factor.

Recall Factor (numeric) ⎣ Wave ⎦ ⎣ Arrhy. ⎦ ⎣Prev. Disp.⎦

⎣HR⎦ ⎣ST ✕⎦ ⎣NIBP⎦ ⎣BP1⎦ ⎣BP2 ✕⎦

⎣RR⎦ ⎣APNEA⎦

⎣SpO2⎦ ⎣T1 ✕⎦ ⎣T2 ✕⎦

⎣CO2⎦

⎣Alarm Setup⎦
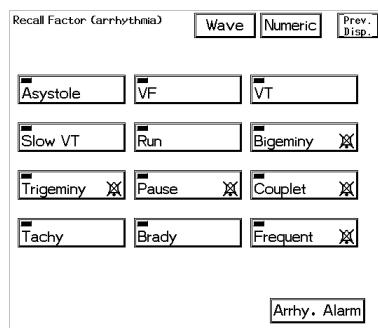
Select the recall factor by pressing the keys.
The key with the LED lighted will be the recall factor.
The alarm OFF mark will be displayed inside the parameter key if the alarm is set to OFF for that parameter.

3 **Select the recall factor (arrhythmia).**

Arrhy.

Pressing the ⎣ Arrhy. ⎦ key will display the menu to select the arrhythmia alarm factor.

Recall Factor (arrhythmia) ⎣ Wave ⎦ ⎣Numeric⎦ ⎣Prev. Disp.⎦

⎣Asystole⎦ ⎣VF⎦ ⎣VT⎦

⎣Slow VT⎦ ⎣Run⎦ ⎣Bigeminy ✕⎦

⎣Trigeminy ✕⎦ ⎣Pause ✕⎦ ⎣Couplet ✕⎦

⎣Tachy⎦ ⎣Brady⎦ ⎣Frequent ✕⎦

⎣Arrhy. Alarm⎦
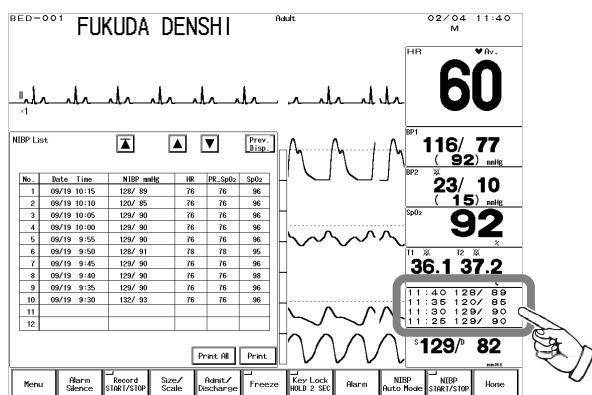
Select an arrhythmia for recall factor. The key with LED lighted will be the recall factor.
The alarm OFF mark will be displayed inside the arrhythmia key if the alarm is set to OFF for that arrhythmia.

NOTE	The recall waveform will start with the following delay time tracing back from the alarm occurrence.			
		Adult	Child	Neonate	
				Meas. Data Alarm	Arrhy. Alarm
	Delay Time	12 sec.	12 sec.	8 sec.	12sec.

This section explains the NIBP list function and recording procedure.

To Display the NIBP List
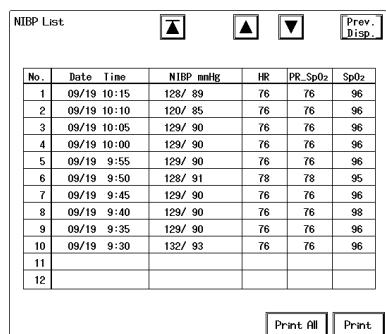
The NIBP list display can be accessed from the menu, or from the preprogrammed user key.

On the NIBP list, NIBP data and HR, SpO$_2$ pulse rate, SpO$_2$ value at the commencement of NIBP measurement will be stored and displayed for 120 NIBP measurements.
If the data exceeds 120, the data will be erased from the oldest one.

1 Press the Menu → Function → NIBP List keys.

The NIBP list will be displayed.

⏫ Displays the newest 12 data of the NIBP list.

🔼 Shifts the display to newer data by 1 page (12 data).

🔽 Shifts the display to older data by 1 page (12 data).

2 Print the NIBP list.

Print All   All the data stored on NIBP list will be printed on the built-in recorder.

Print   Currently displayed NIBP list will be printed.

NOTE	If the measurement unit of BP is kPa, the data cannot be printed on the central monitor recorder.

7

NIBP List

The Description of the Display

NIBP List

No.	Date Time	NIBP mmHg	HR	PR_SpO2	SpO2
1	09/19 10:15	128/ 89	76	76	96
2	09/19 10:10	120/ 85	76	76	96
3	09/19 10:05	129/ 90	76	76	96
4	09/19 10:00	129/ 90	76	76	96
5	09/19 9:55	129/ 90	76	76	96
6	09/19 9:50	128/ 91	78	78	95
7	09/19 9:45	129/ 90	76	76	96
8	09/19 9:40	129/ 90	76	76	98
9	09/19 9:35	129/ 90	76	76	96
10	09/19 9:30	132/ 93	76	76	96
11					
12					

The mean BP will be displayed on the NIBP list only if it is displayed on the home display.
If HR or SpO$_2$ is not measured, or not correctly measured at the commencement of NIBP measurement, the measured data will be displayed as "– – –".
For Quick SYS measurement, only the SYS (highest BP value) will be displayed.
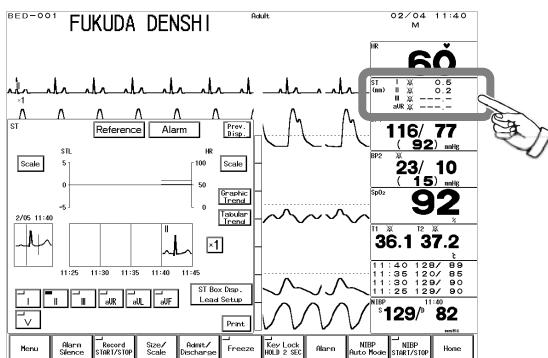
NOTE	If the NIBP measurement was not completed, the data will not be displayed on the NIBP list. At some telemetry central monitor (ex. DS-5700), the time and measurement will be displayed as "00:00" and "– – –" respectively.

This section describes the operation procedure for the ST display and alarm setup.

To Display the ST Measurement Menu

The ST display can be accessed from the menu, or from the preprogrammed user key.
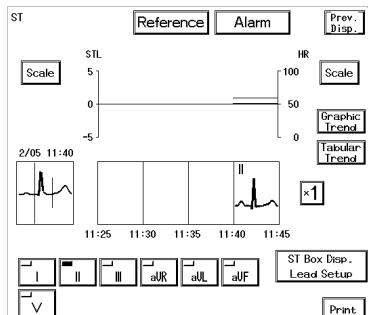
On the ST display, the averaged ECG waveform of 16 beats will be superimposed for 5 minutes.
3 frames of superimposed waveform will be displayed. Also, HR and ST level will be simultaneously displayed as graphic trend. ST1 will be measured for each lead. On the ST display, ST alarm limit and ST reference point / measurement point can be set.
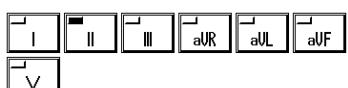
NOTE	● If 3-lead cable is used, measurement will be performed for only the displayed leads. ● "– – –" will be displayed for ST level for the following case. • during arrhythmia learning. • during lead-off condition. • when "N" or "S" is not detected for QRS within 30 seconds. • when reference waveform is not set for ST measurement.

1 Press the Menu → Function → ST Display keys.

The ST display will appear.

2 Select the superimposed waveform.

Select the lead to display.

3 Select the waveform size for the superimposed waveform.
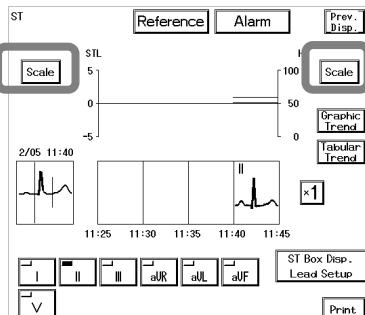
Pressing the key will sequentially change the key as follows;
×1/4 → ×1/2 → ×1 → ×2 → ×4 → ×1/4.

NOTE	The selection of displayed waveform size for the superimposed waveform synchronizes with the ECG waveform size on the home display.

4 **Select the trend scale.**

Select the displaying scale for the trend.

Trend	Scale	Unit
HR	100, 200, 300	bpm
ST	±0.2, ±0.5, ±1.0, ±2.0	mV
	±2, ±5, ±10, ±20	mm

5 **Print the ST display.**
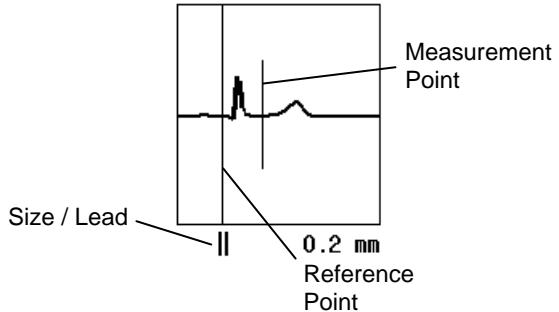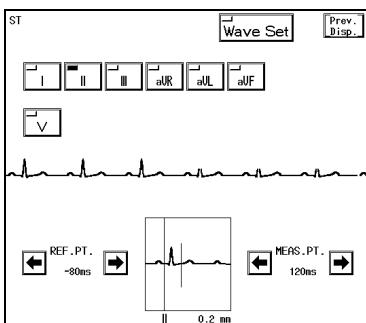
Print

Prints the currently displayed graphic trend, waveform on the ST display.
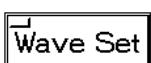
To Set the Reference Waveform

The reference waveform and reference / measurement point for measuring the ST level can be set on this menu.

1 **Press the** **Menu** → **Function** → **ST Display** → **Reference** **keys to display the reference waveform setup menu.**

2 **Read the waveform by pressing the** **Wave Set** **key.**

Wave Set

16 beats average of the ECG judged as normal QRS by arrhythmia analysis will be read. If during arrhythmia learning, or if VPC is present, the reference waveform setup will take for more than 16 beats.

Wave Set
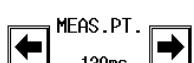
During the reference waveform setup, the key LED will light.

3 **Set the reference point on the ST display.**

◄ REF.PT. ►
   -80ms

The reference point can be set in the range of −240 to 0ms in increments of 10ms from the peak of QRS to the P wave direction.

4 **Set the measurement point on the ST display.**

◄ MEAS.PT. ►
   120ms

The measurement point can be set in the range of 0 to 560ms in increments of 10ms from the peak of QRS to the T wave direction.
Moving the cursor will display the currently measured ST value.
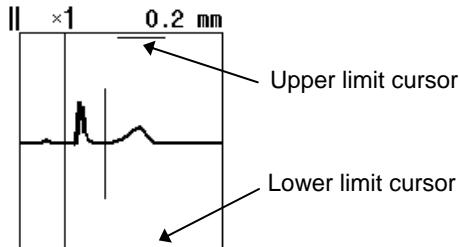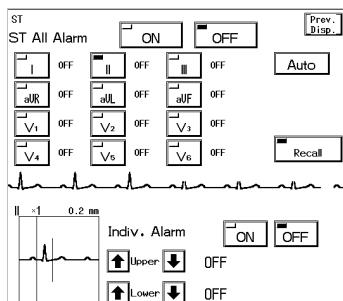
<table>
<tr><td>⚠CAUTION</td><td>For the lead which the electrode is detached, the reference waveform setup cannot be performed. Check if the electrode is correctly attached, and perform the setup again.</td></tr>
</table>

●ST Alarm Setup

The ST upper value and lower value compared with the reference waveform will be set.
The alarm value is to be set for each measurement unit (mm / mV). The upper and lower limit can be set in 1mm / 0.1mV increment.

1 Press the Menu → Function → ST Display → Alarm keys to display the alarm setup menu.

Upper limit cursor

Lower limit cursor

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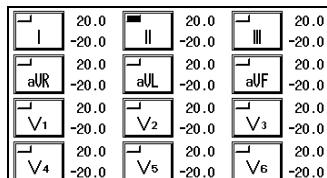
ST All Alarm   ON   OFF

 ON will generate ST alarm.
However, the alarm will not generate for the lead which individual alarm is set to OFF .
 OFF will not generate ST alarm.

3 Select the lead to set the alarm limit.

Press one of the lead keys to set the alarm limit.

4 Set the upper and lower alarm limit.

⬆ Upper ⬇

⬆ Lower ⬇

Use the ⬆ , ⬇ keys to adjust the alarm limit.

Item	Description
Lower Alarm Limit	Select the lower alarm limit (±20mm / ±2.0mV). Alarm will be set to OFF if the value –20mm / –2.0mV or lower is selected.
Upper Alarm Limit	Select the upper alarm limit (±20mm / ±2.0mV). Alarm will be set to OFF if the value +20mm / +2.0mV or above is selected.

5 Select ON/OFF of "Indiv. Alarm".

Indiv. Alarm   ON   OFF

 ON will generate the ST alarm for the selected lead.
 OFF will not generate the ST alarm for the selected lead.
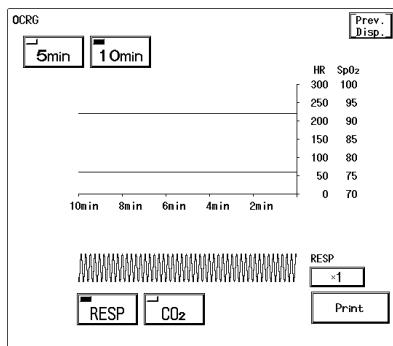
6 Select "Auto" for automatically setting the alarm limit.

Auto

Pressing the Auto key will automatically set the upper alarm limit to current ST value +0.2mV (+2mm), and lower alarm limit to current ST value –0.2mV (–2mm).
Selecting "Auto" will automatically turn ON the ST alarm.
If the upper or lower limit is OFF, the limits will remain to be OFF.
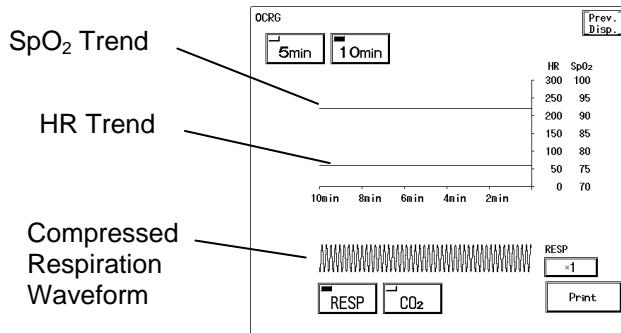
7

ST Display

This section describes the procedure for OCRG display.
The OCRG display can be accessed from the menu, or from the preprogrammed user key.
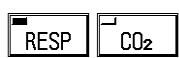
On the OCRG display, compressed respiration waveform, HR trend and SpO_2 trend are displayed simultaneously.

1 Press the ⎿ Menu ⏌ → ⎿ Function ⏌ → ⎿ OCRG ⏌ keys to display the OCRG menu.

SpO₂ Trend

HR Trend

Compressed Respiration Waveform

The trend scale is fixed as follows.
HR   : 0 to 300bpm
SpO_2 : 70 to 100%

2 Select the respiration waveform.

Select ⎿ RESP ⏌ or ⎿ CO₂ ⏌ to display the compressed respiration waveform from impedance respiration (RESP) or CO_2 waveform.

3 Select the displaying duration.

Select a displaying duration from ⎿ 5min ⏌ or ⎿ 10min ⏌ .

4 Select the waveform size for compressed respiration waveform.

Pressing the size key will sequentially change the waveform size.

Respiration Waveform	Size, Scale
Impedance, RESP	×1/4 → ×1/2 → ×1 → ×2 → ×4 → ×1/4
CO₂	100 → 50 → 100 (unit : mmHg)
	4 → 8 → 10 → 4 (unit : % or kPa)

5 Print the OCRG display.

Print

The currently displayed graphic trend and compressed waveform on the OCRG display will be printed.

NOTE	The OCRG cannot be printed on the central monitor recorder.
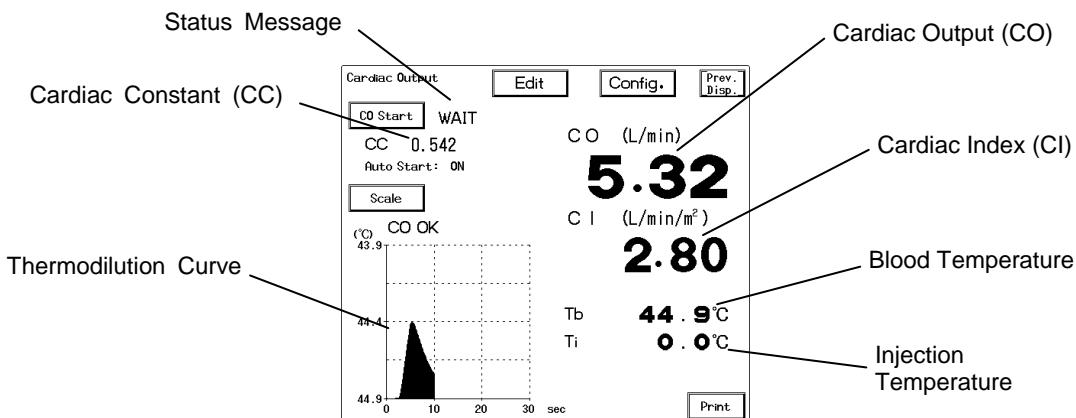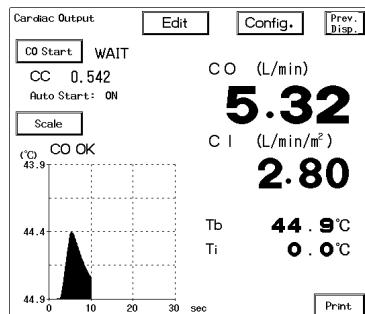
This section explains about the cardiac output measurement using the thermodilution method, setup procedure for catheter type, and procedure for editing the measurement result.

To Display the Cardiac Output Menu

The cardiac output menu can be accessed from the menu, or from the preprogrammed user key.

Status Message
Cardiac Constant (CC)
Thermodilution Curve
Cardiac Output (CO)
Cardiac Index (CI)
Blood Temperature
Injection Temperature

1 **Press the** ⎡**Menu**⎤ → ⎡**Function**⎤ → ⎡**Cardiac Output**⎤ **keys.**

The cardiac output menu will be displayed.
The message will be displayed depending on the status.
The measurement can be started when "READY" is displayed.

●Message List
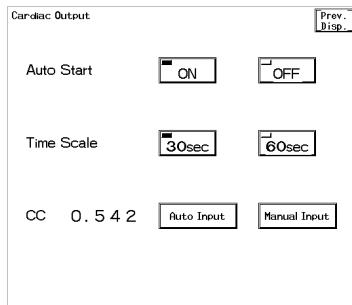
Message	Description
Status Message	
WAIT	Preparing for measurement. Also displayed when the catheter relay cable is not connected to the CO module, or when the thermodilution catheter is not connected.
READY	Ready to begin the measurement.
BUSY	In process of measurement.
END	End of measurement.
Result Message	
CO_OK	CO is correctly measured.
UPPER_FAULT	Measurement error ・The blood temperature is out of the measurable range after the injection. ・The thermistor connector and relay cable is not properly connected. ・The line is cut on the sensor or relay cable.
PEAK_FAULT	Measurement error ・The peak of the thermodilution curve can not be detected. ・The thermistor connector and relay cable is not properly connected. ・The line is cut on the sensor or relay cable.
LOWER_FAULT	Measurement error ・The blood temperature has not returned to stable condition after measurement. ・The thermistor connector and relay cable is not properly connected. ・The line is cut on the sensor or relay cable.
SENSOR_ERROR	Measurement error ・The thermistor connector and relay cable is not properly connected. ・The line is cut on the sensor or relay cable.
OVER RANGE	Measurement error ・The CO value is out of measurable range.

The result status will be displayed for 30 seconds after completion of measurement.

Cardiac Output Setup

Before measuring the cardiac output, set the measurement condition such as ON/OFF of auto start, injection condition, etc.

1 Press the Menu → Function → Cardiac Output → Config. keys.

The cardiac output configuration menu will be displayed.
Set the measurement condition such as ON/OFF of auto start, displaying scale of thermodilution curve, CC value for injection, etc.
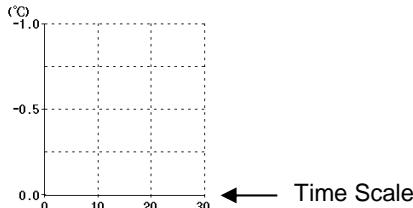
2 Set ON/OFF of "Auto Start".

 ON will automatically start the measurement without pressing the CO Start key.
 OFF will start the measurement when CO Start key is pressed.
Even when ON is selected, the measurement can be manually started by pressing the CO Start key.

3 Set the time scale.

Select the time scale of thermodilution curve from ⎡30sec⎤ / ⎡60sec⎤

Time Scale　　⎡30sec⎤　⎡60sec⎤

◄—— Time Scale

4 Set the computation constant.

CC　0.542　⎡Auto Input⎤　⎡Manual Input⎤

⎡Auto Input⎤ key will automatically input a pre-determined computation constant into the formula for the cardiac output calculation. The constant is dependent on the size of the catheter and the injection volume.
⎡Manual Input⎤ key will allow to manually input the computation constant for the used catheter.

【Auto Input of CC】

Select the catheter manufacturer from ⎡BIOSENSORS⎤, ⎡BD⎤, ⎡EDWARDS⎤, catheter size (F) from ⎡5⎤, ⎡6⎤, ⎡7⎤, ⎡7.5⎤, and injection volume (mL) from ⎡3⎤, ⎡5⎤, ⎡10⎤.
When the above items are selected, CC value will be automatically set.

(BD: Becton Dickinson)

Inj. Temp.　⎡Ice⎤　⎡Room⎤

When using a relay cable which can not measure the injectate temperature, select from the two selections.
When measuring at 0°C, select ⎡Ice⎤, and when measuring at room temperature, select ⎡Room⎤.
When CC is set, finalize it by pressing the ⎡Input⎤ key. If the CC does not correspond to the used catheter, or if you desire to return to the previous CC value, press the ⎡Cancel⎤ key, and input the value manually.

CC　0.000　⎡INPUT⎤　⎡Cancel⎤

【Manual Input of CC】

Switch the manufacturer and select the CC for the used catheter.
Up to 6 types of recently used CC can be programmed for each 3 manufacturers. Pressing the ⎡Manufacturer⎤ key will switch the manufacturer name.

Inj. Temp.　⎡Ice⎤　⎡Room⎤

When using the CJ-382 catheter relay cable, make sure to set the "Injectate Temperature"

CC　⎡INPUT⎤　⎡Cancel⎤

After setting the CC value, press the ⎡Input⎤ key to finalize the value.
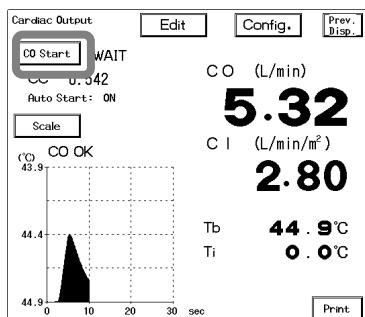
To Measure the Cardiac Output

The measurement can be started when "READY" is displayed.
If "WAIT", "BUSY", "CO_OK" message is displayed, the measurement cannot be started. Wait until it is ready for measurement. Particularly when "WAIT" message is continuously displayed, verify that catheter relay cable is properly connected to cardiac output module, and thermodilution catheter is securely connected.

1 **Display the cardiac output menu.**

2 **Start the measurement.**

Press the CO Start key, and inject as soon as the beep sound generates
If "Auto Start" is set to ON, injecting without pressing the CO Start key will automatically start the measurement by detecting the blood temperature change.
When the measurement is complete, CO and CI value will be displayed.

3 **Print the measurement result.**
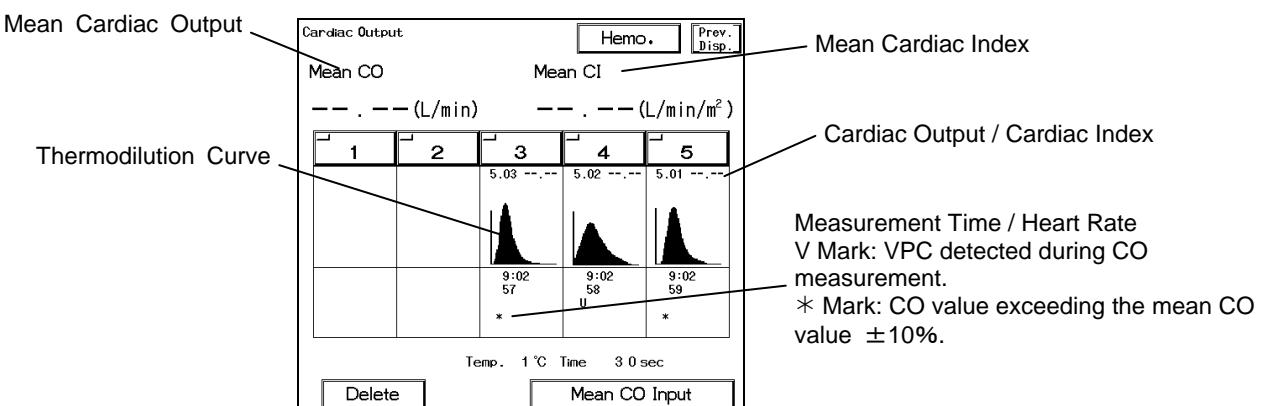
Print

Pressing the Print key will print the displayed thermodilution curve, cardiac output, and cardiac index on the recorder.
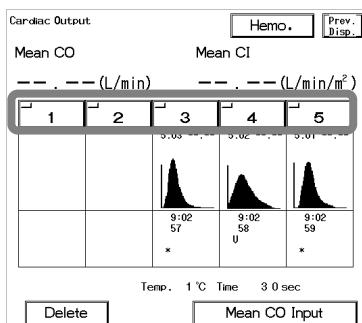
NOTE	• Before injecting, check that the Ti (injectate temperature) setting is correct.
	• When repeatedly performing the measurement, inject at intervals of 30 to 60 seconds
	• In the following cases, measurements may be inaccurate.
	  • Shunt disease, tricuspid regurgitation or pulmonic regurgitation.
	  • During exercise stress
	    As body temperature differs sequentially by exercise, constant CO value cannot be measured.
	  • Excessive Arrhythmia
	    Body Temperature varies non-continuously as a result of arrhythmia. Accurate CO value cannot be measured.
	• The CI value will not be displayed unless height/weight or BSA value is input on the admit menu.

To Edit the Cardiac Output Data

By performing the CO measurement continuously, mean CO and mean CI can be calculated by editing the measurement result.

Mean Cardiac Output

Thermodilution Curve

Mean Cardiac Index

Cardiac Output / Cardiac Index

Measurement Time / Heart Rate
V Mark: VPC detected during CO measurement.
＊ Mark: CO value exceeding the mean CO value ±10%.

1 Press the [Menu] → [Function] → [Cardiac Output] → [Edit] keys.
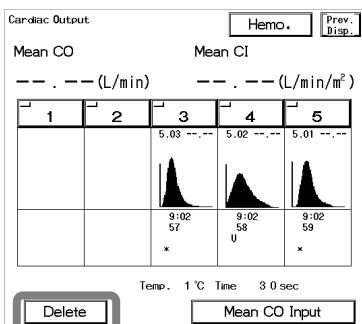
The cardiac output edit menu will be displayed.
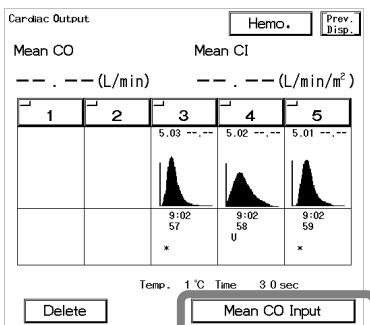The mean CO and mean CI value obtained from the measurement result will be displayed.
The data can be omitted from the averaging by turning OFF the LED of the corresponded data.

2 Delete the measurement result.

Pressing the [Delete] key will delete all the measurement data of the thermodilution curve with the key LED turned OFF.

3 Input the data to the list.

Pressing the [Mean CO Input] key will input the displayed mean CO data to the list.

NOTE	If the height, weight, and BSA are changed on the patient admit menu, the average CI will be recalculated. As the CI will not be recalculated after the hemodynamic calculation, store the average CI by hemodynamic calculation before changing the height, weight, and BSA.

7

CO Measurement

This section explains the procedure for hemodynamic calculation and printing.

●Calculation Data

Data	Description	Formula
BSA	Body Surface Area (m²)	$h^{0.725} \times w^{0.425} \times 71.84 \times 10^{-4}$ (Dubois Formula)
CI	Cardiac Index (L/min/m²)	$\dfrac{CO}{BSA}$
SV	Stroke Volume (mL/beat)	$\dfrac{CO \times 1000}{HR}$
SVI	Stroke Volume Index (mL/beat/m²)	$\dfrac{SV}{BSA}$
SVR	Systemic Vascular Resistance (dynes·sec·cm^{-5})	$\dfrac{(MAP - CVP) \times 79.90}{CO}$
SVRI	Systemic Vascular Resistance Index (dynes·sec·cm^{-5}·m²)	$SVR \times BSA$
PVR	Pulmonary Vascular Resistance (dynes·sec·cm^{-5})	$\dfrac{(MPAP - PCWP) \times 79.90}{CO}$
PVRI	Pulmonary Vascular Resistance Index (dynes·sec·cm^{-5}·m²)	$PVR \times BSA$
LVW	Left Ventricular Work (kg·m)	$CO \times (MAP - PCWP) \times 0.0136$
LVWI	Left Ventricular Work Index (kg·m/m²)	$\dfrac{LVW}{BSA}$
LVSW	Left Ventricular Stroke Work (g·m)	$SV \times (MAP - PCWP) \times 0.0136$
LVSWI	Left Ventricular Stroke Work Index (g·m/m²)	$\dfrac{LVSW}{BSA}$
RVW	Right Ventricular Work (kg·m)	$CO \times (MPAP - CVP) \times 0.0136$
RVWI	Right Ventricular Stroke Work Index (kg·m/m²)	$\dfrac{RVW}{BSA}$
RVSW	Right Ventricular Stroke Work (g·m)	$SV \times (MPAP - CVP) \times 0.0136$
RVSWI	Right Ventricular Stroke Work Index (g·m/m²)	$\dfrac{RVSW}{BSA}$

NOTE	The blood pressure unit for hemodynamics is mmHg or kPa. The unit, cmH$_2$O cannot be used.

To Display the Hemodynamic Data

The latest 5 hemodynamics data will be displayed.

1 Press the ⎡Menu⎤ → ⎡Function⎤ → ⎡Hemodynamic⎤ keys.

The hemodynamic menu will be displayed.

2 Select the data to display.

Select the data to display the calculation result by pressing the data selection key.
On the data selection key, calculated date and time will be displayed.

3 Print the calculation data.

Print

The currently displayed hemodynamic calculation data will be printed.

To Calculate the Newly Input Hemodynamic Data

The hemodynamic calculation can be performed using the newly input data.
The data can be manually entered using the numeric keys, or the current measurement data can be automatically entered.

1 Press the ⎡Menu⎤ → ⎡Function⎤ → ⎡Hemodynamic⎤ → ⎡New⎤ keys.

The hemodynamic menu to enter the new data will be displayed.

2 Automatically enter the current measurement data.

The data already set (height, weight, etc.) and measured data (HR, etc.) will be automatically entered.
MAP (ART), MPAP (PAP), CVP (CVP) can be automatically entered by setting the BP label.

If $\boxed{\text{Auto}}$ key is pressed after entering the data, the entered data will be cleared.

NOTE	Only the BP data with the unit, mmHg/kPa can be automatically entered.

3 Enter the data using the numeric keys.

Input the data using the numeric keys, and press the corresponded key from the $\boxed{\text{Height}}$, $\boxed{\text{Weight}}$, $\boxed{\text{BSA}}$, $\boxed{\text{CO}}$, $\boxed{\text{HR}}$, $\boxed{\text{MAP}}$, $\boxed{\text{CVP}}$, $\boxed{\text{MPAP}}$, $\boxed{\text{PCWP}}$.

BSA will be automatically calculated when height and weight is entered, but it can be also manually entered using the numeric keys.

【Input Data】

Data	Description (Unit)
Height	(cm)
Weight	(kg）
BSA	Body Surface Area (m^2)
CO	Cardiac Output (L/min)
HR	Heart Rate (bpm）
MAP	Mean Artery Pressure (mmHg）
MPAP	Mean Pulmonary Artery Pressure (mmHg）
CVP	Central Venous Pressure (mmHg）
PCWP	Pulmonary Capillary Wedge Pressure (mmHg）

NOTE	If the height, weight, BSA is changed on the patient admit/discharge menu, mean CI will be recalculated. However, the hemodynamic will not be recalculated with the new CI data.

4 Execute the hemodynamic calculation.

After entering the data, press the $\boxed{\text{Calc.}}$ Key.
The calculation result will be displayed.
To cancel the calculation, press the $\boxed{\text{Prev. Disp.}}$ key.

To Edit the Hemodynamic Data

The hemodynamic data can be edited.

1 Press the ⟨Menu⟩ → ⟨Function⟩ → ⟨Hemodynamic⟩ **keys**

Select the hemodynamic data to perform editing.

2 Press the ⟨Edit⟩ **key to edit the data.**

Enter the value using the numeric keys, and press the corresponded key from ⟨Height⟩, ⟨Weight⟩, ⟨BSA⟩, ⟨CO⟩, ⟨HR⟩, ⟨MAP⟩, ⟨CVP⟩, ⟨MPAP⟩, ⟨PCWP⟩ keys.

3 Recalculate the hemodynamic data.
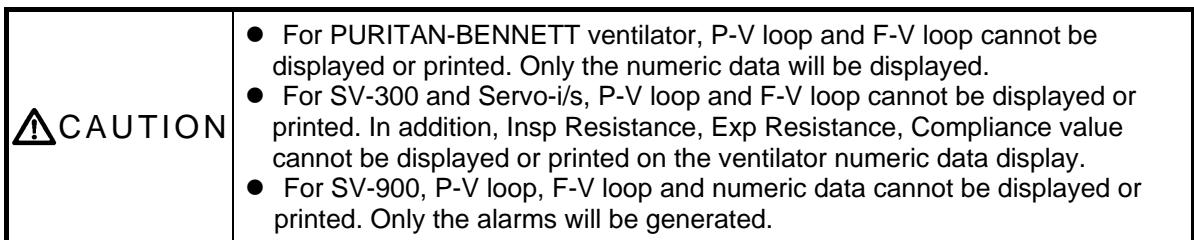
After entering the data, press the ⟨Calc.⟩ key.
The calculation result will be displayed.

To cancel the calculation, press the ⟨Prev. Disp.⟩ key.
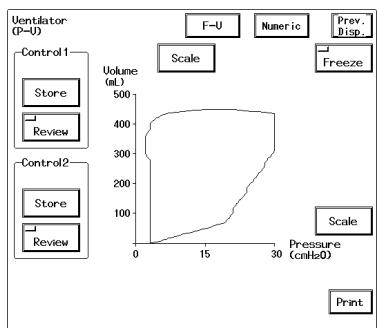The date/time will not change after recalculation.

7

Hemodynamics

By connecting the ventilator, P-V loop (airway pressure / ventilation) and F-V loop (airway flow / ventilation) can be monitored on the ventilator display.

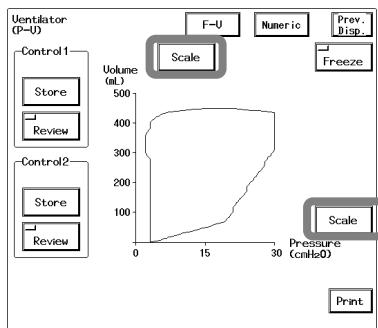| ⚠ CAUTION	● For PURITAN-BENNETT ventilator, P-V loop and F-V loop cannot be displayed or printed. Only the numeric data will be displayed. ● For SV-300 and Servo-i/s, P-V loop and F-V loop cannot be displayed or printed. In addition, Insp Resistance, Exp Resistance, Compliance value cannot be displayed or printed on the ventilator numeric data display. ● For SV-900, P-V loop, F-V loop and numeric data cannot be displayed or printed. Only the alarms will be generated.

P-V Loop

The P-V loop is sampled each 60ms and displayed for each respiration. The beginning of the loop trace is displayed in white, and the rest of the loop is displayed in cyan. The horizontal axis shows AWP (Unit: cmH$_2$O), and vertical axis shows Volume (Unit: mL).

1 **Press the** [Menu] → [Function] → [Ventilator] **keys.**
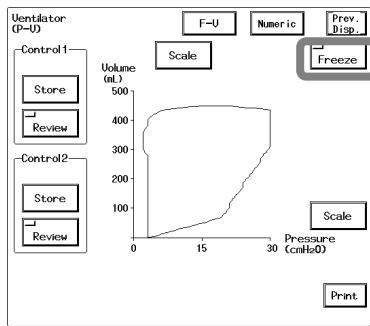

The P-V loop display will appear.

2 **Select the scale for P-V loop.**

The scale will change as the [Scale] key is pressed.
・ Vertical Axis (Volume)
  Select from 250 / 500 / 750 / 1000 (mL).
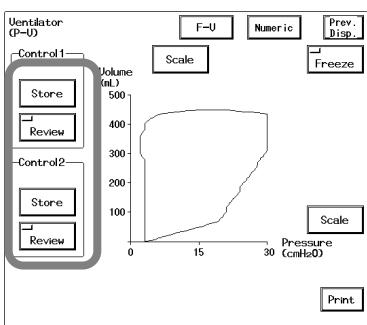・ Horizontal Axis (Pressure)
  Select from 10 / 20 / 30 / 50 / 120 (cmH$_2$O).

3 **Freeze the loop drawing.**

Pressing the [Freeze] key will stop the P-V loop drawing.
Pressing the key again will resume the waveform trace.

4 Program the reference loop.

The control loop can be stored to see the change in P-V loop.

Pressing the ⎡Store⎤ key will store the displayed P-V loop as control loop. Pressing the ⎡Review⎤ key will display the stored control loop. The control loop 1 will be displayed in yellow, and control loop 2 will be displayed in green.

5 Print the P-V loop.

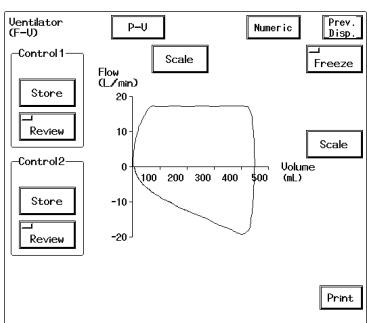⎡Print⎤   The currently displayed P-V loop will be printed.

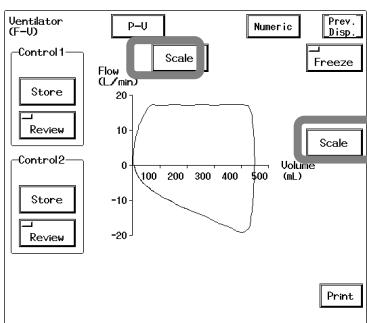| NOTE	The P-V loop cannot be printed on the central monitor recorder.

F-V Loop

The F-V loop is sampled each 60ms and displayed for each respiration. The beginning of the loop trace is displayed in white, and the rest of the loop is displayed in cyan. The horizontal axis shows AWF (Unit: L/min), and vertical axis shows Volume (Unit: mL).

1 Press the ⎡Menu⎤ → ⎡Function⎤ → ⎡Ventilator⎤ → ⎡F-V⎤ keys.

The F-V loop will be displayed.

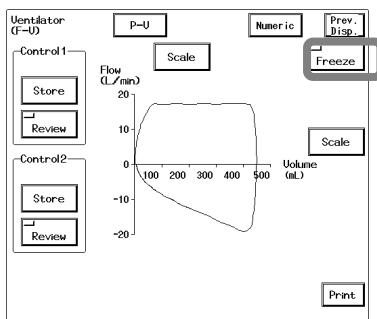## 2 Select the scale for F-V loop.

The scale will change as the ⎡Scale⎤ key is pressed.
· Vertical Axis (Flow)
  Select from ±5 / ±10 / ±20 / ±50 / ±180 (L/min).
· Horizontal Axis (Volume)
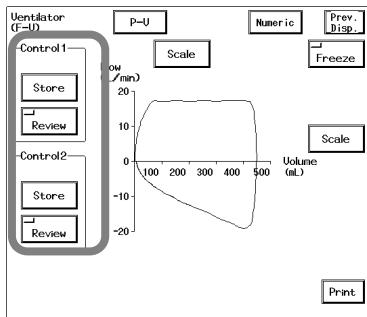 Select from 250 / 500 / 750 / 1000 (mL).

3 **Freeze the loop drawing.**

Pressing the ⎍Freeze⎍ key will stop the F-V loop drawing.
Pressing the key again will resume the waveform trace.

4 **Program the reference loop.**

The control loop can be programmed to see the change in F-V loop.

Pressing the ⎍Store⎍ key will store the displayed F-V loop as the
control loop. Pressing the ⎍Review⎍ key will display the stored
control loop.
The control loop 1 will be displayed in yellow, and control loop 2 will
be displayed in green.

5 **Print the F-V loop.**

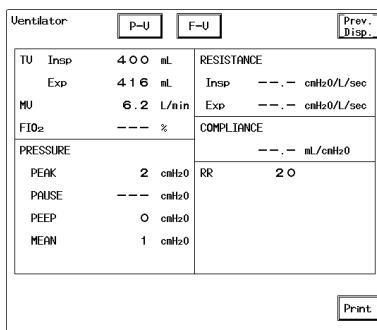Print   The currently displayed F-V loop will be printed.

NOTE	The F-V loop cannot be printed on the central monitor recorder.

Displaying the Ventilator Measurement

The numeric data measured by the ventilator can be displayed.

1 **Press the ⎍Menu⎍ → ⎍Function⎍ → ⎍Ventilator⎍ → ⎍Numeric⎍ keys.**

The ventilator display will appear.

2 **Print the measurement data.**

Print   The currently displayed ventilator measurement data will be printed.

This section explains about the respiration list display and recording procedure.

To Display the Respiration List

The respiration list display can be accessed from the menu, or from the preprogrammed user key.
If the respiration data is displayed on the home display, 24 hours of data will be automatically stored
and displayed in 1-minute interval.
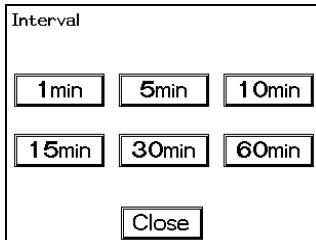
1 Press the Menu → Function → Resp. List keys.

Resp. List	Shift	Interv.10M	Page	Prev. Disp.				
09/19	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10
RR_IMP	30	30	30	30	30	30	30	30
RR_CO2	30	30	30	30	30	30	30	30
RR_VENT	940	940	940	940	940	940	940	940
SpO2	92	92	92	92	92	92	92	92
P_PEAK	2	2	2	2	2	2	2	2
P_PAUSE	0	0	0	0	0	0	0	0
P_MEAN	1	1	1	1	1	1	1	1
PEEP	0	0	0	0	0	0	0	0
E_TV	416	416	416	416	416	416	416	416
I_TV	400	400	400	400	400	400	400	400
MV	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
E_RES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I_RES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COMP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIO2	0	0	0	0	0	0	0	0
EtCO2 mmHg	33	33	33	33	33	33	33	33
APNEA	10	10	10	10	10	10	10	10

The respiration list of 17 parameters will be displayed.

2 Select the displaying interval.

Interv.10M

Pressing the time interval key will display the time interval selection
tool.

Interval
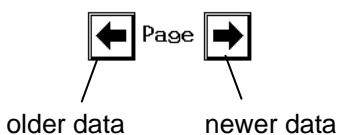
| 1min | 5min | 10min |
| 15min | 30min | 60min |

Close

Select the time interval for the respiration list display.

If 5M is selected, the time will be displayed in real time as follows. 10:00, 10:05, …10:25.
If 60M is selected, it will be displayed as 10:00, 11:00, 12:00.
If the respiration list is displayed at 10:35, the data will be displayed from 10:00.

3 Switch the page.

← Page →

older data   newer data

The page will be switched by one page with the displayed time
interval.
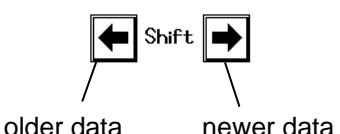 ← key will display the previous page listing the older data.
 → key will display the next page listing the newer data.

The respiration list will be displayed in 8 columns.
If 5-minute interval is selected and if the list starts from 10:00, 35 minutes data from 10:00 to 9:25 will
be displayed in 1 page.
Pressing the ← key will display the list of 9:20 to 8:45.

4 Shift the displayed columns.

← Shift →

older data   newer data

The displayed list will be shifted by one column.
 ← key will shift the display to older data by one column.
 → key will shift the display to newer data by one column.

5 Print the respiration list.

Print

The currently displayed respiration list will be printed.

7

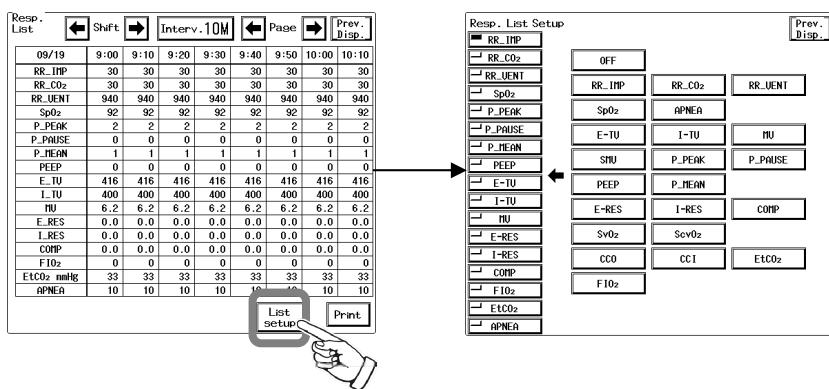Respiration List

The Description of the Display
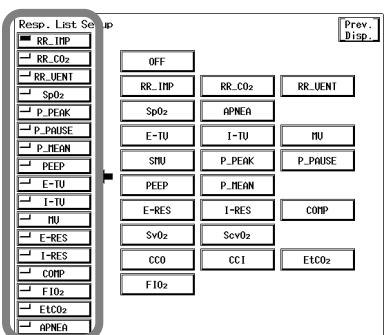
Latest Date

Latest Time

If the time is before the admitted time or if monitoring is suspended, the time will be displayed as "––:––". Also, if the measured data is not displayed on the home display, or BP zero balance is not performed, the data will be displayed as "––:––".

Respiration List Setup

1 **Press the** $\boxed{\text{List Setup}}$ **key on the respiration list display.**
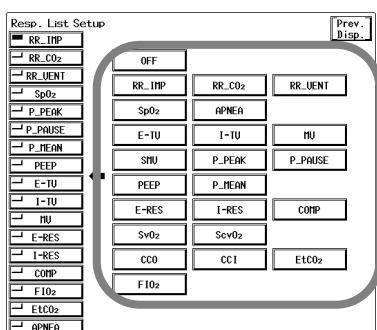

2 **Select the display position on the list.**

Maximum of 17 parameters can be displayed on the list.

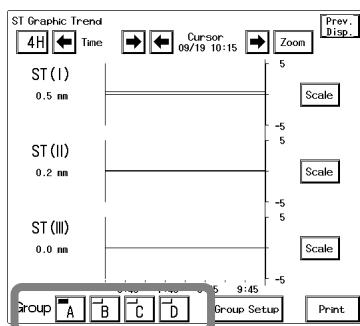**3** **Select the parameter to display.**

Select the parameter by pressing the corresponded key.
The display will automatically shift downward to allow continuous parameter selection.

This section explains about the ST graphic trend display and recording procedure.
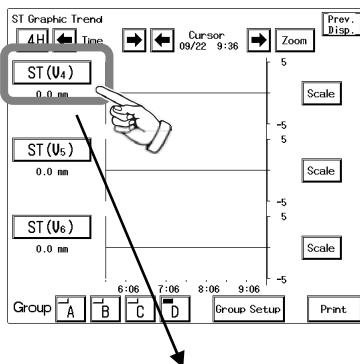
To Display the ST Graphic Trend

The ST graphic trend display can be accessed from the menu, or from the preprogrammed user key.
If the ST data is displayed on the home display, 24 hours of data will be automatically stored and
displayed in 1 minute interval.

1 Press the [Menu] → [Function] → [ST Graphic Trend] keys.
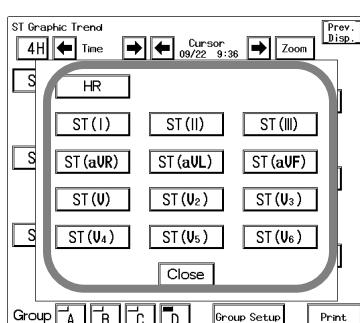
The ST graphic trend will be displayed.
Pressing one of the Group [A], [B], [C], [D] key will switch the
display.

2 Displaying Group D will allow parameter selection on the ST graphic trend menu.

Select the position to set the parameter.

Select the parameter and press the [Close] key.

3 Select the displaying scale.

Pressing the [Scale] key will sequentially switch the scale
depending on the displayed parameter as follows.

7

ST Graphic Trend

Parameter	Scale	Unit
HR	100, 200, 300	bpm
ST	±0.2, ±0.5, ±1.0, ±2.0	mV
	±2, ±5, ±10, ±20	mm

4 **Select the displaying time span.**

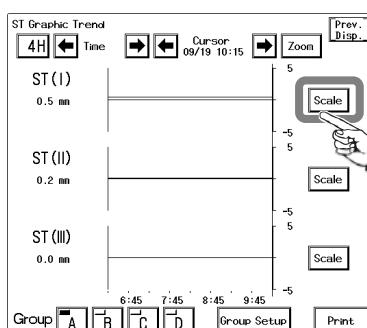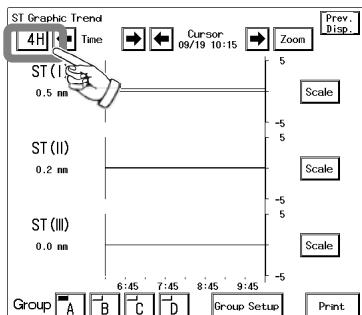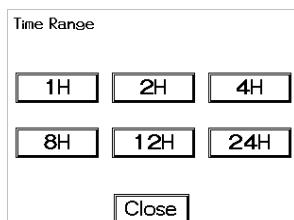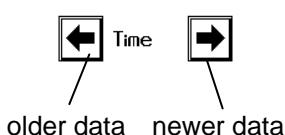Pressing the display time range key will display the time range selection tool.

Select the time range for the ST graphic trend.

Time Span	Sample Rate
1 hour	1 min.
2 hours	1 min.
4 hours	1 min.
8 hours	2 min.
12 hours	3 min.
24 hours	6 min.
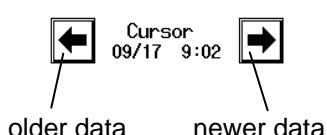
5 **Shift the display.**

older data   newer data

The ST trend display can be shifted to the older or newer data with the displayed time span.

← key will display the older data by the selected time span.
→ key will display the newer data by the selected time span.

6 **Move the cursor.**
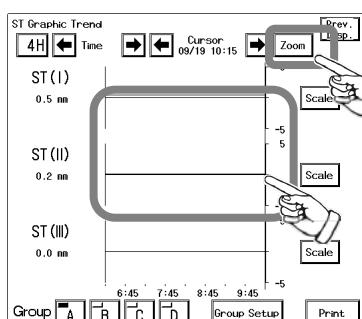
older data   newer data

The cursor can be moved to older or newer data. The time and data at cursor point will be displayed.

← key will display the older data.
→ key will display the newer data.

7 **Enlarge the display.**

Pressing the [Zoom] key will display 1 hour of data with the cursor point at center.

Directly pressing the graph area will move the cursor position.

8 **Print the ST graphic trend.**
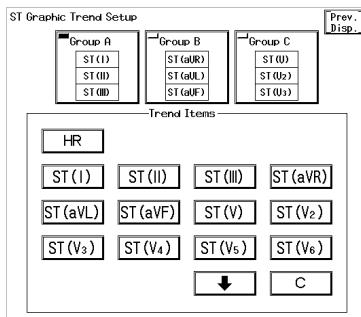
Print

The currently displayed ST graphic trend will be printed.

ST Graphic Trend Group Setup
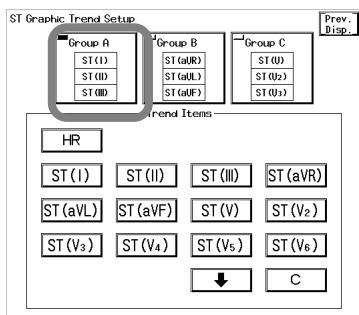
Each trend group displays combination of 3 parameters simultaneously. 3 types of trend group can be programmed.

1 **Press the** ⎡Menu⎤ → ⎡Function⎤ → ⎡ST Graphic Trend⎤ → ⎡Group Setup⎤ **keys.**
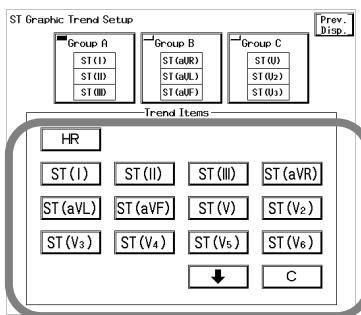
The ST graphic trend group setup menu will be displayed.
On this menu, parameters to display for Group A, Group B, and Group C can be selected.

2 **Select the trend group to set the parameters.**

Select the trend group by pressing the ⎡Group A⎤, ⎡Group B⎤, or ⎡Group C⎤ key.

Select the parameter by pressing the displayed parameter keys. Pressing the parameter key will sequentially set the 3 (three) parameters from the top.

The Description of the Display

The measured data will be compressed for the 8-hour / 12-hour / 24-hour display.
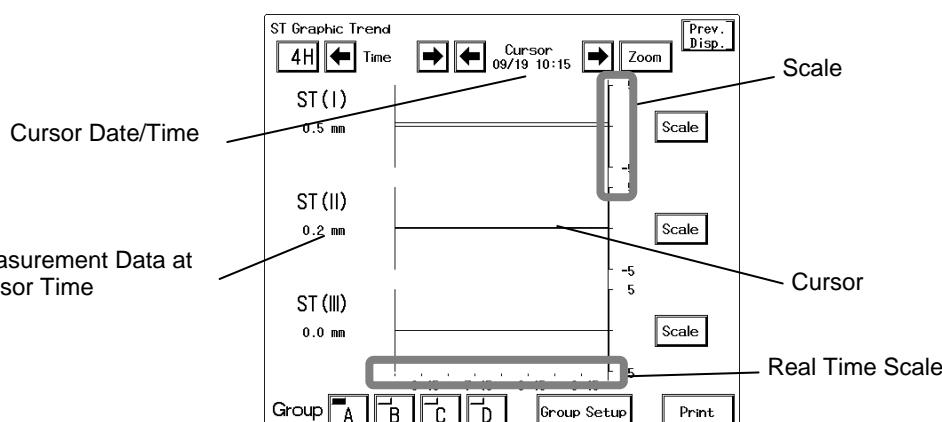
Parameter	Compressed Form
HR	Mean Value
ST	Mean Value

This section explains about the ST tabular trend display and printing procedure.

To Display the ST Tabular Trend

The ST tabular trend display can be accessed from the menu, or from the preprogrammed user key.
If the ST data is displayed on the home display, 24 hours of data will be automatically stored and displayed in 1 minute interval.

1 **Press the** $\boxed{\text{Menu}}$ → $\boxed{\text{Function}}$ → $\boxed{\text{ST Tabular Trend}}$ **keys.**
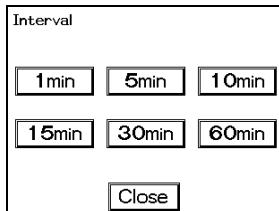
09/19		9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10
HR		60	60	60	60	60	60	60	60
ST(I)	mm	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
ST(II)	mm	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
ST(III)	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(aVR)	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(aVL)	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(aVF)	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(V)	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(V2)	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(V3)	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(V4)	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(V5)	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(V6)	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Each ST level of I, II, III, aVR, aVL, aVF, V_1, V_2, V_3, V_4, V_5, V_6, and HR will be displayed in list format.

2 **Select the display interval.**

$\boxed{\text{Interv.10M}}$

Pressing the time interval key will display the time interval selection tool.

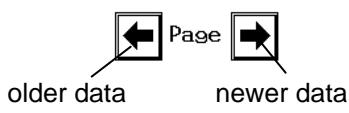| Interval		
1min	5min	10min
15min	30min	60min
	Close	

Select the time interval for the tabular trend display.

If $\boxed{5M}$ is selected, the time will be displayed in real time as follows. 10:00, 10:05, …10:25.
If $\boxed{60M}$ is selected, it will be displayed as 10:00, 11:00, 12:00.
If the ST tabular trend is displayed at 10:35, the data will be displayed from 10:00.

3 **Switch the page.**

$\boxed{\leftarrow}$ Page $\boxed{\rightarrow}$
older data   newer data
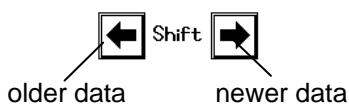
The page will be switched by one page with the displayed time interval.
$\boxed{\leftarrow}$ key will display the previous page listing the older data.
$\boxed{\rightarrow}$ key will display the next page listing the newer data.

The ST tabular trend will be displayed in 8 columns.
If 5-minute interval is selected and if the ST trend starts from 10:00, 35 minutes of data from 10:00 to 9:25 will be displayed in 1 page.
Pressing the $\boxed{\leftarrow}$ key will display the ST trend from 9:20 to 8:45.

4 **Shift the displayed columns.**

$\boxed{\leftarrow}$ Shift $\boxed{\rightarrow}$
older data   newer data

The displayed tabular trend can be shifted by one column.
$\boxed{\leftarrow}$ key will shift the display to older data by one column.
$\boxed{\rightarrow}$ key will shift the display to newer data by one column.

5 **Print the tabular trend.**

$\boxed{\text{Print}}$

The currently displayed ST tabular trend will be printed.

The Description of the Display

Latest Measurement Date

Latest Measurement Time

ST Tab Trend								Prev. Disp.

← Shift → | Interv.10M | ← Page →

09/19	9:00	9:10	9:20	9:30	9:40	9:50	10:00	10:10
HR	60	60	60	60	60	60	60	60
ST(I) mm	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
ST(II) mm	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
ST(III) mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(aVR) mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(aVL) mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(aVF) mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(V₁) mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(V₂) mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(V₃) mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(V₄) mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(V₅) mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ST(V₆) mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Print

For the data when the measurement was not performed (before admittance) or when the monitoring was suspended, the time will be displayed as "—:—".
If the lead can not be monitored depending on the ECG lead cable, the data display will be left blank, and if the ST reference point is not set, the data will be displayed "– – –".
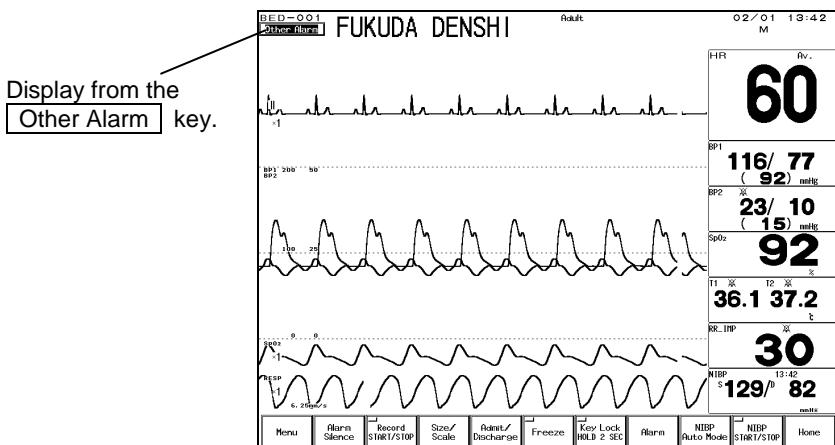
7

ST Tabular Trend

This section explains about the function to display the waveform and numeric data and to set alarms for other bedside monitors. To use this function, DS-LAN Ⅱ or DS-LAN Ⅲ wired network connection is required.
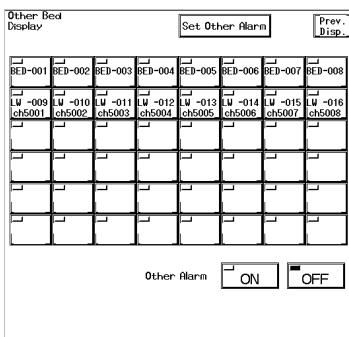
NOTE	The DS-7200 system cannot connect to a wired network of AU-5500N 8ch Recorder set as administrator (1:N network). Even if connected, other bed display, recording and other network function cannot be used.

Other Bed Display

The other bed display can be accessed from the menu or from the preprogrammed user key.
Also, by setting the other bed alarm ON, | Other Alarm | key will be displayed when other bedside monitor generates an alarm. By pressing this | Other Alarm | key, the display for the other bed can be accessed.

Display from the
| Other Alarm | key.

1 **Press the | Menu | → | Function | → | Other Bed Display | keys to display the other bed selection menu.**
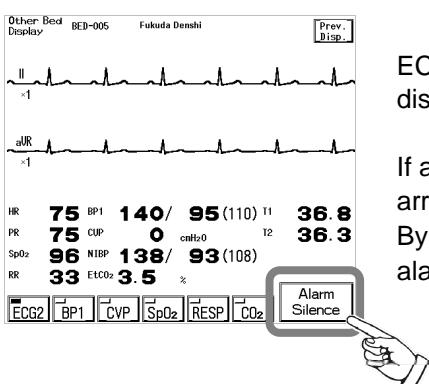
On the other bed selection menu, select the Room / Bed ID to display. For the DS-LANII network, there are 48 beds selection, and for the DS-LANIII network, there are 100 beds selection.

The Room / Bed ID for the alarm generating bed will be displayed in red.
The bed displaying this menu will be displayed in gray.
The key LED for the bed selected as the other bed alarm generating bed will be lighted.

2 **Press the Room / Bed ID key and access the display for the other bed.**

ECG waveform and numeric data for the selected bed will be displayed.

If an alarm is generated for this bed, the physiological alarm / arrhythmia alarm message will be displayed.
By pressing the | Alarm Silence | key on the other bed display, the alarm sound for the displayed bed can be silenced.

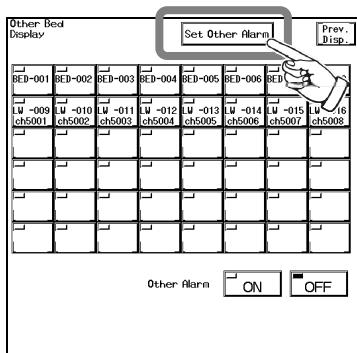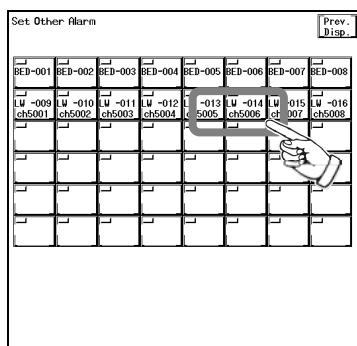| NOTE | ● In case of DS-LANII network, when the temperature unit is °F, the temperature data will not be displayed. |
| | ● In case of DS-LANIII network, if the measurement unit for BP (mmHg/kPa) and temperature (°C/°F) is different between the bedside monitor and the central monitor, the numeric data will not be displayed. |

Other Bed Alarm Setup
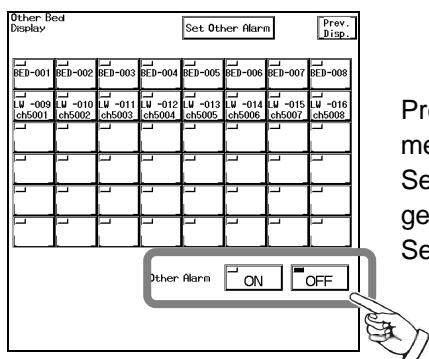
From the bedside monitors connected to the wired network, the bed to generate the other bed alarm and ON/OFF of other bed alarm display can be performed.

1 **Select the bed to generate the other bed alarm.**

Press the ⎡Set Other Alarm⎤ key to display the other bed alarm setup menu.
Select the bed to generate the other bed alarm.

The key LED for the bed selected as the other bed alarm generating bed will be lighted.

2 **Select ⎡ON⎤ for the other bed alarm.**

Press the ⎡Prev. Disp.⎤ key and display the other bed selection menu.
Selecting ⎡ON⎤ will generate the other bed alarm when an alarm generates at the other bed.
Selecting ⎡OFF⎤ will not generate the other bed alarm.

Full Disclosure Waveform Recording

This section explains about the full disclosure waveform recording function.

Maximum of 48 hours of waveforms and numeric data can be recorded on the CF card. The data recorded on the CF card can be displayed on the monitor screen and printed on the built-in recorder.

To Record the Full Disclosure Waveform Data

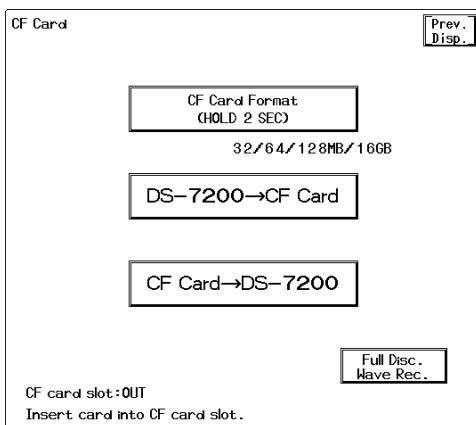To record the full disclosure waveform data, a specified CF card (FCF-16GA) is required.
When using the CF card on this equipment for the first time, make sure to format the CF card in advance.

1 Press the [Menu] → [System Configuration] → [CF Card] keys.

```
CF Card                                    Prev.
                                           Disp.


              CF Card Format
              (HOLD 2 SEC)

                 32/64/128MB/16GB

         DS-7200→CF Card


         CF Card→DS-7200

                                    Full Disc.
                                    Wave Rec.

CF card slot:OUT
Insert card into CF card slot.
```

The "CF Card" screen will be displayed.

2 Insert the CF card (FCF-16GA) to the CF card slot.

3 Format the CF card.

```
        CF Card Format
        (HOLD 2 SEC)
```

Press the [CF Card Format] key for more than 2 seconds.
The system will automatically detect the CF card type and starts the format process.

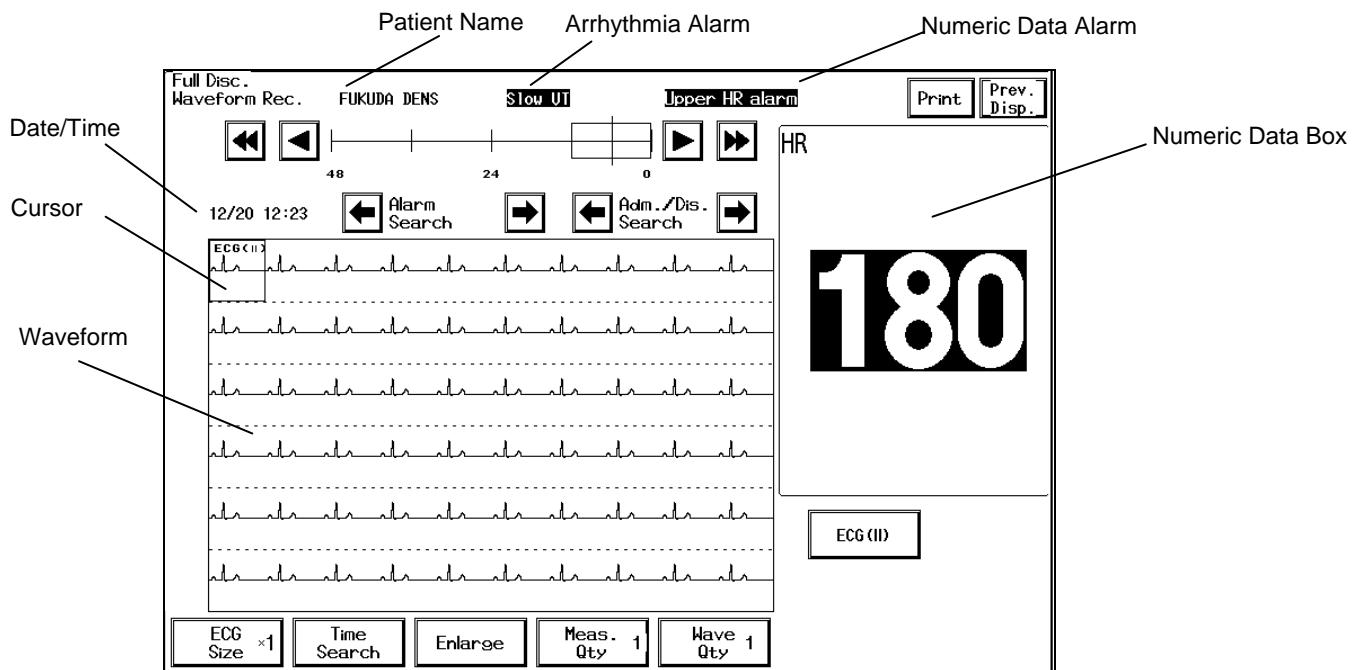When the format process completes, full disclosure waveform data of 48 hours/6 waveforms will be recorded according to the setup.

Reference For details of full disclosure waveform recording setup, refer to "8. System Configuration CF Card".

To Display the Full Disclosure Waveform

1 **To display the full disclosure waveform, press the** $\boxed{\text{Menu}}$ → $\boxed{\text{Function}}$ →
$\boxed{\text{Full Disc. Waveform Rec.}}$ **keys.**

Patient Name Arrhythmia Alarm Numeric Data Alarm

Date/Time Numeric Data Box

Cursor

Waveform

●About the Waveform Display Duration

The waveform display duration will differ depending on the waveform quantity.
Waveform Quantity 1 : 60 seconds per waveform
Waveform Quantity 2 : 30 seconds per waveform
Waveform Quantity 3 : 20 seconds per waveform
Waveform Quantity 6 : 10 seconds per waveform

●To Shift the Displayed Waveform

The displayed waveform data can be shifted to older data.

$\boxed{\blacktriangleleft\!\blacktriangleleft}$ The waveform will shift to older data in interval of one displayed duration.

(60 seconds if 1 waveform is displayed)

$\boxed{\blacktriangleleft}$ The waveform will shift to older data in interval of half the displayed duration.

(30 seconds if 1 waveform is displayed)

The displayed waveform data can be shifted to newer data.

$\boxed{\blacktriangleright\!\blacktriangleright}$ The waveform will shift to newer data in interval of one displayed duration.

(60 seconds if 1 waveform is displayed)

$\boxed{\blacktriangleright}$ The waveform will shift to newer data in interval of half the displayed duration.

(30 seconds if 1 waveform is displayed)
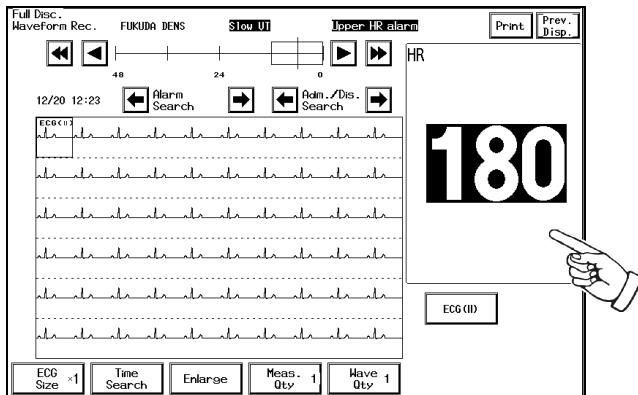
2 **Select the quantity of numeric data to be displayed.**
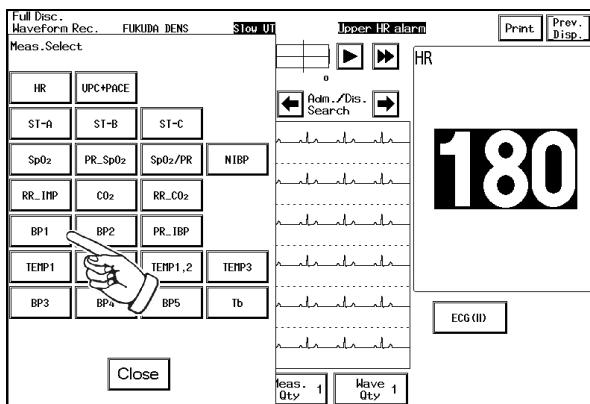
$\boxed{\text{Meas. Qty } 2}$

Pressing the $\boxed{\text{Meas. Qty}}$ key will sequentially change the quantity in the order of 1→2→3→4→5→6→1.

3 **Select the numeric data box.**
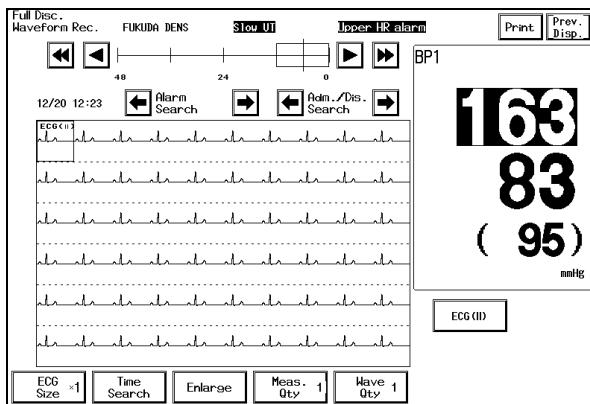
Press the numeric data box area to open the parameter selection window.

Select the parameter on the selection window.

The selected numeric data will be displayed.

4 **Select the waveform quantity.**

Pressing the Wave Qty key will sequentially change the waveform quantity in the order of 1→2→3→6→1.
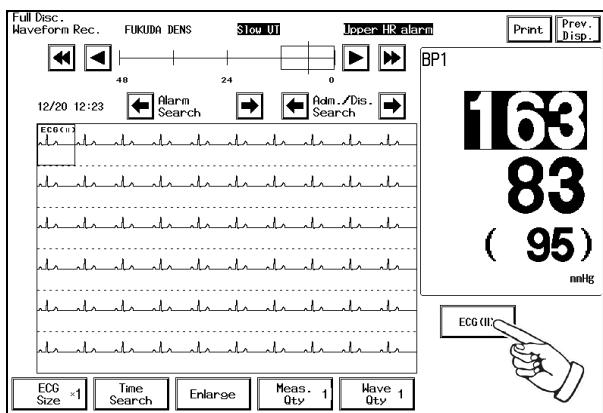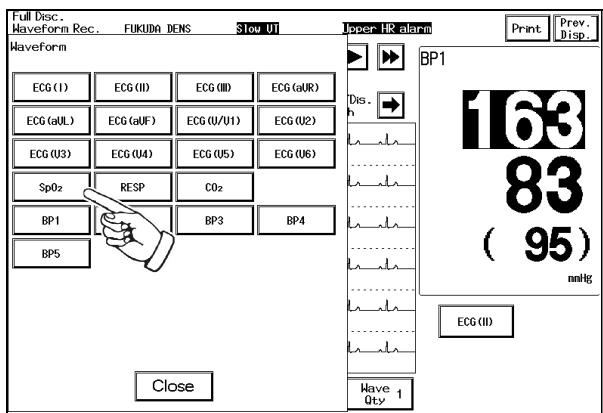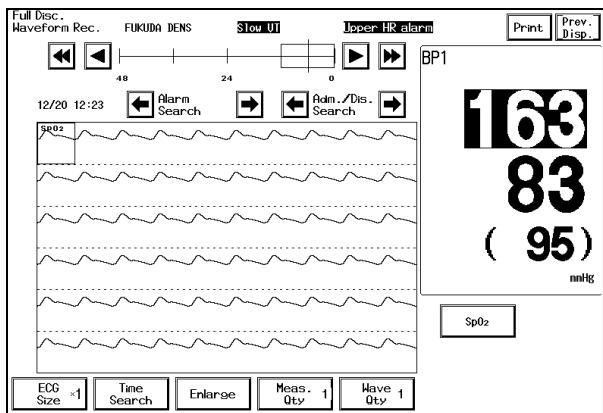
5 **Select the waveform to display.**

Press the waveform parameter key to open the parameter selection window.

Select the parameter on the selection window.

The selected waveform will be displayed.

To Change the ECG Waveform Size

1 **Select the ECG waveform size.**

ECG
Size ×1

Pressing the ECG Size key will sequentially change the displayed ECG waveform size in the order of ×1→ ×2→ ×4→ ×1/4→ ×1/2→ ×1.
This setting is not synchronized with the ECG waveform size on the home display.

●ECG Waveform Amplitude

The ECG waveform amplitude will differ depending on the ECG waveform size.
×1/4 : ± 6.0mV
×1/2 : ± 3.0mV
×1   : ± 1.5mV
×2   : ± 0.75mV
×4   : ± 0.33mV

NOTE	The waveform size for parameters other than the ECG will synchronize with the waveform size on the home display.

To Search by Time

The full disclosure waveform of a specified time can be displayed.
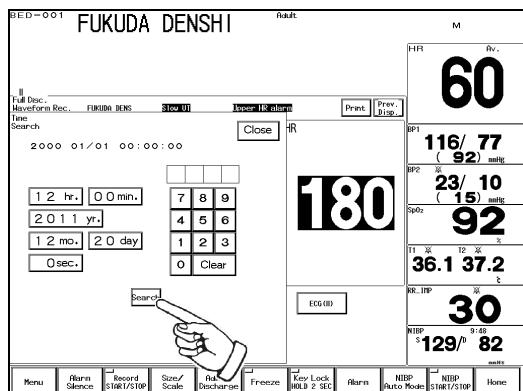
⚠CAUTION	If the time information on the CF card is not correct due to the following cause, the time search operation may fail.
	・When the time setting is changed during the full disclosure waveform recording.
	・When the time setting on the DS-7200 and the central monitor do not match when connected to the wired network.
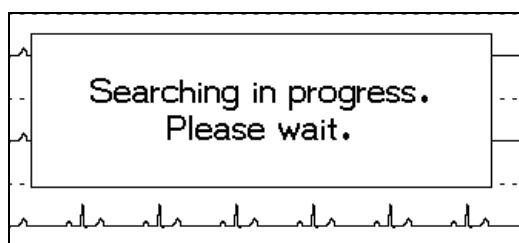
1 **Press the Time Search key.**
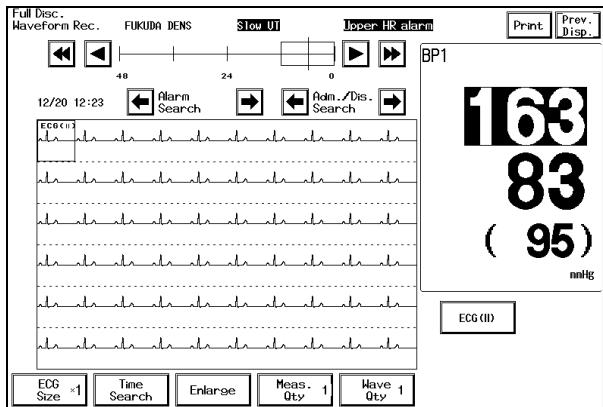
Time
Search

Press the Time Search key to set the date/time for searching.

2 **Enter the date/time, and press the Search key to start searching.**

Searching in progress.
Please wait.

The waveform of the specified date/time will be displayed.

To Search by Alarm
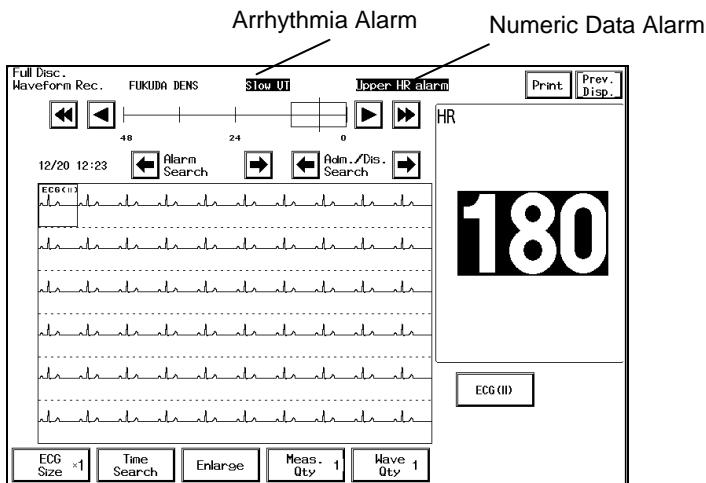
The full disclosure waveform data of an alarm generated point can be searched.

1 **Press the arrow keys for "Alarm Search".**

Pressing the ← / → keys will start the searching process.

The generated arrhythmia alarm or numeric data alarm will be displayed at the upper part of the screen.
The alarm generated numeric data will be highlighted.

Arrhythmia Alarm   Numeric Data Alarm

To Search by Admit/Discharge Date

The full disclosure waveform data of an admitted/discharged date/time can be searched.
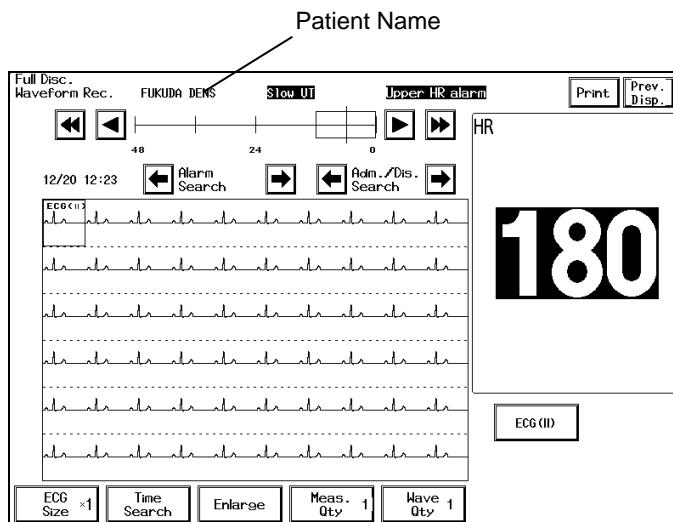
1 **Press the arrow keys for "Adm./Dis. Search".**

Pressing the ◀ / ▶ keys will start searching.

The full disclosure waveform data at the admitted/discharged date/time will be displayed.

The patient name will be also displayed if entered at admittance.

Patient Name
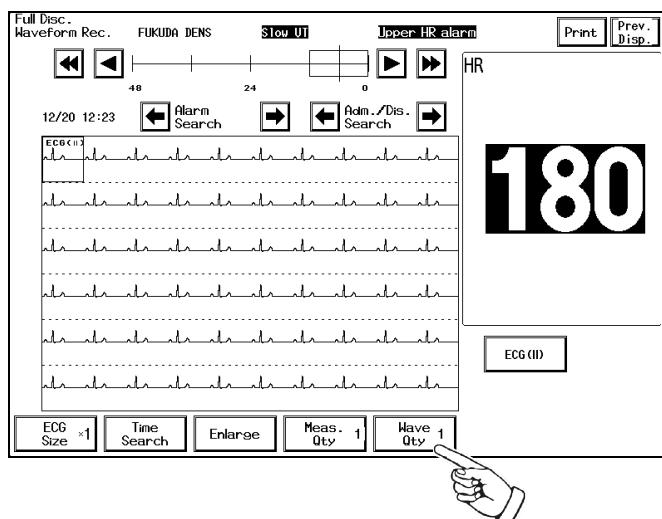
To Print the Waveform

The enlarged full disclosure waveform can be printed on the built-in recorder.
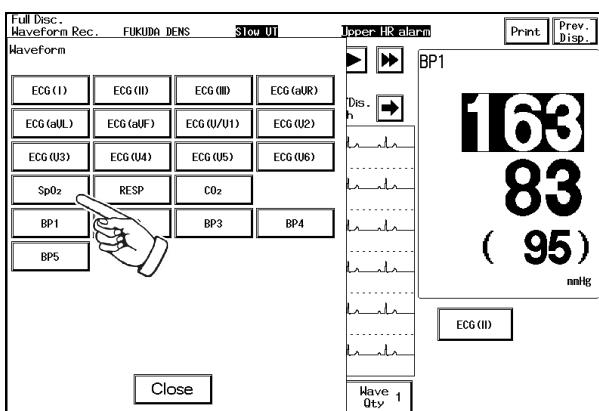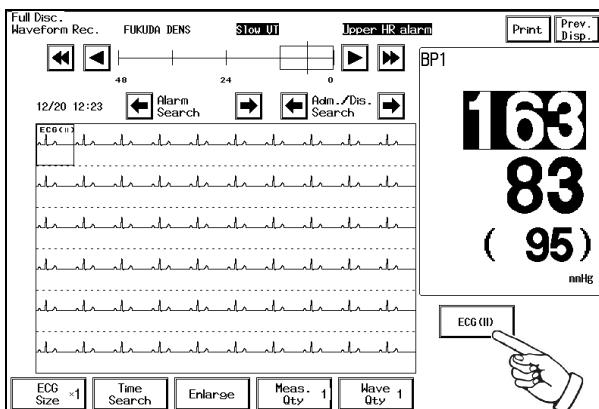
1 **Select the quantity of waveform to print.**

Press the │ Wave Qty │ key to select the quantity of waveform to display and print.
When 6 waveforms are selected, only the 3 waveforms from the top will be printed.

2 **Select the waveform to print.**
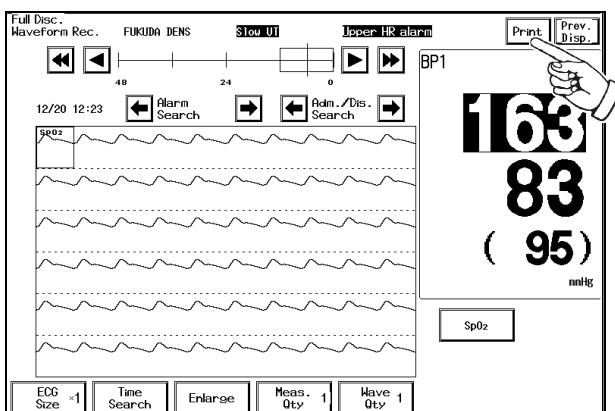
On the parameter selection window, select the waveform to display and print.
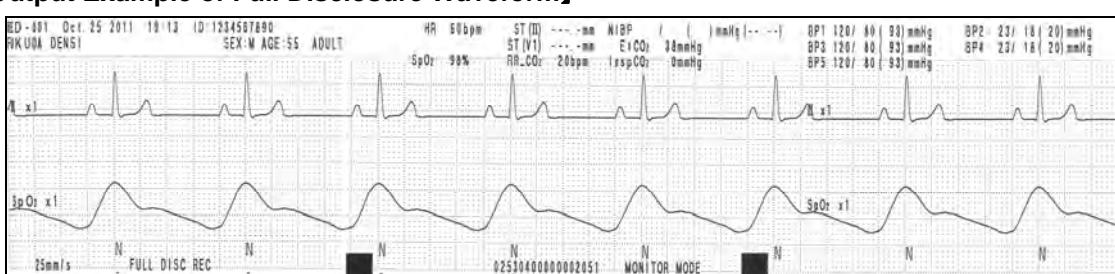
3 **The displayed waveform can be printed.**

Print   Pressing the Print key will print the displayed waveform in enlarged format.

【**Output Example of Full Disclosure Waveform**】
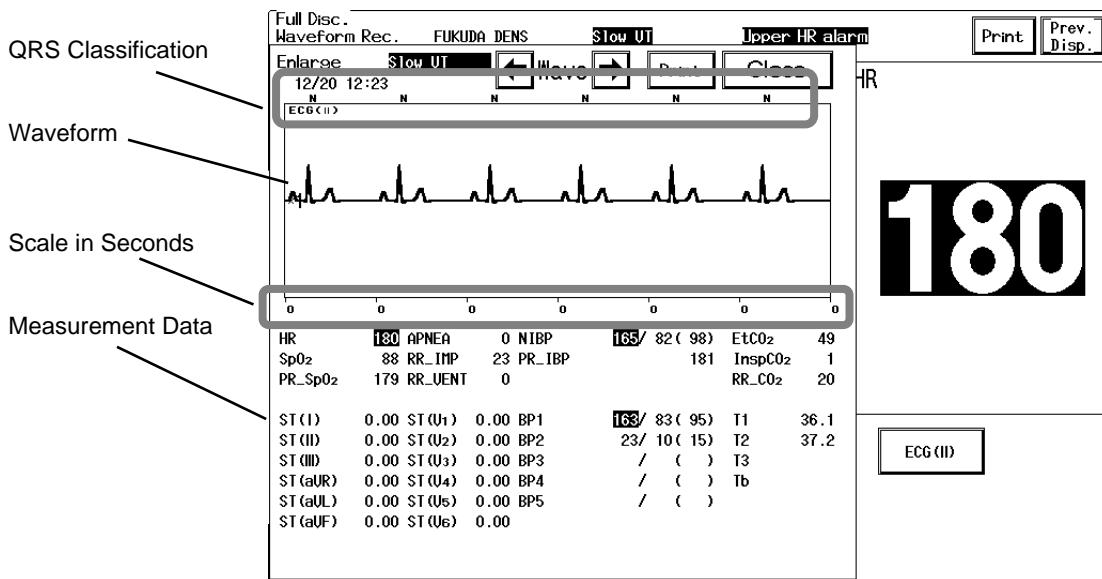
To Enlarge the Waveform

The full disclosure waveform is displayed in compressed format.
On the enlarged display, the selected waveform on the full disclosure waveform screen will be displayed enlarged.
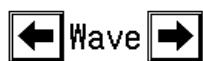
1 Press the ⎡ Enlarge ⎤ key to display the enlarged waveform.

QRS Classification

Waveform

Scale in Seconds

Measurement Data

> Reference For details of QRS classification, refer to "7. Function Arrhythmia Analysis Arrhythmia Definition".

2 The displayed waveform can be shifted to the left or to the right.

←Wave→   Press the arrow keys to shift the waveform.
⎡←⎤ key will display older data, and ⎡→⎤ key will display newer data.

NOTE	The enlarged waveform can be shifted in 1-minute interval.

To Print the Waveform (Enlarged Display)

The enlarged waveform (displayed) can be printed on the built-in recorder.

1 **Print the displayed waveform.**

Press the Print key to print the displayed waveform.

【**Output Example of Full Disclosure Waveform**】

By connecting the Vigilance, Vigilance CEDV, VigilanceII, Vigileo (oximeter /CCO measurement device manufactured by Baxter), the Vigilance data such as SvO$_2$ (mixed venous oxygen saturation), CO (cardiac output) can be displayed in list format.

NOTE	The Vigilance list data will be erased if the power has been turned OFF for more than 5 minutes.

To Display the Vigilance/Vigileo List

The Vigilance/Vigileo list can be accessed from the menu, or from the preprogrammed user key.
If the data is displayed on the home display, the 24 hours of data in 1-minute interval will be automatically stored and displayed.

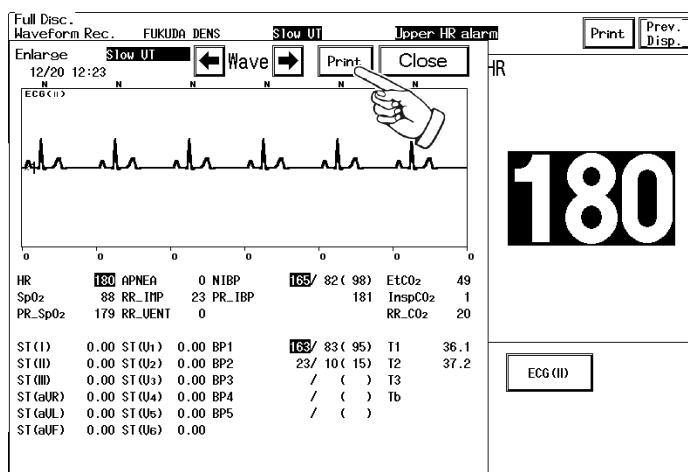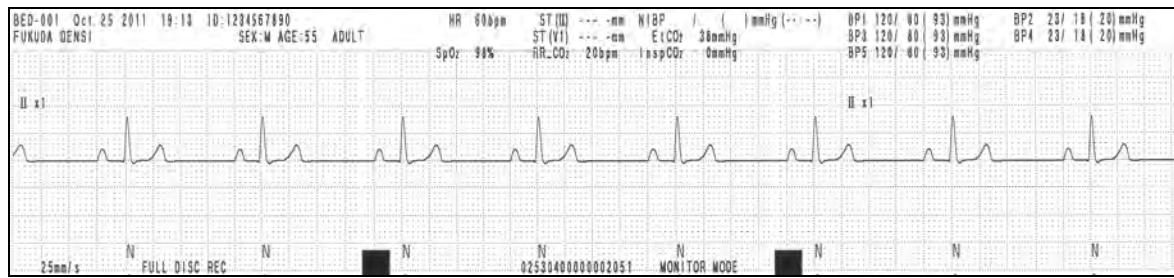| 09/22	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30
SvO2	85	86	84	85	86	84	85	86
CCO	4.3	4.4	4.2	4.3	4.4	4.2	4.3	4.4
EDV	121	122	120	121	122	120	121	122
B_Temp ℃	37.1	37.2	37.0	37.1	37.2	37.0	37.1	37.2
HR	61	65	63	61	65	63	61	65
EF	61	62	60	61	62	60	61	62
SV	61	62	60	61	62	60	61	62
CCI	2.4	2.5	2.3	2.4	2.5	2.3	2.4	2.5
EDVI	66	67	65	66	67	65	66	67
ESV	46	47	45	46	47	45	46	47
SVR	1617	1617	1617	1617	1617	1617	1617	1617
SaO2	96	97	95	96	97	95	96	97
SVI	41	42	40	41	42	40	41	42
ESVI	28	29	27	28	29	27	28	29
SVRI	2247	2248	2246	2247	2248	2246	2247	2248
CCO_STAT	4.6	4.7	4.5	4.6	4.7	4.5	4.6	4.7
EDV_STAT	121	122	120	121	122	120	121	122
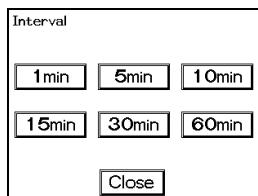
1 **Press the** **Menu** → **Function** → **Vigilance/Vigileo List** **keys.**

2 **Select the display interval.**

Interv.10M   Pressing the time interval key will display the time interval selection tool.

Interval

| 1min | 5min | 10min |
| 15min | 30min | 60min |

Close
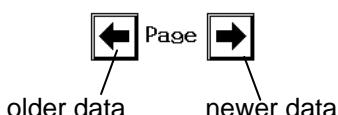
Select the time interval for the tabular trend display.

If 5M is selected, the time will be displayed in real time as follows. 10:00, 10:05, …10:25.
If 60M is selected, it will be displayed as 10:00, 11:00, 12:00.
If the Vigilance/Vigileo list is displayed at 10:35, the data will be displayed from 10:00.

3 **Switch the page.**

← Page →

older data   newer data
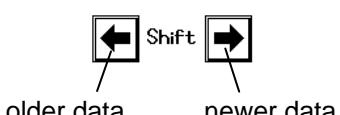
The page will be switched by one page with the displayed time interval.
 ← key will display the previous page listing the older data.
 → key will display the next page listing the newer data.

The Vigilance/Vigileo list will be displayed in 8 columns.
If 5-minute interval is selected and if the list starts from 10:00, 35 minutes of data from 10:00 to 9:25 will be displayed in 1 page.
Pressing the ← key will display the Vigilance/Vigileo list from 9:20 to 8:45.

4 **Shift the displayed columns.**

← Shift →

older data   newer data

The displayed list can be shifted by one column.
 ← key will shift the display to older data by one column.
 → key will shift the display to newer data by one column.

5 **Print the Vigilance/Vigileo list.**

Print   The currently displayed Vigilance/Vigileo list will be printed.

The Description of the Display

Latest Measurement Date

Latest Measurement Time

For the data when the measurement was not performed (before admittance) or when the monitoring was suspended, the time will be displayed as "––:––".
Also, if the data is not displayed on the home display, it will be displayed as "– – –" on the list.
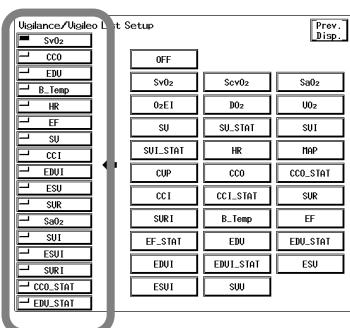
Vigilance/Vigileo List Setup

The parameter to display on the Vigilance/Vigileo list can be selected.

1 **Press the** [List Setup] **key on the Vigilance/Vigileo list display.**
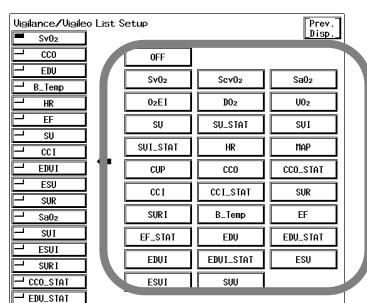
2 **Select the display position on the list.**

Maximum of 17 parameters can be displayed on the list.

3 **Select the parameter to display.**

Select the parameter by pressing the corresponded key.
The display will automatically shift downward to allow continuous parameter selection.

Blank Page

Chapter 8
System Configuration

8

System Configuration

This section explains the procedure to set the night mode.

About the Night Mode
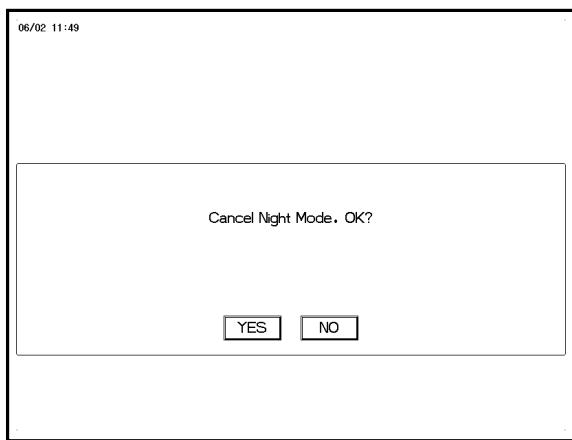
The display brightness and alarm volume can be set to night mode when turning off the light of the ward or when the patient is asleep.
The night mode can be manually set to ON, or automatically set to ON by preprogramming the time to turn ON/OFF the night mode.

Operation flow when the night mode is set to "Time Display Only"
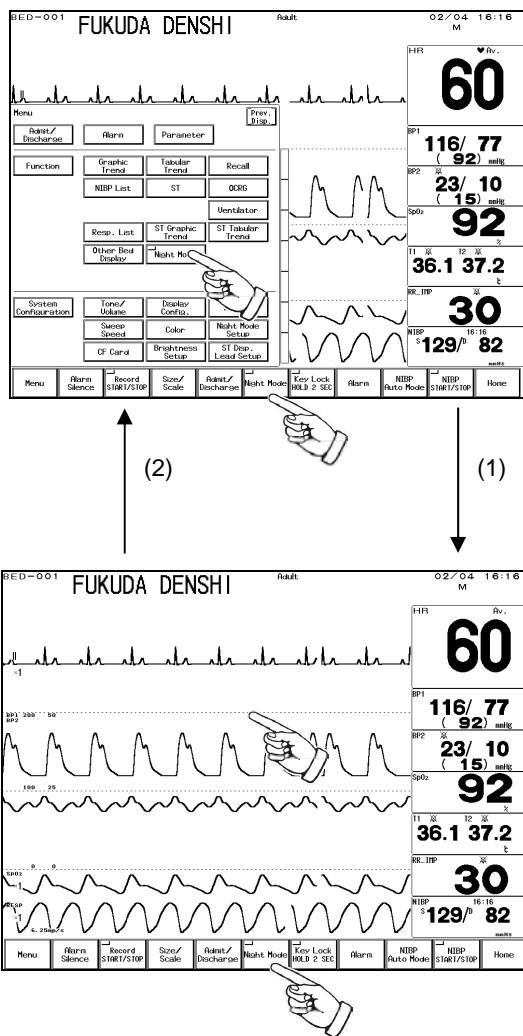
(1) The night mode can be turned ON manually by pressing the Night Mode key on the menu display or the Night Mode key preprogrammed as user key. It can be also automatically turned ON at the preprogrammed time.

(2) Pressing the screen will display the confirmation message to cancel the night mode.

(3) Pressing the YES key will cancel the night mode.

Operation flow when the night mode is set to "Slightly Dark" or "Dark"

(1) The night mode can be turned ON manually by pressing the [Night Mode] key on the menu display or the [Night Mode] key preprogrammed as user key. It can be also automatically turned ON at the preprogrammed time.

(2)   (1)

(2) During the night mode, a message, "Night Mode Active" will be displayed.
To cancel the night mode, select [Any Key] for "Night Mode Cancel" on the hospital setup of the preset menu. Touching anywhere on the screen will cancel the night mode.
Selecting [Night Mode Key] will cancel the night mode by pressing again the [Night Mode] key on the menu display or [Night Mode] key preprogrammed as user key.

8

Night Mode

| Reference | Refer to " 8. System Configuration   Hospital Setup" for procedure to cancel the night mode. |

| NOTE | ● Even when the automatic night mode is set, the night mode can be manually set to ON using the user key. In this case, the night mode will automatically set to OFF at the preprogrammed time.
● The night mode cannot be set when the ventilator alarm is generated. |
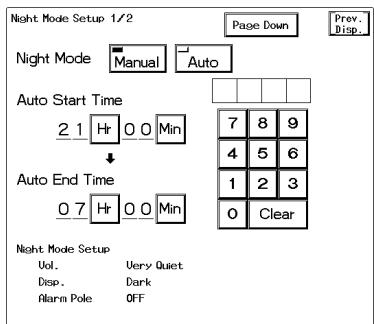
To Set the Night Mode

The time to start and stop the night mode, and the night mode display can be set.

●To Start/Stop the Night Mode

1 Press the ☐ Menu ☐ → ☐ System Configuration ☐ → ☐ Night Mode Setup ☐ keys.

```
Night Mode Setup 1/2      [Page Down]  [Prev. Disp.]

Night Mode  [Manual] [Auto]

Auto Start Time
    2 1 [Hr] 0 0 [Min]    [7][8][9]
           ↓              [4][5][6]
Auto End Time             [1][2][3]
    0 7 [Hr] 0 0 [Min]    [0][Clear]

Night Mode Setup
    Vol.        Very Quiet
    Disp.       Dark
    Alarm Pole  OFF
```

The night mode setup menu will be displayed.
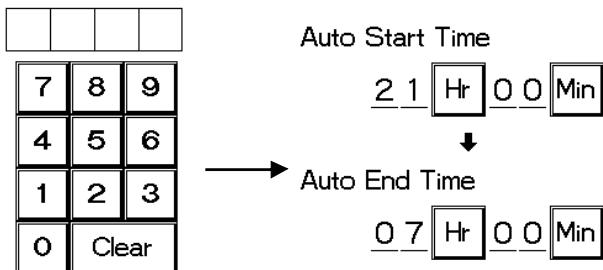
2 Select ☐ Manual ☐ or ☐ Auto ☐ to start the night mode.

Night Mode [Manual] [Auto]

☐ Manual ☐ key will start the night mode manually by pressing the ☐ Night Mode ☐ key set as user key.

☐ Auto ☐ will start the night mode automatically at the preprogrammed time. If automatic night mode is set to ON, the night mode can be manually turned ON using the user key or remote control.
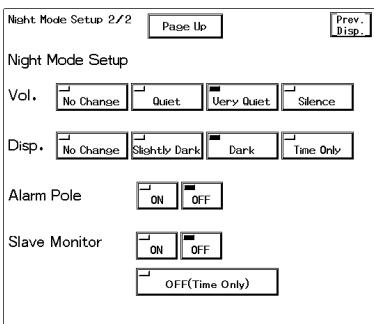
3 Set the "Auto Start Time" and "Auto End Time" of the night mode. (Only for the automatic night mode)

```
[7][8][9]
[4][5][6]  →   Auto Start Time
[1][2][3]          2 1 [Hr] 0 0 [Min]
[0][Clear]                ↓
               Auto End Time
                   0 7 [Hr] 0 0 [Min]
```

Enter the hour and minute using the numeric keypad and press the ☐ Hr ☐ key, ☐ Min ☐ key for the start time and end time.

●Night Mode Display Setup

1 Press the ☐ Page Down ☐ key on the Night Mode Setup (1/2).

```
Night Mode Setup 2/2   [Page Up]    [Prev. Disp.]

Night Mode Setup

Vol.  [No Change][Quiet][Very Quiet][Silence]

Disp. [No Change][Slightly Dark][Dark][Time Only]

Alarm Pole    [ON][OFF]

Slave Monitor [ON][OFF]
              [OFF(Time Only)]
```

The second page of the night mode setup menu will be displayed.

2 **Set the volume for the night mode.**

This volume setup will be effective for all sounds such as key sound and alarm sound.

Vol. [No Change] [Quiet] [Very Quiet] [Silence]

Selection	Actual Volume
No Change	Standard volume
Quiet	Third level from the minimum
Very Quiet	Minimum volume
Silence	No sound

⚠ WARNING | When selecting ⬚Silence⬚, pay attention not to miss any important alarm by simultaneously monitoring the bed on other monitors such as central monitor.

3 **Select the display brightness of the Night Mode.**

Disp. [No Change] [Slightly Dark] [Dark] [Time Only]

Selection	Actual Brightness
No Change	Standard display
Slightly Dark	80% of maximum brightness
Dark	50% of maximum brightness
Time Disp. Only	Only the time will be displayed. The message will disappear after 1 minute from starting the night mode.

⚠ WARNING | When selecting ⬚Time Disp. Only⬚, pay attention not to miss any important alarm by simultaneously monitoring the bed on other monitors such as central monitor.

4 **Select ON/OFF of alarm pole for the night mode.**

Alarm Pole   [ON] [OFF]

Selection	Alarm Pole
ON	The alarm pole will light during the night mode.
OFF	The alarm pole will not light during the night mode.

⚠ WARNING | When selecting ⬚OFF⬚ for "Alarm Pole" for the night mode, pay attention not to miss any important alarm by simultaneously monitoring the bed on other monitors such as central monitor.

5 **Set the slave monitor display for the night mode.**

Slave Monitor

Selection	Operation
ON	The waveforms/numeric data from the home display will be displayed on the slave monitor during night mode.
OFF	The slave monitor display will be OFF during night mode.
OFF (Time Only)	When ⎾Time Only⏌ is selected for night mode display setup, only the time will be displayed on the slave monitor. If ⎾No Change⏌, ⎾Slightly Dark⏌ or ⎾Dark⏌ is selected, then the slave monitor display will be OFF.

		Slave monitor Setup			Operation	
		ON	OFF	Time Only	Home Display	Slave Monitor
Night Mode Setup	Time Only	○	—	—	Display will depend on the night mode setup.	The display brightness will not be dimmed and the waveforms/numeric data will be displayed.
		—	○	—		Display will be OFF.
		—	—	○		Only the time will be displayed.
	No Change/ Slightly Dark/ Dark	○	—	—		Same as the home display.
		—	○	—		Display will be OFF.
		—	—	○		Display will be OFF.
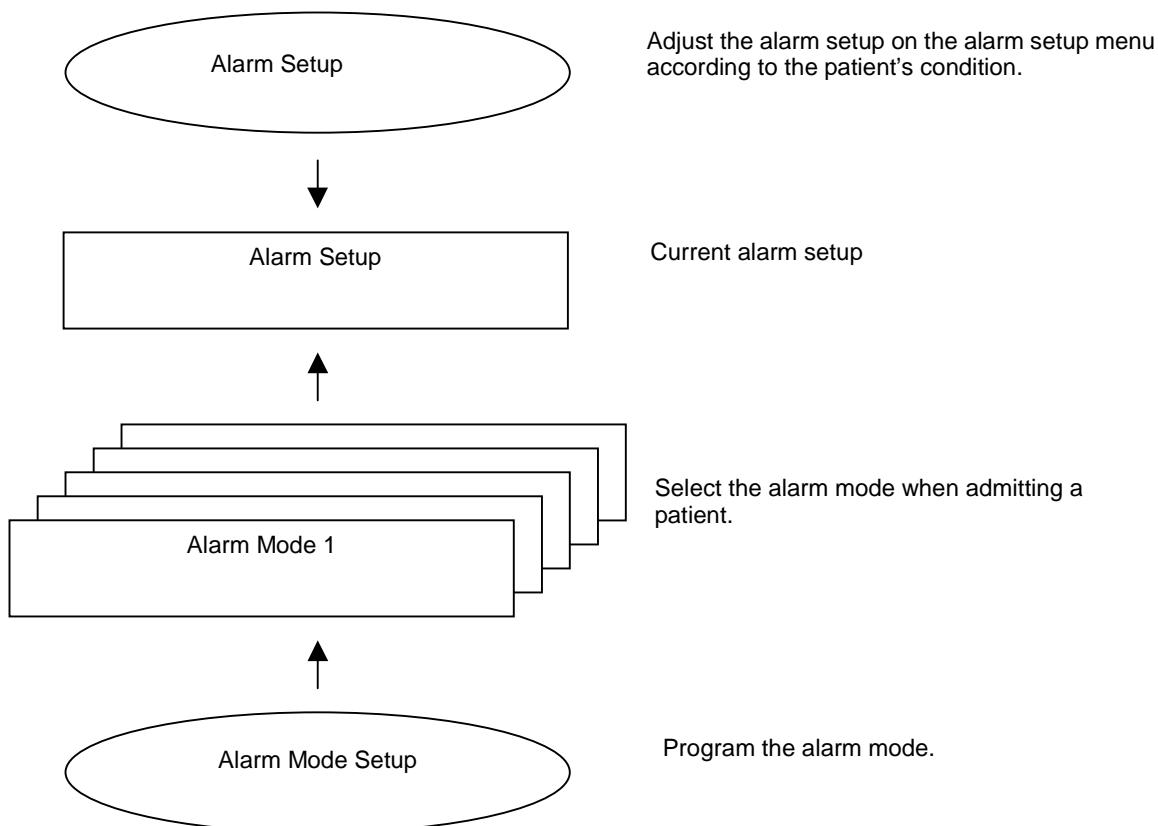
This section explains the procedure to program the alarm mode.

About the Alarm Mode

On the DS-7200 system, 5 patterns of alarm mode can be programmed according to the monitoring purpose.

Setting all the alarm condition for each time the patient is admitted may be troublesome.
To simplify this procedure, 5 patterns of alarm mode other than default setting can be programmed according to the monitoring purpose.
By preprogramming the setups to each alarm mode, alarm setups at admitting procedure can be simplified by just selecting the alarm mode.

⚠ WARNING	It is recommended to program the alarm mode in rough classification such as patient's age, monitoring purpose (ICU or surgery), and if necessary, perform unique setup for each patient.

Alarm Setup — Adjust the alarm setup on the alarm setup menu according to the patient's condition.

Alarm Setup — Current alarm setup

Alarm Mode 1 — Select the alarm mode when admitting a patient.

Alarm Mode Setup — Program the alarm mode.
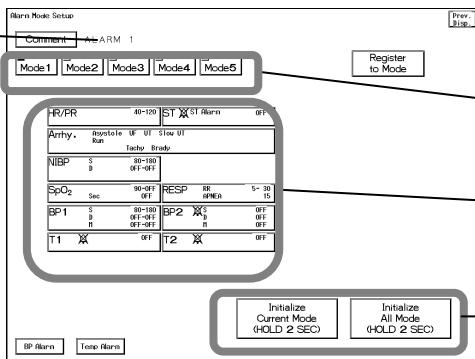
To Program the Alarm Mode

Programming the alarm condition for each alarm mode can be performed on the standard alarm setup menu. The default setting can be changed for each alarm mode.

1 **Press the** **Menu** → **System Configuration** → **Pre-Set** → **Alarm Mode Setup** **keys.**

Enter the comment for the mode.

Select a mode for programming.

Program the alarm condition for each parameter.

Initialize the alarm mode setting to factory default setting.
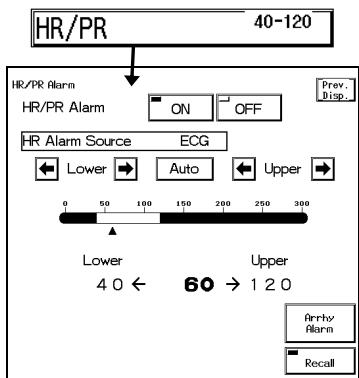
NOTE	On the alarm mode setup menu, the setup of currently selected alarm mode will be displayed. Changing the mode and returning to the home display will set the alarm value with the setup of the last selected mode.

2 **Select a mode for programming.**

Mode1 Mode2 Mode3 Mode4 Mode5

Select the mode to program the alarm condition.
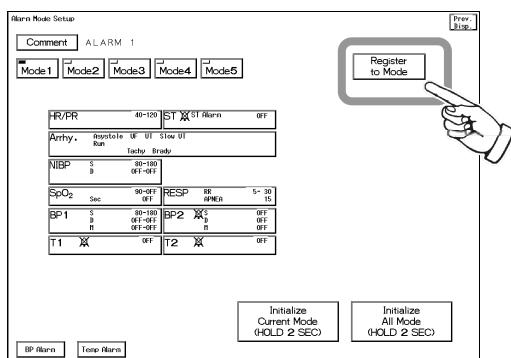
3 **Program the alarm condition.**

The programmed alarm condition will be displayed inside the numeric data key.
The programmed value and alarm OFF mark will be displayed simultaneously.
Pressing the numeric data key will display the alarm setup menu which allows to change the alarm condition.
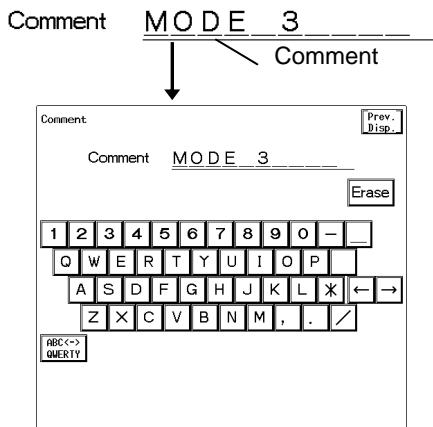
Pressing the **Register to Mode** key will register the current alarm condition to the alarm mode (1 to 5) selected at procedure 2.

4 **Enter a comment.**

Comment MODE 3_____
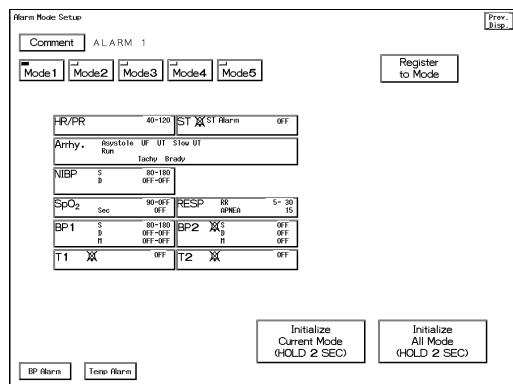
Pressing the ⌞Comment⌟ key will display the keyboard display. Enter the comment using the keyboard.

To Initialize the Alarm Mode

The alarm mode setting can be initialized to factory default setting.

1 **Press the** ⌞**Menu**⌟ → ⌞**System Configuration**⌟ → ⌞**Pre-Set**⌟ → ⌞**Alarm Mode Setup**⌟ **keys.**

⌞Initialize Current Mode⌟ will initialize the currently selected alarm mode to factory default setting.

⌞Initialize All Mode⌟ will initialize all alarm modes (Mode1 to Mode5) to factory default setting.

Reference   For factory default setting of the alarm mode, refer to "11. Technical Information".

8

Alarm Mode Setup

This section describes the setup items that can be set individually for each monitor.

Monitor Setup 1/5	Page Down	Prev. Disp.
Message Icon	ON	OFF
Check discharge at power ON	ON	OFF

Time/Date	Set Password	Program Version
	R.C.Setup	Key Mask
User Key	Alarm Pole Setup	Menu Setup
Display Optim. Setup	Backup at discharge	Low Limit Alarm Vol.

Monitor Setup 2/5	Page Up	Page Down	Prev. Disp.
Password		ON	OFF
Discharge Mode		Suspend	Admit
Event Key		ON	OFF
Drift Filter display/ Exp clock display		Drift Filter Disp.	Exp clock Disp.
HR/PR Alarm Source		ECG/ SpO2	ECG/ SpO2/ BP
Freeze Mode Cursor		ON	OFF

Monitor Setup 3/5	Page Up	Page Down	Prev. Disp.
Parameter Key Operation		Store	Not Store
BP Alarm Increment		Normal	Small
CO2 (mmHg) upper limit for LAN, telemetry		No limit	99mmHg
Battery Operation		Normal	Power Save
Store all alarms to "Recall".		ON	OFF
Buzzer Tone (speaker) Failure		Enable	Disable
Built-in Rec. Status Display		ON	OFF

Monitor Setup 4/5	Page Up	Page Down	Prev. Disp.
Vigilance/Vigileo SVR, SVRI Calc.		Vigilance	DS-7200
Alarm Level		Standard	User
			Level

"User" cannot be selected if connected to DS-LAN II/III.
If "User" is already selected when the DS-LAN II/III
is connected, it will automatically change to "Standard".

Alarm System	FUKUDA DENSHI	IEC
DS-LAN Setup	DS-LANII (10Mbps)	DS-LANIII (100Mbps)

*To validate the setup, you need to restart the system.

Level 3 Alarm Sound	One time	15s interv.

Monitor Setup 5/5	Page Up	Page Down	Prev. Disp.
RR Alarm Increment		Normal	Small
Patient Name on Home Display		ON	OFF

About the Monitor Setup

The monitoring condition can be set for each monitor on the monitor setup menu.

First Page (1/5)

- ・Message Icon
- ・Time/Date
- ・Program Version
- ・Key Mask
- ・Alarm Pole Setup
- ・Display Optim. Setup
- ・Low Limit Alarm Vol.

- ・Check Discharge at Power ON
- ・Set Password
- ・R.C. Setup
- ・User Key
- ・Menu Setup
- ・Backup at Discharge

Second Page (2/5)

- ・Password
- ・Event Key
- ・HR/PR Alarm Source

- ・Discharge Mode
- ・Drift Filter Display / Exp Clock Display
- ・Freeze Mode Cursor

Third Page (3/5)

- ・Parameter Key Operation
- ・CO2 (mmHg) upper limit for LAN
- ・Store all alarms to "Recall"
- ・Built-in Rec. Status Display

- ・BP Alarm Increment
- ・Battery Operation
- ・Buzzer Tone (speaker) Failure

Fourth Page (4/5)

- ・Vigilance/Vigileo SVR, SVRI Calc.
- ・Alarm System
- ・Level 3 Alarm Sound

- ・Alarm Level
- ・DS-LAN Setup

Fifth Page (5/5)
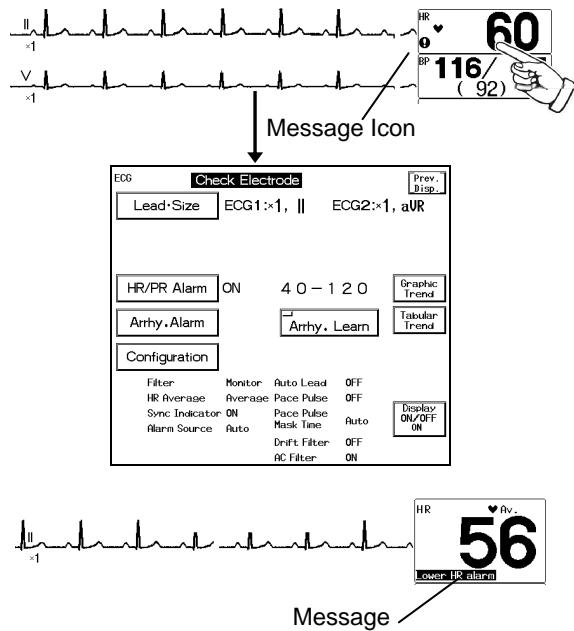
- ・RR Alarm Increment
- ・Patient Name on Home Display

●Message Icon

Message Icon [ON] [OFF]   Select ON/OFF to display message icon.

Message Icon

When there are many numeric data display, the parameter key size will be reduced which may disable the message to be displayed inside the parameter key.

In such case, an icon will be displayed inside the parameter key to indicate that there is a message.

The message can be checked by pressing the parameter key with the icon, and displaying the parameter setup menu.

If the parameter key size is large, a message will be displayed inside the parameter key.

Message
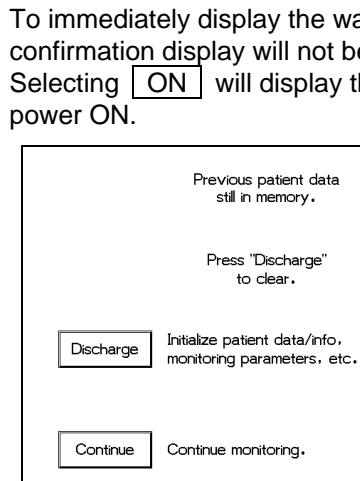
●Check Discharge at Power ON

The trend data and NIBP list data will remain stored even when the power is turned OFF. To start monitoring a new patient, it is necessary to perform discharge procedure on patient admit/discharge menu, and clear the data of previous patient.

Check discharge at power ON   [ON] [OFF]

This function allows to select ON/OFF of discharge confirmation display when previous data remains at power ON.

To immediately display the waveform and numeric data at power ON, select [OFF]. The discharge confirmation display will not be displayed and monitoring will be immediately started.
Selecting [ON] will display the discharge confirmation display when the previous data remains at power ON.

Previous patient data
still in memory.

Press "Discharge"
to clear.

[Discharge] Initialize patient data/info,
monitoring parameters, etc.

[Continue] Continue monitoring.

＜Discharge Confirmation at Power ON＞

●Time/Date Setup

Time/Date

Time / Date key will display the time/date setup menu.

Enter the time/date using the numeric keypad, and press the corresponded key.
For example, to change the time from 2min to 5min, enter 5 on the numeric keypad.
Next, press the 02 Min key.
Then, press the Setup key to finalize the setup.
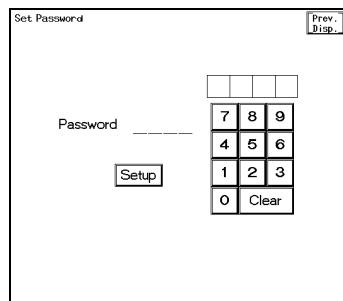
⚠ CAUTION	● If the time/date is not correctly set, or changed during monitoring, malfunction may occur to NIBP measurement, periodic recording, trend, NIBP list data, and age calculation from the birth date. ● When connected to a wired network, the same time/date with the central monitor will be set. Even if the time/date is changed on the DS-7200 system, it will be corrected to the time/date of the central monitor. ● If the time/date is changed, the time/date for the trend, NIBP list, recall data will also change. ● If the time/date is changed during monitoring, the patient's age will not be recalculated.

●Password Setup

Set Password

A 4-digit password to be entered on the preset menu can be set.

If the password is set to ON in the monitor setup menu, a password will be required to access the preset menu.
Enter the numbers, and press the Setup key.
The programmed password will be displayed when the setup is complete.

●Program Version

Program Version
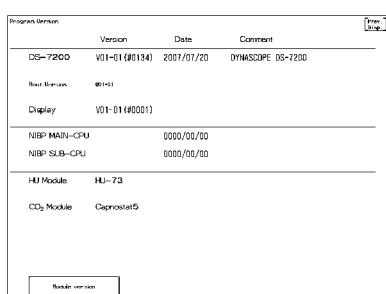
The software information will be displayed.
Pressing the Program Version key will display software version of the monitor, produced date, and comment.
The software version required for the DS-7200 system will be displayed.
・DS-7200 Software
・Display Unit Software
・NIBP MAIN-CPU Software
・NIBP SUB-CPU Software
・HU Module Type
・CO_2 Module Type
The boot version will be also displayed.
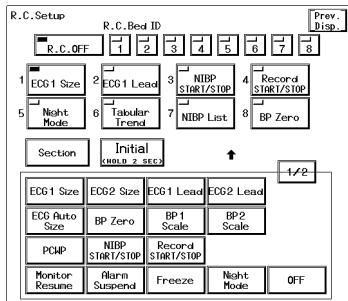
Pressing the Module Version key will display the equipment information of the equipment connected to serial connector of the main unit.

●R.C. Setup

R.C.Setup

Set the user key, ID and zone for remote control unit (CF-700) of option. Pressing the R.C. Setup key will display R.C. Setup display to select the ID function.
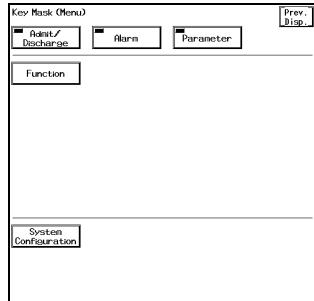
Reference For details, refer to "4. Monitoring Setup R.C. Setup"

●Key Mask

Key Mask

Unnecessary keys on the Menu display can be erased.
Pressing the Key Mask key will display Key Mask display to select the key to erase from the Menu display.
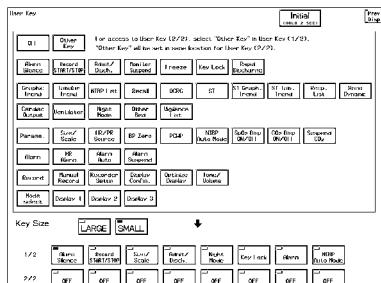
Reference For details, refer to "4. Monitoring Setup Key Setup Erasing the Unnecessary Keys"

●User Key Setup

User Key

6 or 8 user keys can be programmed to be displayed on the home display. Pressing the User Key key will display the user key setup menu.
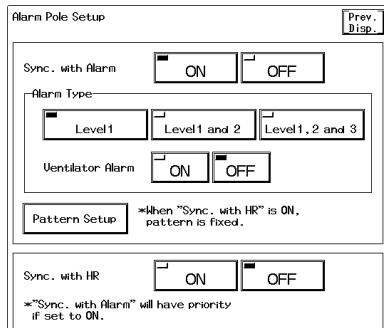
Reference Refer to "4. Monitoring Setup Key Setup" for details.

●Alarm Pole Setup

Alarm Pole Setup

Sets the function for the alarm pole located at the top of the monitor.
Press the Alarm Pole Setup key to display the alarm pole setup menu.
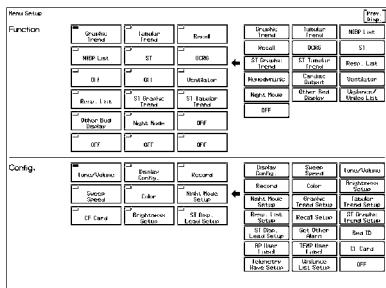
Reference Refer to "4. Monitoring Setup Alarm Pole Setup" for details.

8

Monitor Setup

●Menu Setup

Menu Setup

Sets the key and location to display on the menu display.
Press the | Menu Setup | key to display the Menu Setup display.
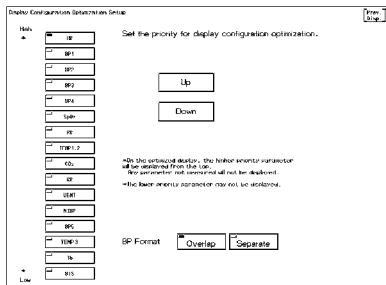
| Reference | Refer to "4. Monitoring Setup　Key Setup　To Configure the Menu Display" for details. |

●Display Optimization Setup

Sets the display priority when the display configuration is optimized.

Display Optim.
Setup

Press the | Display Optim. Setup | to display the Display Configuration Optimization Setup Screen.
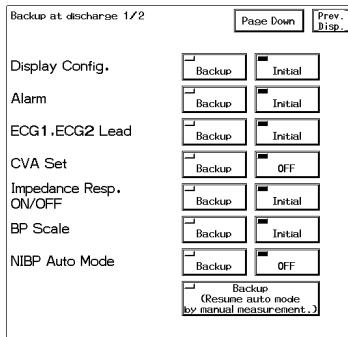
| Reference | For details, refer to "4. Monitoring Setup　Display Configuration　Optimizing the Display Configuration". |

●Backup at Discharge

Backup at
discharge

Press the | Backup at discharge | key to display the "Backup at Discharge" screen.
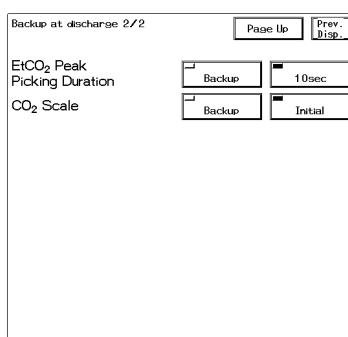
Switch the page using the | Page Down | / | Page Up | keys.

Select whether to backup or to initialize after discharge for each item.

Select | Backup | if you do not want to initialize the item after the discharge procedure.

Selecting | Initial | will initialize the item to factory default setting after the discharge procedure.
・ If | Initial | is selected for "Display Config." and "Alarm", the currently selected display mode and alarm mode will be initialized.
・ Select | Backup | or | OFF | for "CVA Set".
・ Select | Backup | or | 10sec | for "EtCO$_2$ Peak Picking Duration".
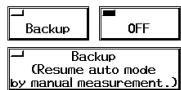
【**NIBP Auto Mode**】

Whether or not to back up the NIBP Auto Mode after discharge can be selected.

Selecting OFF will turn off the NIBP auto mode after the discharge procedure.

Selecting Backup will back up the NIBP auto mode even after the discharge procedure. It will function even if the patient is not admitted.

NIBP Auto Mode

| Backup | OFF |

| Backup
(Resume auto mode
by manual measurement.) |
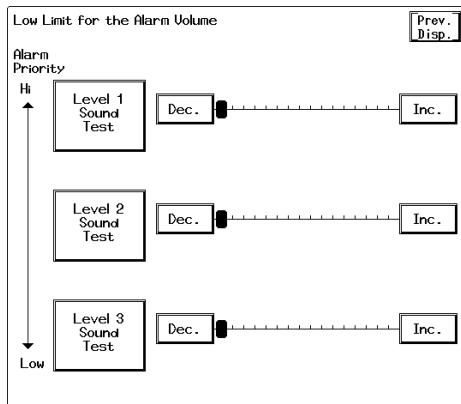
 Backup (Resume auto mode by manual measurement) will resume the NIBP auto mode when the next admitted patient has first started the manual measurement. NIBP will be periodically measured at the same interval with the previous patient.

Until the NIBP auto mode is resumed or the interval is changed, "Standby" will be displayed inside the NIBP numeric data box.
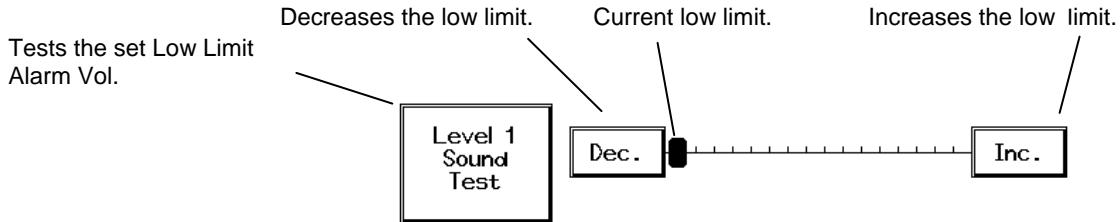
●Low Limit for the Alarm Volume

The low limit for the alarm volume range on the "Tone/Vol." screen can be set.
The alarm volume range can be changed for each alarm level.
The adjustable alarm volume range will be indicated by a yellow underline in the "Tone/Vol." screen.

Decreases the low limit.　Current low limit.　Increases the low limit.

Tests the set Low Limit Alarm Vol.

⚠CAUTION	● The alarm priority is high for level 1 (life threatening alarm), medium for level 2 (cautionary alarm), and low for level 3 (treatment needed alarm). ● Pay attention not to set the alarm volume too low to avoid missing any important alarms. ● During the night mode, the volume set on the "Night Mode Setup" will be applied.
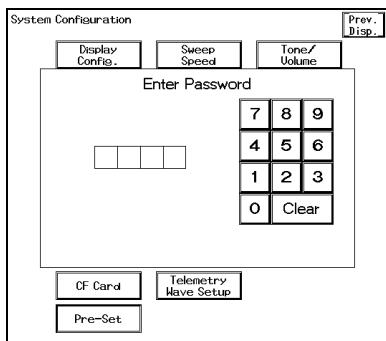
●Password

Sets the password requirement to access the preset menu.

Password

| ON | OFF |

Selecting ON will require to enter password to access the preset menu.

8

Monitor Setup

```
System Configuration                    Prev.
                                        Disp.
   Display      Sweep       Tone/
   Config.      Speed       Volume
         Enter Password
                        7  8  9
                        4  5  6
    [  ][  ][  ][  ]    1  2  3
                        0  Clear

     CF Card   Telemetry
               Wave Setup
     Pre-Set
```

A 4-digit password can be set on the monitor setup menu.
Also, "7200" can be used as maintenance password.

●Monitoring Condition after Discharge

Sets the monitoring condition after the patient has discharged.

Admit will continue monitoring after discharge.
Suspend will suspend monitoring after discharge.
Numeric data display will be erased and alarm
generation, NIBP periodic measurement and periodic
recording will not be performed.

Discharge Mode   [Suspend] [Admit]

```
Monitor Suspend
Monitoring
      is
suspended.

        [ Resume ]
```

●Event Key

Displays event key on the home display at alarm occurrence.

ON will display the event key on the home display at
Event Key   [ON]   [OFF]   alarm occurrence.
OFF will not display the event key on the home display.

Pressing the event key will suspend the alarm sound and display the recall menu.
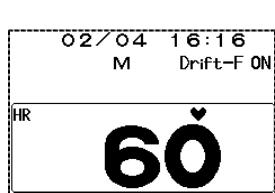
Event Key

```
BED-001  FUKUDA DENSHI    [🔔]Adult           12/11  14:51
                                                      M
```

●Drift Filter display / Exp. clock display

Drift Filter display/   [Drift Filter] [Exp clock]   Drift Filter Disp. will display the drift filter status.
Exp clock display   [Disp.   ] [Disp.   ]   Exp. clock Disp. will not display the drift filter status
                                                         and displays the enlarged time instead.

```
02/04  16:16          Drift Filter Status
   M   Drift-F ON      Display

HR                          ♥
   60
```

```
02/04 16:16           Enlarged Time
   M                   Display

HR                          ♥
   60
```

●HR/PR Source

This setup will allow HR/PR source selection of ECG/SpO$_2$ or ECG/SpO$_2$/BP .

                    [ECG/] [ECG/]   ECG/SpO$_2$ will allow HR/PR source selection from ECG or
                    [SpO$_2$] [SpO$_2$/]   SpO$_2$.
HR/PR Source   [BP]   ECG/SpO$_2$/BP will allow HR/PR source selection from ECG,
                                        SpO$_2$, or BP.

| ⚠ CAUTION | If HR/PR alarm source is BP (Or, if Auto selects BP for HR/PR source), ECG waveform will not be transmitted on a wired network. |

| NOTE | ● If HR/PR alarm source is BP, and ART is not selected as the first BP label, BP1 will be the HR/PR alarm source. If BP1 is not measured at this time, PR_IBP value will be blank.
● If HR/PR alarm source is BP, PR_IBP value will be displayed as HR on the wired network central monitor. |

●Freeze Mode Cursor

When the Freeze key preprogrammed as user key is pressed, Freeze Mode Cursor will be displayed on the home display. By moving this cursor, BP value at cursor position can be displayed, and interval time between the cursors can be measured.

Freeze Mode Cursor   [ON] [OFF]   Select ON to display the Freeze Mode Cursor.

●Parameter Key Operation

Whether or not to store the screen accessed from the parameter key (numeric data box) can be selected. By storing the parameter key operation, the previously accessed screen can be directly displayed.

Parameter Key Operation   [Store] [Not Store]   Store will store the screen accessed from the parameter key. The next time the parameter key is pressed, the previously accessed screen will be directly displayed.
Not Store will not store the parameter key operation. The next time the parameter key is pressed, the initial screen (ex. ECG menu if HR parameter key is pressed) will be displayed.

●BP Alarm Increment

The BP alarm increment can be selected from Normal or Small.

	When Normal is selected	When Small is selected
0 to 50mmHg	2mmHg increment	1mmHg increment
55 to 300mmHg	5mmHg increment	
0 to 7kPa	0.2kPa increment	0.1kPa increment
7.5 to 40.0kPa	0.5kPa increment	

BP Alarm Increment   [Normal] [Small]   Select Normal or Small according to the monitoring purpose.

●CO$_2$ (mmHg) Upper Limit for LAN, Telemetry

When the measurement unit of CO$_2$ is mmHg, whether or not to limit the CO$_2$ value to 99mmHg when transmitting to the central monitor can be selected.

CO$_2$ (mmHg) upper limit for LAN, telemetry   [No limit] [99mmHg]   No limit will transmit the actual CO$_2$ value to the central monitor even if the value is 100mmHg or above.
99mmHg will transmit the CO$_2$ value as 99mmHg if the value is 100mmHg or above.

8
Monitor Setup

8－17

●Battery Operation

The battery operation mode can be selected from "Normal" or "Power Save".

Battery Operation | Normal | | Power Save |

| Power Save | will darken the screen to save the battery consumption.

| Normal | will display the screen with standard brightness.

●Store all alarms to "Recall"
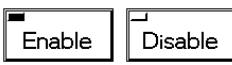
Store all alarms to "Recall". | ON | | OFF |

| ON | will store all alarms to "Recall".

| OFF | will store only the selected alarm factors to "Recall".

●Buzzer Tone (Speaker) Failure

Whether or not to generate a buzzer tone during speaker failure can be selected.

Buzzer Tone (speaker) Failure | Enable | | Disable |

| Enable | will generate a buzzer tone instead of an alarm sound under the following condition.
- ・Speaker failure
- ・Alarm sound level is not set to the lowest level, or "Alarm Mute" (Hospital Setup) is set OFF.
- ・If the monitor is in a night mode, the night mode volume is not set to | Silence |.
- ・Alarm (level 1, 2, 3 or ventilator alarm) is generating.
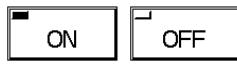
If the buzzer tone is generated at alarm generation, it can be silenced by pressing the | Alarm Silence | key.

| Disable | will not generate a buzzer tone even during speaker failure.

●Built-in Rec. Status Display
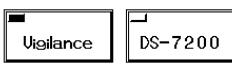
Built-in Rec. Status Display | ON | | OFF |

| ON | will display built-in recorder status message on the home display.

| OFF | will not display built-in recorder status message on the home display.

●Vigilance/Vigileo SVR, SVRI, Calc.

The source of SVR, SVRI, MAP, CVP value for the Vigilance/Vigileo list can be selected from Vigilance or DS-7200.
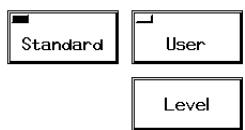
| Vigilance | will display the SVR, SVRI, MAP, CVP value obtained from Vigilance on the Vigilance/Vigileo list.

Vigilance/Vigileo SVR, SVRI Calc. | Vigilance | | DS-7200 |

| DS-7200 | will display the SVR, SVRI, MAP, CVP value obtained from DS-7200 on the Vigilance/Vigileo list.

●Alarm Level

The alarm level for numeric data alarm (HR/PR, SpO_2, BP, NIBP, RR, $EtCO_2$) and arrhythmia alarm can be changed.
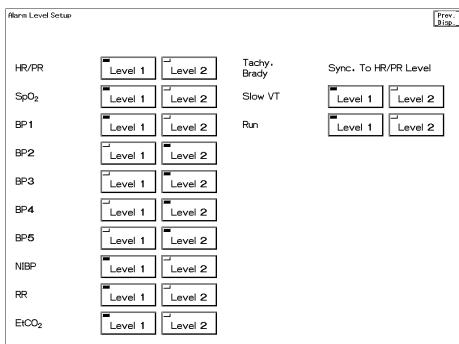
Alarm Level | Standard | | User | | Level |

| Standard | will set the default alarm level.

| User | will set the user-defined alarm level which can be set on the alarm level setup menu.

"User" cannot be selected if connected to DS-LAN II.
If "User" is already selected when the DS-LAN II is connected, it will automatically change to "Standard".

Alarm Level Setup [Prev. Disp.]

HR/PR [Level 1][Level 2] Tachy. Brady   Sync. To HR/PR Level
SpO₂ [Level 1][Level 2] Slow VT   [Level 1][Level 2]
BP1 [Level 1][Level 2] Run   [Level 1][Level 2]
BP2 [Level 1][Level 2]
BP3 [Level 1][Level 2]
BP4 [Level 1][Level 2]
BP5 [Level 1][Level 2]
NIBP [Level 1][Level 2]
RR [Level 1][Level 2]
EtCO₂ [Level 1][Level 2]

If User is selected, press the Level key to display the Alarm Level Setup menu.
Select Level 1 or Level 2 for each alarm.

⚠ CAUTION	If the monitor is connected to wired network, User cannot be selected.

●Alarm System

The alarm system such as alarm sound and alarm indicator will differ depending on this selection.

Alarm System   [FUKUDA DENSHI] [IEC]

⚠ WARNING	When "Alarm System" setting (IEC/FUKUDA DENSHI) is changed on the Monitor Setup menu, make sure to check the alarm sound and alarm indicator.

【Tone/Volume Setup】

		When FUKUDA DENSHI is set	When IEC is set
Sound	(1) When the tone setting is set between the 1st and 4th level from the lowest level (2) When the tone setting is set to the 5th level or above from the lowest level		
	Level 1	(1) Continuous tone with alternate high and low pitch sound (2) Continuous rapid tone	Continuous tone
	Level 2	(1) 5 seconds interval alternate high and low pitch sound (2) 5 seconds interval rapid tone	5 seconds interval beep tone
	Level 3	(1) Single beep tone or 15 seconds interval alternate high and low pitch sound (2) Single rapid tone or 15 seconds interval rapid tone (*)	Single beep tone (different tone from FUKUDA DENSHI mode) or 15 seconds interval beep tone (*)
Volume Setup			
	Level 1	Setting is possible.	The volume for low level alarm cannot be set higher than the high level alarm.
	Level 2		
	Level 3		
Tone Setup			
	Level 1	Setting is possible.	Setting is possible.
	Level 2		Setting is not possible. (Setting for Level 1 will be applied.)
	Level 3		Setting is not possible. (Setting for Level 1 will be applied.)
Other Setup			
Other Bed Alarm		Setting is possible.	Setting is not possible. (Setting for Level 1 will be applied.)
Ventilator Alarm		Setting is possible.	Only ON/OFF setting is possible. (For tone and volume, setting for Level 1 will be applied.)
Alarm Mute (Hospital Setup)		Setting is possible.	Setting is not possible. (Fixed to "OFF")

【**Alarm Pole Setup**】

Setup	When FUKUDA DENSHI is set	When IEC is set
Sync. with Alarm		Setting is not possible. (Fixed to "ON")
Alarm Type	Setting is possible.	Setting is not possible. (Fixed to "Level 1, 2 and 3")
Ventilator Alarm		Setting is not possible. (Fixed to "ON")
Pattern Setup		Setting is not possible.
Sync. with HR		Setting is possible.

⚠ CAUTION	The alarm priority is high for level 1 (life threatening alarm), medium for level 2 (cautionary alarm), and low for level 3 (treatment needed alarm).

●Level 3 Alarm Sound

The alarm generating time interval for Level 3 alarm can be set.

Level 3 Alarm Sound　[One time]　[15s interv.]　If One time is selected, the alarm sound will generate only one time.
If 15s interv. is selected, the alarm sound will generate in 15 seconds interval.

●DS-LAN Setup

The DS-LAN network type can be selected.

DS-LAN Setup　[DS-LANII (10Mbps)]　[DS-LANIII (100Mbps)]
*To validate the setup, you need to restart the system.

NOTE	● When the "DS-LAN Setup" is changed, make sure that the same setting is made on the central monitor. If the setting is different, proper communication cannot be performed. ● The following central monitors can connect to DS-LANII network only. When connecting these central monitors, make sure all monitors in the same wired network is set to DS-LANII. 　DS-5700, DS-5800N/NX/NX^{MB}, DS-7600/7600W (software version of V05 and prior) ● To validate the "DS-LAN Setup", it is necessary to restart the system. Make sure to restart the system when the setting is changed for "DS-LAN Setup".

●RR Alarm Increment

The RR alarm increment can be setup as Normal or Small.

	Normal	Small
Adult	5Bpm increment	1Bpm increment
Child/Neonate	2Bpm increment	1Bpm increment

RR Alarm Increment Normal Small   Select Normal or Small .

●Patient Name on Home Display

ON/OFF of the patient name on home display can be selected.

Patient Name on Home Display ON OFF   ON will display the patient name.
OFF will not display the patient name.

8

Monitor Setup

Display Mode Setup
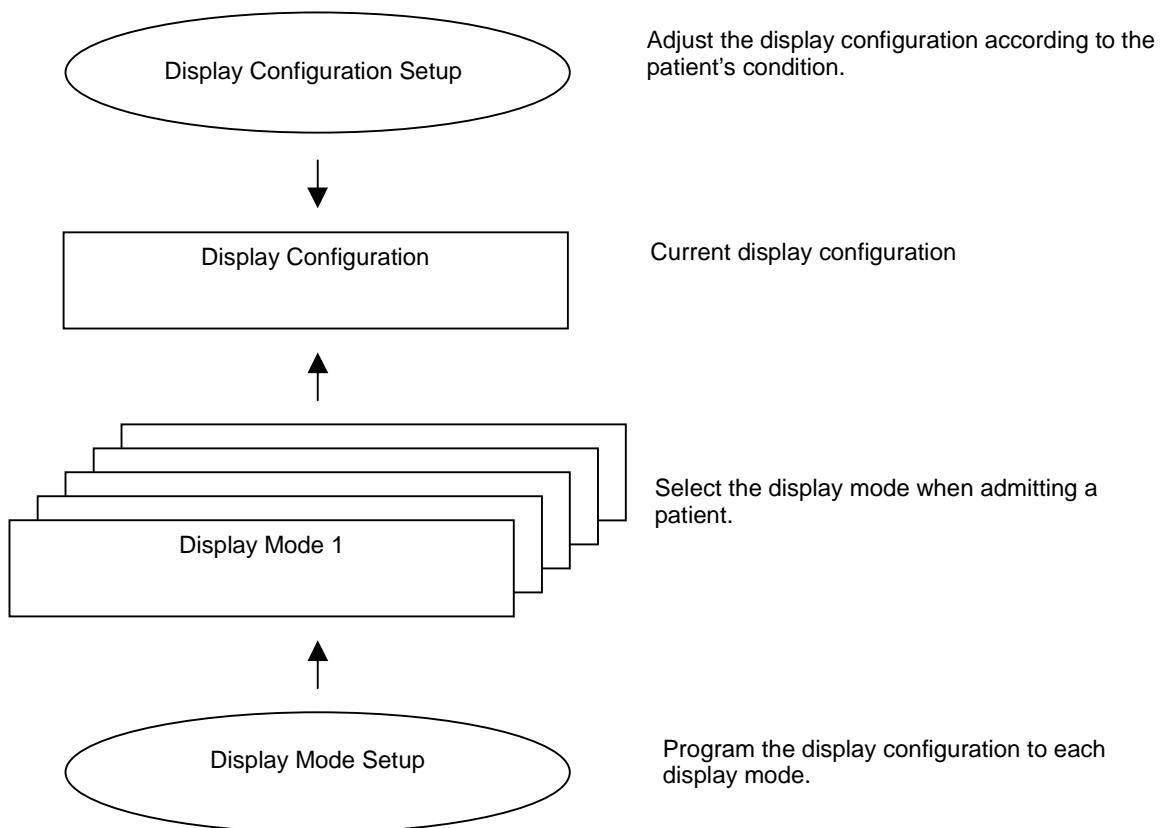
On the DS-7200 system, 5 patterns of display configuration can be programmed according to the monitoring purpose.

Setting the display configuration for each time the patient is admitted or each time the parameter is added or deleted may be troublesome.
To simplify this procedure, 5 patterns of display configuration other than default setting can be programmed according to the monitoring purpose.
By preprogramming the configuration to each display mode, display configuration setups at admitting procedure can be simplified by just selecting the display mode.
It is recommended to program the display mode in rough classification such as patient's condition, monitoring purpose (ICU or surgery), and if necessary, perform unique setup for each patient.

Display Configuration Setup — Adjust the display configuration according to the patient's condition.

Display Configuration — Current display configuration

Display Mode 1 — Select the display mode when admitting a patient.

Display Mode Setup — Program the display configuration to each display mode.
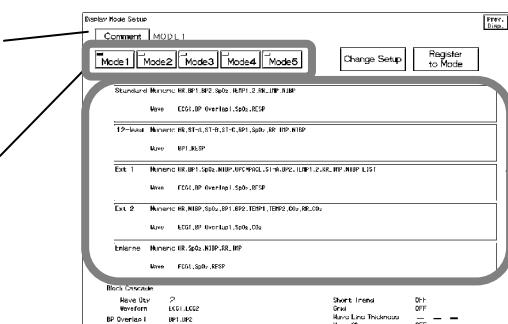
To Program the Display Mode

Programming the display configuration for each display mode can be performed on the display configuration setup menu. The default setting can be changed for each display mode.

1 Press the ⎹ Menu ⎸ → ⎹ System Configuration ⎸ → ⎹ Pre-Set ⎸ → ⎹ Display Mode Setup ⎸ keys.

Enter a comment for each mode.

Select a mode for programming.

Program the display configuration. Standard, 12-lead, Extension 1, Extension 2, and Enlarge can be programmed.

2 Select a mode for programming.

⎹ Mode1 ⎸ ⎹ Mode2 ⎸ ⎹ Mode3 ⎸ ⎹ Mode4 ⎸ ⎹ Mode5 ⎸   Select a mode to program the display configuration.
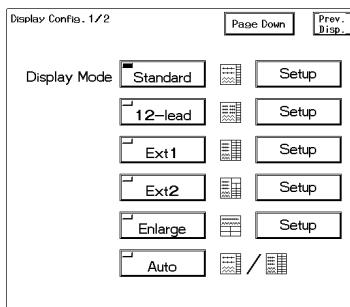
NOTE	On the display mode setup menu, the setup of currently selected mode will be displayed. Changing the mode and returning to the home display will set the display configuration to the setup of the last selected mode.

3 Program the display configuration for the mode.
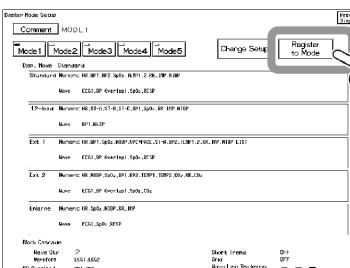
Press the ⎹ Change Setup ⎸ key.

Set the display configuration.
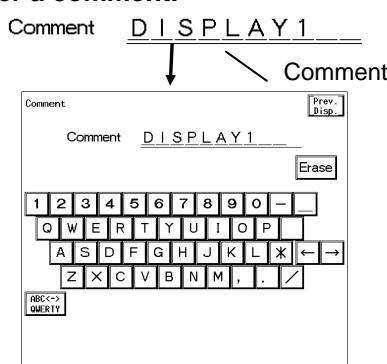
Reference	For display configuration setup procedure, refer to "4. Monitoring Setup　Display Configuration"

Pressing the ⎹ Register to Mode ⎸ key will register the current display configuration setup to the display mode (1 to 5) selected at procedure 2.

4 Enter a comment.
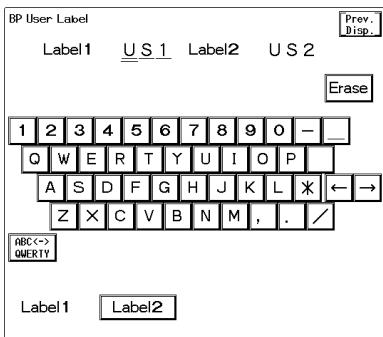
Comment

Pressing the ⎹ Comment ⎸ key will display the keyboard to enter the comment.

This section describes the procedure to program the user label for BP and TEMP.

To Set the BP User Label

Any 3 letters can be programmed as BP user label. Up to 2 BP user labels can be set.

1 **Press the** | **Menu** | → | **System Configuration** | → | **BP User Label** | **keys.**

The BP User Label Setup menu will be displayed.
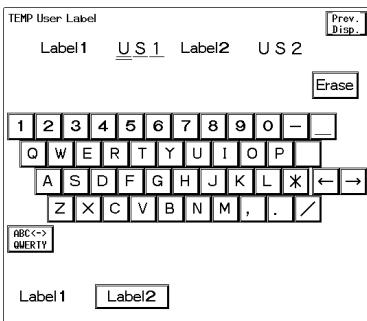
2 **Set the user label for Label 1 or Label 2.**

Enter 3 letters using alphabet, number, and symbol keys.

To Set the Temperature User Label

Any 3 letters can be programmed as TEMP user label. Up to 2TEMP user labels can be set.

1 **Press the** | **Menu** | → | **System Configuration** | → | **TEMP User Label** | **keys.**

The TEMP user label setup menu will be displayed.

2 **Set the user label for Label 1 or Label 2.**

Enter 3 letters using alphabet, number, and symbol keys.

This section explains about the different setup for each hospital.

About the Hospital Setup

A different monitoring condition can be set for each hospital.

First Page (1/3)

・Date	・Alarm Mute
・Arrhythmia Analysis Filter	・Ext. Device Connection
・NIBP Data Erase Time	・Status Output Setup
・Unit	・Telemeter Setup
・TCON Setup	

Second Page (2/3)
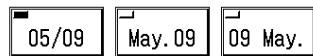
・Trend Clip	・BP Record Scale
・Suspend Arrhy. Analysis during Noise Interference	
・MEAN Calculation	・Night Mode Cancel
・Asystole, VF, VT	

Third Page (3/3)

・DS-LAN Pat. ID Tx	・Admit/Discharge Key Setup
・HR/PR Low Limit during Alarm Auto Setting	
・Password for Alarm Setup	・Rec. Paper

8

Hospital Setup

●Date Format

Date | 05/09 | | May.09 | | 09 May. |

The date format for display and recording can be selected from 3 formats.

●Alarm Mute

Alarm Mute | ON | | OFF |

The alarm sound can be silenced at time of alarm occurrence. To avoid shocking the patient from the alarm sound, or if alarm sound is not necessary, this function can be used. This setting will not affect recall and alarm recording.

When | IEC | is selected for "Alarm System" on the Monitor Setup menu, ON/OFF setting for "Alarm Mute" is not possible.

⚠ C A U T I O N	The alarm mute ON/OFF setting will remain effective even when the power is turned OFF. Be cautious not to miss any important alarm by leaving the alarm silenced.

●Arrhythmia Analysis Filter

Arrhy. Analysis Filter | Disp Waveform | | Fixed |
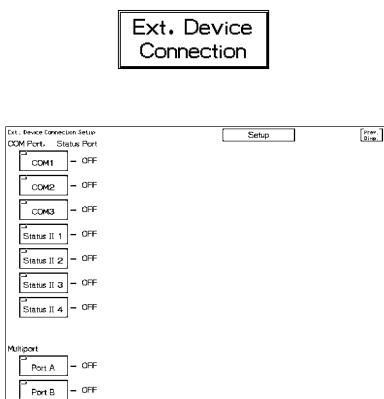
The ECG filter to perform arrhythmia analysis can be set.
| Disp. Waveform | will set the filter mode selected on admit menu or ECG configuration menut.
| Fixed | will set the filter to 1.0 to 30Hz regardless of the filter mode selection.

●External Device Connection Setup

Ext. Device
Connection
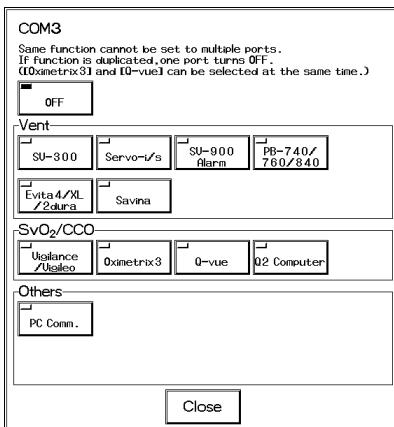
This device is equipped with 8 serial ports (COM port or Status II port) and 2 multiports to connect to other devices.
Press the │ Ext. Device Connection │ key to select the connecting device.

Press the │ COM＊ │, │ StatusII＊ │, │ Port＊ │ key to select the connecting equipment for each port.
For StatusII 5 port and Multiport B, only one of either can be used.

【Ex. COM3 Connection】
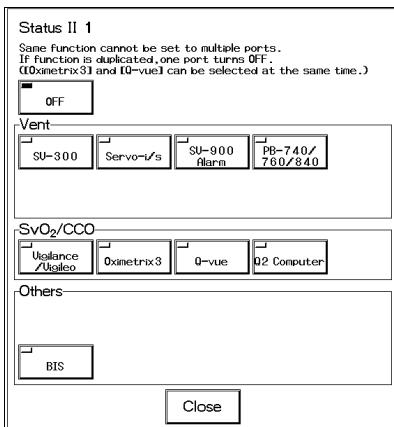
One equipment (function) can be selected for each COM port (COM1, COM2, COM3). The same equipment (function) cannot be set to multiple ports.
Ventilator and SvO₂/CCO can be selected only for COM3 port.
│ HLX │ (HLX-561/HLX-801) can be selected only for COM1 port.
│ TCON │ (HTC-702) can be selected only for COM2 port.
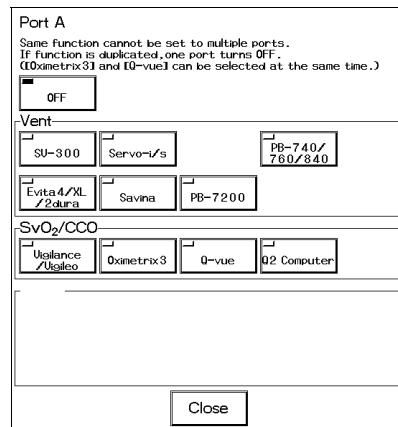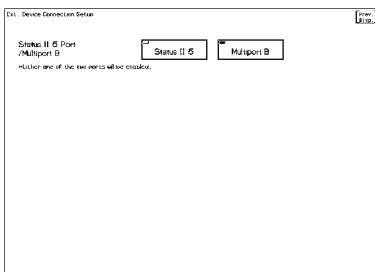
【Ex. StatusII 1 Connection】   【Ex. Multiport Connection】

【Setup Screen】

For StatusII 5 port and Multiport B, only one of either can be used.
Press the │ Setup │ key to select the using port from
│ StatusII 5 │ or │ Multiport B │.

Hospital Setup
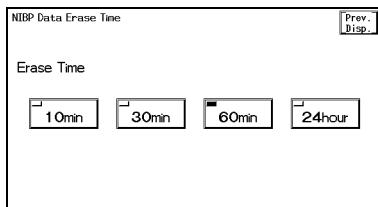
【**Equipments that can be connected to each port**】

| | COM1 | COM2 | COM3 | StatusⅡ | | Port A | Port B |
				1	2 to 5		
PC Comm.	Yes	Yes	Yes	No	No	No	No
SV-300	No	No	Yes	Yes	Yes	Yes	Yes
Servo-i/s	No	No	Yes	Yes	Yes	Yes	Yes
SV-900	No	No	Yes	Yes	Yes	No	No
PB-740/760/840	No	No	Yes	Yes	Yes	Yes	No
Evita4/XL/2dura	No	No	Yes	No	Yes	Yes	Yes
Savina	No	No	Yes	No	Yes	Yes	Yes
PB-7200	No	No	No	No	No	Yes	No
Vigilance/Vigileo	No	No	Yes	Yes	Yes	Yes	Yes
Oximetrix3	No	No	Yes	Yes	Yes	Yes	Yes
Q-vue	No	No	Yes	Yes	Yes	Yes	Yes
Q2 Computer	No	No	Yes	Yes	Yes	Yes	Yes
BIS	No	No	No	Yes	Yes	No	No
HLX-561/HLX-801	Yes	No	No	No	No	No	No
TCON (HTC-702)	No	Yes	No	No	No	No	No

●NIBP Data Erase Time

Set the time to erase the NIBP data. Press the NIBP Data Erase Time key to display the setup menu for the erase time.
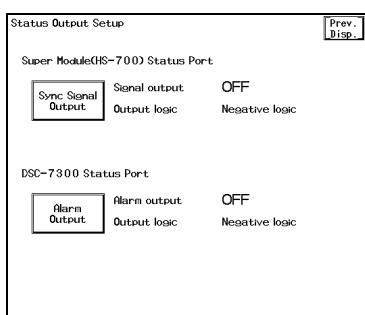
Select the time from 10min , 30min , 60min , 24hour .
When the selected time passes, the NIBP data will be erased.

●Status Output Setup

This device is capable to output the synchronized signal (HR, RR) and alarm.
Also, this device can output the generating alarm to external device.
Pressing the Status Output Setup key allows to set the details of synchronized signal output and alarm output.
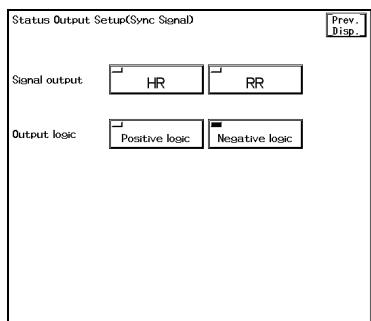
Pressing the Sync Signal Output key will display the menu to select the synchronized signal (HR, RR) and output logic (positive logic, negative logic).
Pressing the Alarm Output key will display the menu to select the alarm to output and output logic (positive logic, negative logic).

Synchronized Signal Output Setup

Select the output signal from ⎯HR⎯, ⎯RR⎯.
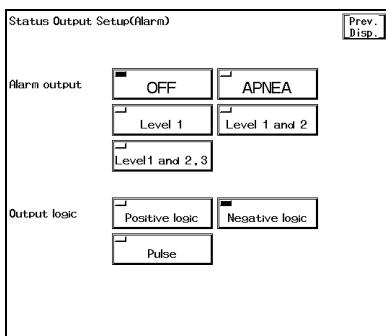
⎯HR⎯ will output the synchronized signal according to the selected HR source (ECG, SpO$_2$, BP1).

⎯RR⎯ will output the synchronized signal according to the selected RR source (impedance, CO$_2$).

Select the output logic from ⎯Positive Logic⎯, ⎯Negative Logic⎯.

Positive logic outputs the synchronized signal in plus, and negative logic outputs the synchronized signal in minus.

Alarm Output Setup

Select the alarm to output.

⎯Level 1⎯ will output the signal when the level 1 alarm generates.

⎯Level 1 and 2⎯ will output the signal when level 1 or level 2 alarm generates.

⎯Level 1, 2 and 3⎯ will output the signal when level 1, level 2, or level 3 alarm generates.

⎯APNEA⎯ will output the signal when apnea alarm generates.

Select ⎯OFF⎯ if not necessary to output the alarm.

Select the output logic from ⎯Positive Logic⎯, ⎯Negative Logic⎯, ⎯Pulse⎯.

Positive logic outputs the signal in plus, and negative logic outputs the signal in minus.

A square wave of 440ms cycle is output for ⎯Pulse⎯.
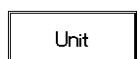
| Reference | Refer to "11. Technical Information External Connection" for connector pin assignments of the output signal. |

| NOTE | The equipment status alarm will be output as level 3. Select ⎯Level 1, 2, and 3⎯ when outputting the equipment status alarm. |
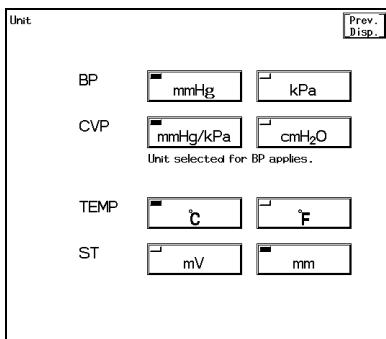
●Measurement Unit Setup

Select the unit for the measurement.

Changing the unit will erase the tabular trend data and graphic trend data.

Also, perform the alarm setup again as alarm condition should be set for each measurement unit.
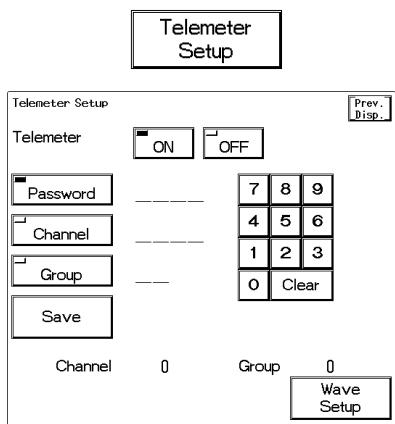
BP   : Changes the unit for BP and NIBP.
CVP   : Changes the unit for CVP. (When BP label is CVP.)
TEMP : Changes the unit for temperature.
ST   : Changes the unit for ST measurement.

●**Telemeter Setup**

```
┌─────────────┐
│  Telemeter  │
│    Setup    │
└─────────────┘
```

The channel ID for the telemeter can be set.
Press the | Telemeter Setup | key to display the telemeter setup menu.
Select | OFF | if not using the telemeter.
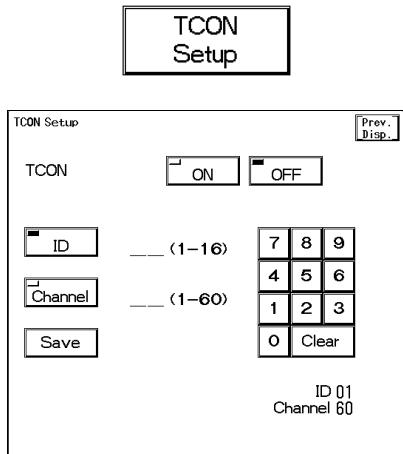
```
┌────────────────────────────────┐
│ Telemeter Setup          ┌────┐ │
│                          │Prev.│ │
│                          │Disp.│ │
│ Telemeter    ┌─┐   ┌──┐        │
│              ■ ON  ☐ OFF       │
│                                │
│ ┌──────────┐        ┌─┬─┬─┐    │
│ ■ Password  _____   │7│8│9│    │
│ └──────────┘        ├─┼─┼─┤    │
│ ┌──────────┐        │4│5│6│    │
│ ☐ Channel   _____   ├─┼─┼─┤    │
│ └──────────┘        │1│2│3│    │
│ ┌──────────┐        ├─┼─┴─┤    │
│ ☐ Group     __      │0│Clear   │
│ └──────────┘        └─┴───┘    │
│ ┌──────────┐                   │
│ │ Save     │                   │
│ └──────────┘                   │
│                                │
│    Channel   0    Group   0    │
│                      ┌──────┐  │
│                      │ Wave │  │
│                      │ Setup│  │
│                      └──────┘  │
└────────────────────────────────┘
```

Reference   For telemeter setup procedure, refer to "9. Installation　Wireless Network Connection ●Channel ID Setup".

●**TCON Setup**

```
┌─────────┐
│  TCON   │
│  Setup  │
└─────────┘
```

TCON: | ON | will turn ON the bidirectional wireless communication.
　　　| OFF | will turn OFF the bidirectional wireless communication.

TCON ID:
　　Set the ID for the bidirectional wireless communications. The ID should not duplicate with other monitors within the same TCON group (channel).

TCON Channel:
　　Set the channel for the bidirectional wireless communication. The same channel should be set for the monitors within the same TCON group (channel).

```
┌────────────────────────────────┐
│ TCON Setup               ┌────┐ │
│                          │Prev.│ │
│                          │Disp.│ │
│ TCON       ┌──┐   ┌───┐        │
│            ☐ ON   ■ OFF        │
│                                │
│ ┌──────┐                ┌─┬─┬─┐│
│ ■ ID     ___ (1-16)     │7│8│9││
│ └──────┘                ├─┼─┼─┤│
│ ┌──────┐                │4│5│6││
│ ☐ Channel ___ (1-60)    ├─┼─┼─┤│
│ └──────┘                │1│2│3││
│ ┌──────┐                ├─┼─┴─┤│
│ │ Save │                │0│Clear│
│ └──────┘                └─┴───┘│
│                                │
│                      ID 01     │
│                      Channel 60│
└────────────────────────────────┘
```

Reference   Refer to "9. Installation　Bidirectional Wireless Communications (TCON) system　TCON ID / TCON Channel Setup" for TCON setup.

●**Trend Clip**

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

Trend Clip　　　| ■ ON |　| ☐ OFF |

| ON | will indicate the exceeded portion with straight line at upper (lower) limit.
| OFF | will not display the exceeded portion.

●**BP Recording Scale**

BP Record Scale　　| ■ 40mm |　| ☐ 20mm |

Select the scale height for the BP1 to BP5 waveform when recording.

●Suspend Arrhy. Analysis during Noise Interference

Suspend Arrhy. Analysis
during Noise Interference
[ON] [OFF]

During the arrhythmia analysis, the following conditions will be detected (every second) as noise.
・ When poor signals are frequently detected from the picked up QRS candidates.
・ When the baseline drift duration is too long.
・ When spike noises similar to QRS and baseline noises are frequently detected.

OFF will suspend arrhythmia analysis for 1 second when a noise is interfering.

ON will suspend arrhythmia analysis for 5 seconds when a noise is interfering. In addition, more noises will be detected when ON is selected.

⚠ CAUTION	Regardless of ON/OFF setting of "Suspend Arrhy. Analysis during Interference" under Hospital Setup (Preset Menu), the "Cannot analyze" alarm will generate when analysis is suspended for more than 30 seconds. Refer to "10. Maintenance Troubleshooting ECG".

●MEAN Calculation (BP1, ART, NIBP)

MEAN Calculation
(ART, NIBP)
[Wave] [Calc.]
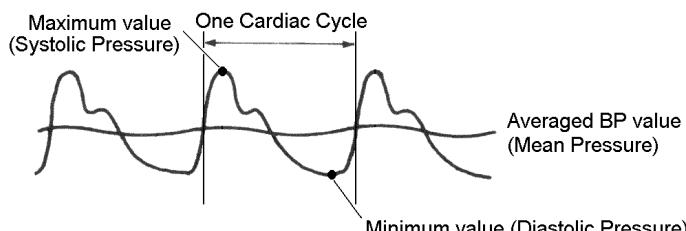
The mean blood pressure value of BP and NIBP can be selected to be measured from the waveform from calculation.

Calc. : Calculates the mean BP from the following calculation.
Mean BP = (Systolic BP + Diastolic BP × 2)÷3

Wave : Measures the mean BP as follows.

Maximum value (Systolic Pressure)
One Cardiac Cycle
Averaged BP value (Mean Pressure)
Minimum value (Diastolic Pressure)

●Night Mode Cancel

Night Mode Cancel
[Any Key] [Night Mode Key]

Select the procedure to cancel the night mode when "Slightly Dark" or "Dark" is set.
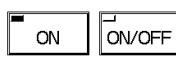
Any Key will cancel the night mode by pressing anywhere on the screen.

Night Mode Key will cancel the night mode by pressing the Night Mode key preprogrammed as user key or Night Mode key on the menu display.

●Asystole, VF, VT

Asystole, VF, VT
(only asystole for neonate)
[ON] [ON/OFF]

ON will not allow the alarms for asystole, VF, VT, Slow_VT to be turned off in the arrhythmia alarm setup menu.

ON/OFF will allow the alarms for asystole, VF, VT, Slow_VT to be turned ON or OFF.

Reference	Refer to "4. Monitoring Setup To Set ON/OFF of Arrhythmia Alarm" for arrhythmia alarm setup.

8
Hospital Setup

●Patient ID Transmission Starting Digit for DS-LAN Ⅱ

On the DS-7200 system, patient ID of up to 20 digits can be set, but only 10 digits can be transmitted on the DS-LANII network. This setup allows to set the starting digit of the 10 digits to be transmitted. On the DS-LANIII network, if ⎢ Center ⎢ is selected for the recorder and recording is started on the DS-7200, the central monitor recorder can print only up to 10 digits. This setup will set the starting digit to be printed. However, all 20 digits can be displayed on the central monitor.

DS–LAN Pat. ID Tx　　⎢◄⎢　1 char.　⎢►⎢　　⎢◄⎢ : The starting digit will shift to left.

⎢►⎢ : The starting digit will shift to right.

NOTE	On the DS-7200 system, patient ID of up to 20 digits can be set, but only 10 digits can be transmitted on the DS-LANII network.

●Admit/Discharge Key Setup

Whether or not to display the following keys on the admit menu can be selected.
- ⎢ Impedance Mode ⎢ key
- Filter Mode (⎢ Monitor ⎢ / ⎢ ESIS ⎢ / ⎢ DIAG. ⎢)
- ⎢ Bed ID ⎢ key

Admit/Discharge
Key Setup　　　　⎢ Full ⎢ ⎢ Light ⎢

⎢ Full ⎢ will display the above keys.
⎢ Light ⎢ will not display the above keys. If these keys are not necessary to be displayed, select ⎢ Light ⎢.

●HR/PR Low Limit during Alarm Auto Setting

HR/PR Low Limit during　⎢ OFF ⎢

Alarm Auto Setting　　　⎢ 30bpm ⎢ ⎢ 40bpm ⎢

⎢ OFF ⎢ will not restrict the HR/PR low limit.
⎢ 30bpm ⎢ will restrict the lower limit to 30bpm.
⎢ 40bpm ⎢ will restrict the lower limit to 40bpm.

●Password for Alarm Setup

Whether or not to require password for alarm setup menu can be selected.

Password for
Alarm Setup　　　⎢ ON ⎢ ⎢ OFF ⎢

⎢ ON ⎢ will require password for alarm setup menu.
⎢ OFF ⎢ will not require password for alarm setup menu.

●Recording Paper

Recording paper size can be selected.

Rec. Paper　　　　⎢ A4 ⎢ ⎢ LETTER ⎢

⎢ A4 ⎢ will record on the A4 size paper.
⎢ LETTER ⎢ will record on the letter size paper.
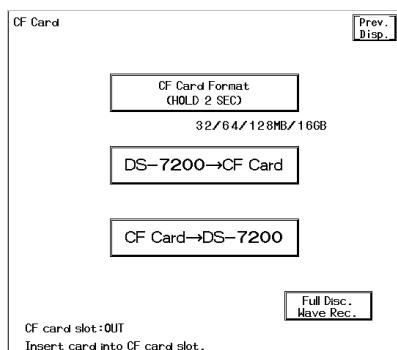
This section explains about transferring the setup data and recording the full disclosure waveform using the optional CF card. To set all the monitors in the same ward to the same alarm setup and display configuration may take large amount of time. However this process can be simplified by performing the setup on one monitor, and copying the data to all the other monitors using the CF card.

Also, by using the CF card for full disclosure waveform recording, full disclosure waveform (48 hours, 6 waveforms) can be recorded and displayed on the monitor.

⚠CAUTION	● Use only the specified CF card. For data transfer: FCF-128 For full disclosure waveform recording: FCF-16GA ● When using the CF card for the first time, make sure to format the CF card on the using equipment. ● When the CF card is formatted, all the data stored in the CF card will be erased. ● The CF card intended for full disclosure waveform recording cannot be used for data transfer. ● The CF card intended for data transfer cannot be used for full disclosure waveform recording.

NOTE	When using a CF card with write protect function, make sure to cancel the write protect function before data transfer.

1 Press the ⟨ **Menu** ⟩ → ⟨ **System Configuration** ⟩ → ⟨ **CF Card** ⟩ keys.

The CF card menu will be displayed.

CF Card Format

1 Insert the CF card to CF card slot 1.

For data transfer   FCF-128
For full disclosure waveform   FCF-16GA

2 Format the CF card.

Pressing the ⟨ CF Card Format ⟩ key for more than 2 seconds will automatically determine the CF card type (32/64/128Mbyte, 16Gbyte), generates a beep sound and starts formatting.

3 A beep sound will generate again to notify that the format process is complete.
<In case of CF card for data transfer>
The CF card can be used for data transfer for setup data and patient data.

Refer to "Data Transfer (DS-7200 → CF Card) or "Data Transfer (CF Card → DS-7200) in this section.
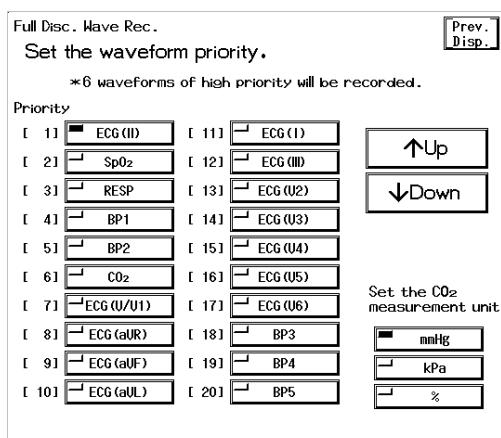
<In case of CF card for full disclosure waveform recording>
The CF card can be used for full disclosure waveform recording.
As the full disclosure waveform will be automatically recorded, leave the CF card inserted in the CF card slot.
To select the waveform for recording, refer to the next section.

Full Disclosure Waveform Recording Setup

Select the waveform for full disclosure waveform recording.

```
Full Disc. Wave Rec.                          Prev.
  Set the waveform priority.                  Disp.

       *6 waveforms of high priority will be recorded.
Priority
 [  1] ■ ECG(II)      [ 11] ⌐ ECG(I)
 [  2] ⌐ SpO2         [ 12] ⌐ ECG(III)        ↑Up
 [  3] ⌐ RESP         [ 13] ⌐ ECG(V2)
 [  4] ⌐ BP1          [ 14] ⌐ ECG(V3)         ↓Down
 [  5] ⌐ BP2          [ 15] ⌐ ECG(V4)
 [  6] ⌐ CO2          [ 16] ⌐ ECG(V5)
 [  7] ⌐ ECG(V/V1)    [ 17] ⌐ ECG(V6)     Set the CO2
 [  8] ⌐ ECG(aVR)     [ 18] ⌐ BP3          measurement unit.
 [  9] ⌐ ECG(aVF)     [ 19] ⌐ BP4          ■ mmHg
 [ 10] ⌐ ECG(aVL)     [ 20] ⌐ BP5          ⌐ kPa
                                            ⌐ %
```
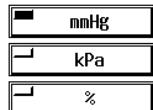
Press the [↑Up] key to increase the priority of the selected waveform.
Press the [↓Down] key to decrease the priority of the selected waveform.

The 6 waveforms of high priority will be recorded on the CF card.

```
Set the CO2
measurement unit
  ■ mmHg
  ⌐ kPa
  ⌐ %
```

For the CO_2 waveform, select the measurement unit from mmHg/kPa/%.

Data Transfer (DS-7200 → CF Card)

The data can be transferred from the monitor to the CF card.
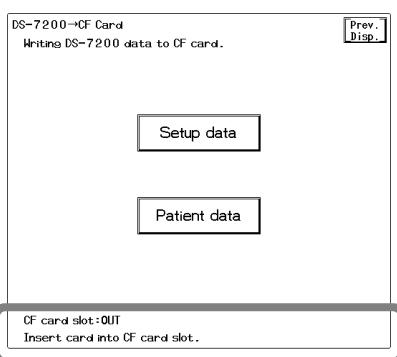
1 **Insert the CF card to CF card slot 1.**

2 **Write data to the CF card**

[DS-7200→CF Card]

The data will be transferred from the monitor to the CF card.
Press the [DS-7200 → CF Card] key to select the data type to transfer.

3 **Select the data type.**

```
DS-7200→CF Card                    Prev.
  Writing DS-7200 data to CF card.  Disp.




           [ Setup data ]



           [ Patient data ]




CF card slot:OUT
Insert card into CF card slot.
```
—— Message Display

[Setup data] key will transfer the setup data such as alarm setup, display configuration, parameter setup to the CF card.
[Patient data] key will transfer the patient data such as admitting data (name, age, ID, etc.), graphic trend and tabular trend.
Recall data, OCRG, ST measurement and short trend data cannot be transferred.
If the CF card is not inserted to the card slot, a message will be displayed.

4 **Confirm if OK to write the data to the CF card.**

Press the ⎡YES⎤ key if you are sure to overwrite the CF card data with the monitor data.

```
┌─────────────────────────────┐        ┌─────────────────────────────┐
│  Write setup data to CF card.│        │  Write patient data to CF card.│
│                             │        │                             │
│            OK?              │        │            OK?              │
│      ┌─────┐   ┌─────┐      │        │      ┌─────┐   ┌─────┐      │
│      │ YES │   │ NO  │      │        │      │ YES │   │ NO  │      │
│      └─────┘   └─────┘      │        │      └─────┘   └─────┘      │
│                             │        │                             │
└─────────────────────────────┘        └─────────────────────────────┘
```
              <Setup Data>   <Patient Data>

Data Transfer (CF Card → DS-7200)

The data can be transferred from the CF card to the monitor.

1 **Insert the IC card to IC card slot.**

2 **Read the data from the CF card.**

```
┌─────────────────────────┐
│   CF Card→DS-7200        │
└─────────────────────────┘
```
The data will be transferred from the CF card to the monitor.
Press the ⎡CF Card → DS-7200⎤ key to select the data type to transfer.

3 **Select the data type.**

```
┌─────────────────────────────────┐
│ CF Card→DS-7200         ┌──────┐ │
│  Reading CF card data into DS-7200.│Prev.││
│                         │Disp. │ │
│         ┌──────────────┐└──────┘ │
│         │  Setup data  │         │
│         └──────────────┘         │
│                                  │
│         ┌──────────────┐         │
│         │  Patient data│         │
│         └──────────────┘         │
│                                  │
│ CF card slot:OUT                 │
│ Insert card into CF card slot.   │
└─────────────────────────────────┘
```
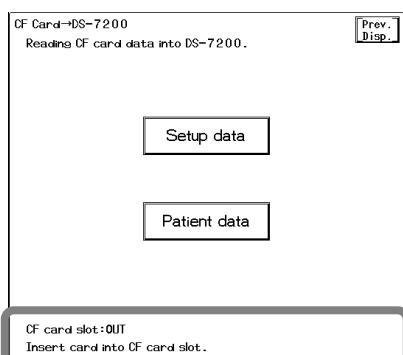
⎡Setup Data⎤ key will transfer the setup data such as alarm setup, display configuration, parameter setup from the CF card.
⎡Patient Data⎤ key will transfer the patient data such as admitting data (name, age, ID, etc.), graphic trend and tabular trend from the CF card.

If the CF card is not inserted to the card slot, a message will be displayed.

— Message Display

4 **Confirm if OK to read the data from the CF card.**

Press the ⎡YES⎤ key if you are sure to overwrite the monitor data with the CF card data.

```
┌─────────────────────────────────┐   ┌─────────────────────────────────┐
│   Read setup data from CF card.  │   │  Read patient data from CF card. │
│                                  │   │                                  │
│             OK?                  │   │             OK?                  │
│       ┌─────┐   ┌─────┐          │   │       ┌─────┐   ┌─────┐          │
│       │ YES │   │ NO  │          │   │       │ YES │   │ NO  │          │
│       └─────┘   └─────┘          │   │       └─────┘   └─────┘          │
│                                  │   │                                  │
│ *If BP or TEMP unit of measurement is different from│ *If BP or TEMP unit of measurement is different from│
│  current setup, all the corresponded trend data and │  current setup, all the corresponded trend data and │
│  recall data will be initialized.│   │  recall data will be initialized.│
│ *After reading setup data, power the unit again.│   │                                  │
└─────────────────────────────────┘   └─────────────────────────────────┘
```
            <Setup Data>   <Patient Data>

NOTE	When the data retrieving process completes, the display will return to the home display.

⚠CAUTION	● Restart the system after reading the setup data from the CF card. The setup data will become effective after the system is restarted. ● Reading the patient data from the CF card will erase all previous patient data stored in the patient monitor.

8

CF Card

Data for Transfer

The setup data such as monitoring condition, alarm setup, and patient data such as graphic trend data and tabular trend data can be transferred.

Setup Data

Data		*Description*
Parameter Setup		Stores the monitoring condition (size, lead, etc.) for all the monitoring parameters.
Alarm Setup		Stores the alarm threshold level.
System Configuration	ST Meas. Condition	Stores the current setup.
	Record	
	Sweep Speed	
	Tone / Volume	
	Color / Brightness	
	Display Configuration	
	Night Mode Setup	
	Graphic Trend Setup	
	Tabular Trend Setup	
	Resp. List Setup	
	Vigilance List Setup	
	Recall Setup	
	ST Graphic Trend Setup	
	ST Display Lead Setup	
	Set Other Alarm	
	BP User Label	
	TEMP User Label	
Pre-Set	Alarm Mode Setup	Stores the current setup.
	Display Mode Setup	
	Hospital Setup (Not all data)	
	Monitor Setup (Not all data)	

Patient Data

Data	*Description*
Patient Information	Stores patient information such as name, ID, age, sex, pacemaker use, patient type.
Graphic Trend Data	Stores 24 hours of graphic trend data.
Tabular Trend Data	Stores 24 hours of tabular trend data.

Error Message

CF card slot : OUT

Cause   : CF card is not inserted or not correctly set in the CF card slot.
Solution : Set the CF card into the CF card slot.

Invalid CF card.

Cause   : Unspecified CF card is used.
Solution : Set the specified CF card into the CF card slot.

No data on the CF card.

Cause   : There is no data on the CF card to be read out.
Solution : Check if the correct CF card is being used, or rewrite the data on the CF card.

CF card error.

Cause 1 : An error has been detected when writing/reading data on the CF card.
Solution : If the error has been detected during writing, try again.
            If the error has been detected during reading, data might not be correctly written on the CF card. Rewrite the data after formatting and try the procedure again.

Cause 2 : The software version of the DS-7200 is older than that of the data stored in the CF card.
Solution : The data of newer software version cannot be read.
            Update the software version of the DS-7200.

Cause 3 : There is no more space on the CF card to write the data.
Solution : Format the CF card.

8

CF Card

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