

DynaScope 7000 Series

Patient Monitor

# DS-7000 System

Ver.06

Operation Manual

《 Monitoring Operation 》



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

**This operation manual is for the DS-7000 System Version 06.**

**⚠CAUTION**

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

**CAUTION:**

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

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.

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# 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.

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# Composition of This Operation Manual

The DS-7000 Operation Manual is composed of the following 2 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, setup procedures, maintenance, specification, accessories, etc.

- |                                   |  |
|-----------------------------------|--|
| 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. Installation                   | : Describes about the environment for use, wireless system, etc.   |
| 9. Initial Settings               | : Describes the procedure to set the initial settings which should be preprogrammed before monitoring a patient. |
| 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 important descriptions for handling and operating the unit properly and safely. A damaged label may compromise safe operation.

## DS-7000 Patient Monitor

### **DANGER**

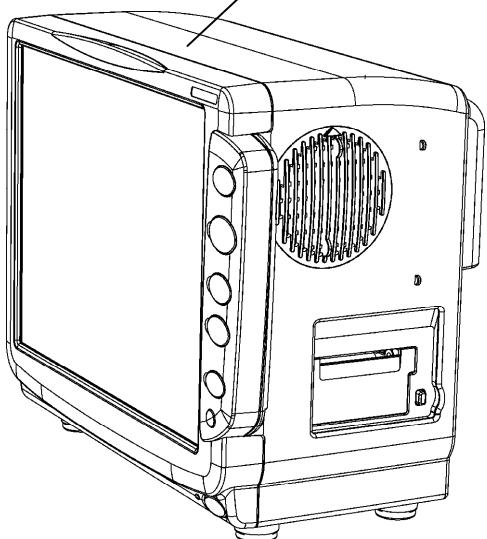
Risk of explosion if used in the presence of flammable anesthetics.

### **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/HU-72/HU-73 Option Unit

### **DANGER**

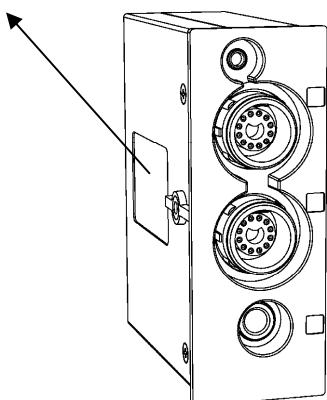
Risk of explosion if used in the presence of flammable anesthetics.

### **CAUTION**

Before connecting, read instruction manual.

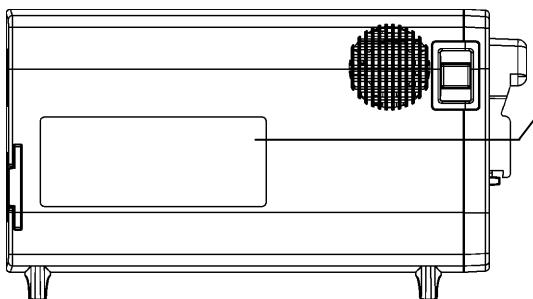
### **CAUTION**

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



<HU-71>

## MGU-701/MGU-702 Multigas Unit (Optional)



### ⚠ DANGER

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

### ⚠ CAUTION

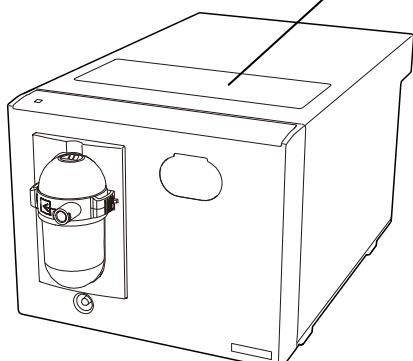
Before connecting, read instruction manual.

### ⚠ CAUTION

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

<MGU-701>

## MGU-801P/MGU-802/MGU-803 Multigas Unit (Optional)



### ⚠ 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.

<MGU-801P>

## Measurement Unit for Each Parameter

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The measurement units for this equipment are as follows.

<b>Detail</b>	<b>Parameter</b>	<b>Display</b>	<b>Unit</b>	<b>Default</b>
Heart Rate / Pulse Rate	ECG	HR	bpm (beats per minute)	
	Invasive Blood Pressure	PR-IBP	bpm (beats per minute)	
	SpO <sub>2</sub>	PR-SpO <sub>2</sub>	bpm (beats per minute)	
	Non-Invasive Blood Pressure	PR-NIBP	bpm (beats per minute)	
ST Level	ECG	ST	mm, mv	mm
VPC	ECG	VPC	bpm (beats per minute)	
Respiration Rate	Impedance Respiration	RR-IMP	Bpm (breaths per minute)	
	CO <sub>2</sub>	RR-CO <sub>2</sub>	Bpm (breaths per minute)	
	Ventilator	RR-VENT	Bpm (breaths per minute)	
Apnea	Impedance Respiration	APNEA	s (second)	
	CO <sub>2</sub>	APNEA	s (second)	
	Ventilator	APNEA	s (second)	
Invasive Blood Pressure	Invasive Blood Pressure	BP	mmHg, kPa cmH <sub>2</sub> O (CVP only)	mmHg
Non-Invasive Blood Pressure	Non-Invasive Blood Pressure	NIBP	mmHg, kPa	mmHg
Arterial Oxygen Saturation	SpO <sub>2</sub>	SpO <sub>2</sub>	%	
	Perfusion Index	PI	%	
Temperature	Temperature	TEMP	°C / °F	°C
Cardiac Output	Cardiac Output	CO	L/minute	
	Cardiac Index	CI	L/minute/m <sup>2</sup>	
Blood Temperature	Blood Temperature	Tb	°C / °F	°C
Injectate Temperature	Injectate Temperature	Ti	°C / °F	°C
Airway Flow	Airway Flow	AWF	L/minute	
Airway Pressure	Airway Pressure	AWP	cmH <sub>2</sub> O	
Tidal Volume	Inspiratory Tidal Volume	I-TV	mL	
	Expiratory Tidal Volume	E-TV	mL	
	Tidal Volume	TV	mL	
Minute Volume	Minute Volume	MV	L/minute	
Compliance	Compliance	COMP	mL/cmH <sub>2</sub> O	
Airway Resistance	Inspiratory Resistance	I-RES	cmH <sub>2</sub> O/L/Sec	
	Expiratory Resistance	E-RES	cmH <sub>2</sub> O/L/Sec	
Airway Pressure	Mean Airway Pressure	MEAN	cmH <sub>2</sub> O	
	Maximum Airway Pressure	PEAK	cmH <sub>2</sub> O	
	Pause Airway Pressure	PAUSE	cmH <sub>2</sub> O	
	Peak End Expiratory Pressure	PEEP	cmH <sub>2</sub> O	
	Fraction of Inspiratory Oxygen	VFiO <sub>2</sub>	%	

<b>Detail</b>	<b>Parameter</b>	<b>Display</b>	<b>Unit</b>	<b>Default</b>
Vigilance Data • Vigilance • Vigilance CEDV • VigilanceII • Vigileo	Mixed Venous Oxygen Saturation	SvO <sub>2</sub>	%	
	Central Venous Oxygen Saturation	ScvO <sub>2</sub>	%	
	Arterial Oxygen Saturation	SaO <sub>2</sub>	%	
	Oxygen Uptake Index	O <sub>2</sub> EI	%	
	Oxygen Transport	DO <sub>2</sub>	mL/minute	
	Oxygen Consumption	VO <sub>2</sub>	mL/minute	
	Stroke Volume	SV	mL	
	Stroke Volume (STAT Mode)	SV-STAT	mL	
	Stroke Volume Index	SVI	mL/m <sup>2</sup>	
	Stroke Volume Index (STAT Mode)	SVI-STAT	mL/m <sup>2</sup>	
	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 <sup>2</sup>	
	Continuous Cardiac Index (STAT Mode)	CCI-STAT	L/minute/m <sup>2</sup>	
	Systemic Vascular Resistance	SVR	dynes-sec/cm <sup>5</sup>	
	Systemic Vascular Resistance Index	SVRI	dynes-sec/cm <sup>5</sup>	
	Blood Temperature	B-Temp	°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 <sup>2</sup>	
	End-Diastolic Volume Index (STAT Mode)	EDVI-STAT	mL/m <sup>2</sup>	
	End-Systolic Volume	ESV	mL	
	End-Systolic Volume Index	ESVI	mL	
	Stroke Volume Variance	SVV	%	
Gas Unit Data	End Tidal Carbon Dioxide	EtCO <sub>2</sub>	mmHg, kPa, %	mmHg
	Inspired Carbon Dioxide	In-CO <sub>2</sub>	mmHg, kPa, %	mmHg
	Expired Oxygen	Ex-O <sub>2</sub>	%	
	Inspired Oxygen	FiO <sub>2</sub>	%	
	Expired Nitrous Oxide	Ex-N <sub>2</sub> O	%	
	Inspired Nitrous Oxide	In-N <sub>2</sub> O	%	
	Expired Agent Gas	Ex-AGT	%	
	Inspired Agent Gas	In-AGT	%	
	MAC Value	MAC	No unit	

<b>Detail</b>	<b>Parameter</b>	<b>Display</b>	<b>Unit</b>	<b>Default</b>
NICO Monitor Data	Cardiac Output (Average Mode)	CO	L/min	
	Cardiac Index	CI	L/min/m <sup>2</sup>	
	Cardiac Output (Fast Mode)	CO-F	L/min	
	Carbon Dioxide Emission	VCO <sub>2</sub>	mL/min	
	Minute Ventilation	MV	L/min	
	Alveolar Minute Ventilation	MVAL	L/min	
	Expiratory Tidal Volume	TV-E	mL	
	Inspiratory Tidal Volume	TV-I	mL	
	Peak Inspiratory Pressure	PIP	cmH <sub>2</sub> O	
	Mean Airway Pressure	MAP	cmH <sub>2</sub> O	
	Peak End Expiratory Pressure	PEEP	cmH <sub>2</sub> O	
	Dynamic Compliance	CDYN	mL/cmH <sub>2</sub> O	
	Airway Resistance	RAW	cmH <sub>2</sub> O/L/sec	
	End-Tidal CO <sub>2</sub> Concentration	EtCO <sub>2</sub>	mmHg	
	Respiration Rate	RR	Bpm	
	Arterial Oxygen Saturation	SpO <sub>2</sub>	%	
	Pulse Rate	PR	bpm	
	Stroke Volume	SV	mL	
	Expired Carbon Dioxide Partial Pressure	PECO <sub>2</sub>	mmHg	
	Airway Deadspace Volume	VDAW	mL	
	Alveolar Tidal Volume	VTALV	mL	
BIS Monitor Data	Bispectral Index	BIS	(no unit)	
	Signal Quality Index	SQI	%	
	Electromyograph	EMG	dB	
	Suppression Ratio	SR	%	
	Spectral Edge Frequency	SEF	Hz	
	Total Power	TOTPOW	dB	
	Impedance	IMP	Kohms	
Radical-7 Monitor Data	Arterial Oxygen Saturation	SpO <sub>2</sub> (R)	%	
	Pulse Rate	PR(R)	bpm (beats per minute)	
	Perfusion Index	PI (R)	%	
	Pleth Variability Index	PVI (R)	%	
	Carboxyhemoglobin Concentration	SpCO (R)	%	
	Methemoglobin Concentration	SpMet (R)	%	
	Total Hemoglobin Concentration	SpHb (R)	g/dL	
	Oxygen Content	SpOC (R)	mL/dL	

## Graphic Symbols

The following symbols are used for this equipment.

### DS-7000 Main Unit

Symbol	Description
	Caution; refer to accompanying documents Indicates the need to refer to related accompanying documents before operation.
	Potential Equalization Terminal Indicates the terminal to equalize the potential difference when interconnecting the devices.
	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.

### DS-7000 : Symbols displayed on the screen

Symbol	Description
	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 Mark Displayed when an alarm generates. Whether or not to display this icon can be selected on the display setup menu.
	Message Icon Displayed in the numeric data box when an alarm message is present for that parameter. Whether or not to display this icon can be selected on the monitor setup menu.

## Precautions for Safe Operation of Medical Electrical Equipment

<b>⚠ CAUTION</b>	<p>Read the following precautions thoroughly to correctly operate the device.</p> <ul style="list-style-type: none"><li>● Users should have a thorough knowledge of the operation before using this system.</li><li>● Pay attention to the following when installing and storing the equipment.<ul style="list-style-type: none"><li>• Do not install or store in an area where the equipment will be subject to splashing water.</li><li>• 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.</li><li>• Place the equipment on a stable surface where there is no inclination, vibration, or shock (including during transportation).</li><li>• Do not install or store in an area where there are chemical or gasses stored.</li><li>• Verify the power frequency, voltage and allowable current (or power consumption).</li><li>• Ensure the grounding is proper by connecting the accompanying power cable to the hospital grade outlet.</li></ul></li><li>● Before operating the system, verify the following items.<ul style="list-style-type: none"><li>• Verify the power voltage.</li><li>• Check the cable connection and polarity to ensure proper operation of the equipment.</li><li>• Make sure the power system has adequate earth ground.</li><li>• Ensure that all cables are firmly and safely connected.</li><li>• Pay special attention when the device is used in conjunction with other equipment as it may cause erroneous judgment and danger.</li><li>• Ensure all patient connections are proper and secure.</li></ul></li><li>● During operation of the system, verify the following items.<ul style="list-style-type: none"><li>• Always observe the system and patient to ensure safe operation of the equipment.</li><li>• 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.</li><li>• Do not allow the patient to come in contact with the device.</li></ul></li><li>● After using the system, verify the following items.<ul style="list-style-type: none"><li>• Unplug all the cables from the patient before turning off the power.</li><li>• When unplugging the cables, do not apply excessive force by pulling on the cord. Pull by the connector part of the cable.</li><li>• Clean the accessories and cables, and keep them together in one place.</li><li>• Keep the unit clean to ensure proper operation of the next use.</li></ul></li><li>● 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.</li><li>● Do not remodel the equipment.</li><li>● Maintenance Check<ul style="list-style-type: none"><li>• Make sure to periodically check the equipment, accessories and cables.</li><li>• Before reusing the device that has been left unused for a while, make sure that the device works normally and safely.</li></ul></li><li>● 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.</li></ul>
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## Precautions for Safe Operation of Medical Telemetry

<b>CAUTION</b>	<p>Precautions for Safe Operation of Medical Telemetry To operate the device correctly, read the following precautions carefully.</p> <ul style="list-style-type: none"><li>● 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).</li><li>● 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 throughout the medical institution.</li><li>● When using telemetry which requires zone location, display and identify each prepared zone in the equipment.</li><li>● When laying receiver antenna for each transmitter, the institution has to be examined so as not to generate electronic interference.</li><li>● Based on the above examination result, the institution places each receiver antenna as required.</li></ul> <p>In managing, be sure to follow the precautions below.</p> <ul style="list-style-type: none"><li>● 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.</li><li>● Select a telemetry manager who understands the characteristics and functionality of telemetry systems, and is skilled in operating telemetry.</li><li>● When installing telemetry, the Overall Manager and the Zone Manager have to understand the precautions for use of the telemetry in advance.</li><li>● The Overall Manager takes responsibility of wireless channel management and transmitter storage for the whole medical institution by giving proper instruction.</li><li>● 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.</li><li>● The Zone Manager assumes responsibility for managing the wireless channels, storing, and managing telemetry.</li><li>● The Zone Manager assigns the transmitter to the user, and provides enough education for use inside the zone.</li><li>● The telemetry user verifies operation of the transmitter/receiver before use.</li><li>● 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.</li><li>● 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.</li></ul>
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## Precautions about the Maintenance

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### 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.



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-7000 is available from your local Fukuda Denshi representative.

## Precautions about the Pacemaker

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 <b>WARNING</b>	<ul style="list-style-type: none"><li>● 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.)</li><li>● 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]</li><li>● 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.</li></ul>
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## Non-Explosion Proof

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 <b>DANGER</b>	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.
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## Defibrillation Safety

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 <b>WARNING</b>	<ul style="list-style-type: none"><li>● When using the defibrillator, keep away from the electrodes or medicament applied to the patient chest. If this is not possible, remove the electrodes or medicament before using it. If the defibrillator paddles are directly in contact with the electrodes or medicament, electrical shock may result by the discharged energy.</li><li>● When using the defibrillator, 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.</li><li>● When using the defibrillator, do not touch the patient and the metal part of the device or cables. Electric shock may result by the discharged energy.</li></ul>
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## Electrosurgery Safety

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 <b>WARNING</b>	<p>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:</p> <p><u>Location</u></p> <p>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.</p> <p><u>Power Supply</u></p> <p>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.</p> <p><u>Electrode Placement</u></p> <p>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.</p> <p><u>Ground Plate</u></p> <p>When using electrosurgical instruments, make sure the contact between the patient and the ground plate is secure. If the contact is poor, the patient may suffer a burn at the electrode site.</p>
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## Precautions about Magnetic Resonance Imaging

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 <b>WARNING</b>	<ul style="list-style-type: none"><li>● Do not operate this equipment in magnetic resonance imaging (MRI) environments.</li><li>● When conducting MRI test, remove the electrodes and sensors connected to the patient (test subject).</li></ul> <p>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.</p>
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## Precautions about Connections to Peripheral Devices

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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.

 <b>WARNING</b>	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.
 <b>CAUTION</b>	All the peripheral device connectors on the DS-7000 are isolated from the power supply, but the peripheral devices are not isolated. To prevent danger of electric shock, always position the peripheral devices away from the patient.

When connecting peripheral devices to DS-7000, 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

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 <b>DANGER</b>	If the fuse blows, contact Fukuda Denshi Service Representative. Do not continue using it as internal damage to the equipment may be considered.
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## Accessories and Optional Accessories

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 <b>WARNING</b>	Use only the cables specified by Fukuda Denshi. Not only the DS-7000 cannot deliver its maximum performance but may also result in increase in emission or decrease in immunity.
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## Precautions about the DS-7000

### 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-7000 is not a life-support equipment.
- The DS-7000 is not intended for use during patient transport outside a healthcare facility, and is not considered as mobile or portable equipment.
- The DS-7000 is not intended for use with flammable anesthetic agents.
- Do not connect unit or cable not authorized by Fukuda Denshi to any I/O connector. If done so by mistake, the DS-7000 cannot deliver its maximum performance and the connected units may be damaged, resulting in a safety hazard.
- If the DS-7000 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 accompanying 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 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.
- Make sure to set the patient classification and pacemaker usage. These settings influence the precision of the QRS detection and NIBP measurement. Make sure the correct selection is made.
- The pacemaker usage 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.
- When measuring the SpO<sub>2</sub> of patient with high fever or peripheral circulatory insufficiency, check the sensor attachment periodically and change the attachment site. The temperature of attachment site will rise 2 to 3°C due to the sensor heat which may result in burn injury.
- For the following case, accurate measurement of SpO<sub>2</sub> may not be possible.
  - Patient with excessive abnormal hemoglobin (COHb, MetHb)
  - Patient with 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
- Be cautious when setting the "SpO<sub>2</sub> Averaging" duration as the SpO<sub>2</sub> alarm is based on the displayed SpO<sub>2</sub> value which is averaged from the duration set in "SpO<sub>2</sub> Averaging". The alarm occurrence time will be affected or may not occur for the transient value of SpO<sub>2</sub> depending on the set duration.
- Before the 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.
- When monitoring multigas concentration, use the specified gas sampling products such as sampling line, airway adapter, and water trap.

 **WARNING**

- When using the airway adapter, always consider the circumference of the intubation tube. If inappropriate airway adapter is used for a patient with low ventilation, CO<sub>2</sub> may mix in to the inspired air resulting in incorrect measurement, or apnea detection may become difficult.
- When the multigas unit (MGU-701/MGU-702/MGU-801P/ MGU-802/ MGU-803) is used, the sampling line may get clogged by internal condensation.
- Precautions for MGU-701/MGU-702
  - Adverse affects of humidity
    - Given the small effect of water vapor on agent gas and CO<sub>2</sub> measurements, the method of agent gas analysis is ATPS (Ambient Temperature and Pressure, Saturated; 21°C, 750 mmHg, 100% Humidity Saturated).
    - The effect of humidity on oxygen measurements is negligible.
  - Adverse affects of leaks and internal venting
    - Environmental pollution of nitrous oxide and halogenated agents may cause accuracy errors.
    - Always use anesthetic gas scavenging systems (AGSS) with the monitoring system.
  - Return of sampled gas
    - Infectious agents may be transferred between patients through the sampled gas exhaust port to the patient's breathing circuit.
    - Always use a scavenging line connected to the exhaust port and to the facility scavenging system.
  - Never attach intravenous tubes to gas sampling connections. Gas sampling lines may be inadvertently connected to intravascular fluid systems, allowing air into a blood vessel.
  - Never place the MGU-701/MGU-702 or monitor inside an oxygen tent or any gas containment apparatus.
- Precautions for MGU-801P/MGU-802/MGU-803
  - If the water trap should break or become damaged during operation, there is a risk that bacteria and/or mucus may contaminate the MGU-801P/MGU-802/MGU-803.
  - The airway adapter and sampling line are intended for single patient use only, and must not be reused in order to avoid cross infection.
  - Connection of the MGU-801P/MGU-802/MGU-803 exhaust outlet to the hospital's waste gas scavenging system is strongly recommended to prevent exposure of hospital personnel to the patient's respiratory sample.
  - MGU-801P/MGU-802/MGU-803 must not be used with flammable anesthetic agents.
  - Do not use Adult/Pediatric type water traps and/or sampling lines with neonates to avoid high sampling flow.
  - Connect only DRYLINE™ gas sampling lines to the water trap. Note that there may be other compatible tubing present, e.g. IV-lines.
  - Do not use DRYLINE™ Neonatal sampling lines (blue Luer lock nuts) with DRYLINE™ Adult/Pediatric water traps as this could result in incorrect measurement data.
  - Do not use DRYLINE™ Adult/Pediatric sampling lines (colorless Luer lock nuts) with DRYLINE™ Neonatal water traps as this could result in incorrect measurement data.
  - When emptying the DRYLINE™ Water Trap, its contents should be handled as a potential infection hazard.
- 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.
- 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.

 **WARNING**

- The HR/PR alarm will not be generated unless the numeric data box corresponded to the selected HR/PR alarm source is displayed. When HR/PR alarm source selection is changed, be sure to display the numeric data box corresponding to the selected HR/PR source.
- 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.)
- The RR and apnea alarm will not be generated unless the numeric data box corresponded to the selected RR source is displayed. If the RR source is changed, make sure to display the numeric data box corresponding to the RR source.
- When selecting **Silence** or **Time Only** for the night mode, pay attention not to miss any important alarm by simultaneously monitoring the bed on other monitors such as central monitor.
- When lifting this device, hold the bottom part of the main unit.
- About the Air Filter used for the Cooling Fan (DS-7000, MGU-701/ 702)
  - When the air filter is washed with neutral detergent, dry it completely before reattaching. If moisture remains on the air filter, it may damage the equipment.
  - The air filter must be attached at all time. If the equipment is used without it, damage to the equipment can occur.

## CAUTION

- Systems
  - This equipment is intended to be used for only one patient.
  - The installation of this equipment 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.
  - 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.
  - 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.
  - For quality improvement, specifications and accessories are subject to change without prior notice.
  - The touch panel utilizes exclusive fluorescent light for the backlight. Since this fluorescent light deteriorates with its life cycle, the display may become dark, scintillate, or may not light in 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 for a prolonged time to any part of the panel.
  - 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.
  - If the power supply is interrupted due to power failure, etc., the following will occur.
    - For the DS-7000, 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, all data will be initialized.
    - For the multigas unit, 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 cable, lead cable 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.
  - The indication for continuous use of the electrode is about one day.
  - Replace the electrode if the skin contact gets loosen due to perspiring, etc.
  - When an electrode is attached at the same location for a long time, some patients may develop a 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.
  - The threshold level for arrhythmia detection changes with ECG waveform size. Set a proper waveform size for monitoring.  
When the waveform size is  $\times 1/4$ ,  $\times 1/2$ , or  $\times 1$ , the detection threshold is 250 $\mu$ V. When the waveform size is  $\times 2$  or  $\times 4$ , the detection threshold is 150 $\mu$ V.

 CAUTION

- 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 ECG 1, 2 will be used for recall waveform and recording waveform as well as for arrhythmia analysis.
- 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.
- The arrhythmia detection leads, monitoring leads on the central monitor, recording leads are fixed as ECG1 and ECG2 leads. 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 pacemaker pulse cannot 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 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 spontaneous QRS and pacemaker pulse overlap (ex. fusion beat, etc.), QRS detection cannot be performed properly. In this case, the heart rate is degraded.
- When continuously detecting AC noise artifact as pacemaker pulses, QRS detection stops and heart rate is extremely degraded. Also arrhythmia cannot be detected.
- 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.
- SpO<sub>2</sub> 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.
  - 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 constantly (every 4 hours). As the temperature of sensor attachment site normally rises 2 to 3°C, compression necrosis and burn injury may generate.
  - As skin for neonate / low birth weight infant is immature, change the sensor attachment site more frequently depending on the condition.

## CAUTION

- Direct sunlight to the sensor area can cause a measurement error.  
Place a black or dark cloth over the sensor.
- When not performing the measurement, unplug the relay cable and sensor from the SpO<sub>2</sub> connector. Otherwise, the measurement data may be erroneously displayed by the ambient light.
- 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 foot.
- 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.
- Measuring on a limb with NIBP cuff, arterial catheter, or intracatheter may result in incorrect measurement.
- The pulse wave is normalized for SpO<sub>2</sub> measurement. It does not indicate perfused blood volume. Check proper probe attachment by observing the pulse wave.
- If **High** is selected for pulse wave sensitivity on the SpO<sub>2</sub> setup menu for DS-700M MASIMO® Model, sensor-detached detection will become somewhat inaccurate.
- NIBP Monitoring
  - Select the appropriate cuff size which best fits the arm circumference. If the cuff size is inappropriate, it may cause measurement error.
  - Pay attention when measuring the NIBP of patient with bleeding disorders or hyper coagulation. The cuff inflation may cause petechia or circulatory failure by 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
  - If the NIBP measurement has not been performed since the power was turned ON, the "NIBP measurement at alarm occurrence" function will not be effective.
  - 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 a child or neonate causing dangerous situation to the patient.
  - When a PTG (SpO<sub>2</sub>) sensor is applied to the toe or forehead, the Dyna Alert may not function depending on the patient's condition.
  - 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.
  - 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.

 CAUTION

- BP Monitoring
  - 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 30 seconds from power OFF, the previous zero balance information is retained 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.
  - 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 30 seconds.
  - Note that Systolic Pressure (SYS) = Peak Systolic Pressure (PSP) for trend, data base, and alarm setup.
  - When ECG is not measured, PDP cannot be calculated.
  - The BP data (S/D/M) not displayed will not generate BP alarm or be displayed in the table. Select the appropriate display type according to the monitoring purpose.
- Multigas Monitoring (MGU-701/MGU-702)
  - The MGU-701/MGU-702 requires at least 20 minutes of warm up period to perform correct measurement.
  - If the power supply is interrupted due to reason such as power failure, the MGU-701/MGU-702 will be initialized and enter into warm-up state even if the power failure is within 30 seconds.
  - In an environment where there is alcohol vapor, some errors may be observed to the measurement.
  - The MGU-701/MGU-702 complies with standards for cyclical pressure up to 10kPa.
  - The accuracy of MGU-701/MGU-702 may be affected at extreme temperatures. Do not store them at extreme temperature. Temperatures exceeding specified storage temperatures (-5 to 50°C) could damage the units.
  - After the MGU-701/MGU-702 is stored in low temperature, when turning on the device, it may require additional warm-up time.
- Multigas Monitoring (MGU-801P/MGU-802/MGU-803)
  - The MGU-801P/MGU-802/MGU-803 requires at least 10 minutes of warm up period to perform full accuracy measurement.
  - If the power supply is interrupted due to reason such as power failure, the MGU-801P/MGU-802/MGU-803 will be initialized and enter into warm-up state even if the power failure is within 30 seconds.
  - In an environment where there is alcohol vapor, some errors may be observed to the measurement.
  - While the MGU-801P/802/803 is in the process of warming up, the date of the last measurement check cannot be updated. Perform the update after the warming up process is completed.
  - If the gas measurement accuracy check is performed using a low pressure gas, the accuracy of the gas measurement will be reduced. Make sure to check the gas measurement accuracy using the specified calibration gas before its expiration date.
  - Contamination with CO<sub>2</sub>, N<sub>2</sub>O or Anesthetic Agent in the air surrounding the MGU-801P/MGU-802/MGU-803 may cause significant measurement errors.
  - The MGU-801P/MGU-802/MGU-803 complies with standards for cyclical pressure up to 10kPa.

## CAUTION

- The accuracy of MGU-801P/MGU-802/MGU-803 may be affected at extreme temperatures. Do not store them at extreme temperature. Temperatures exceeding specified storage temperatures (-10 to 60°C) could damage the units.
- After the MGU-801P/MGU-802/MGU-803 is stored in low temperature, when turning on the device, it may require additional warm-up time.
- Alarm
  - Pay attention not to set the alarm volume too low to avoid missing any important alarms.
  - 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-7000, HR alarm and PR alarm cannot be set to ON at the same time.
  - 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 SpO<sub>2</sub> alarm and SEC alarm setup is set to OFF, the SEC alarm integral value will be set to 0.
- System Configuration
  - If the time/date is not correctly set, or if changed during monitoring, malfunction may occur to NIBP measurement, periodic recording, trend, NIBP list data, and age calculation from the birth date.
  - When the waveform and numeric data display for each parameter is set to OFF, the alarm generation and table/trend input 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<sub>2</sub> is set to OFF, the pulse rate derived from SpO<sub>2</sub> will not be displayed either.
  - When the waveform and numeric data display for CO<sub>2</sub> is set to OFF, the respiration rate derived from CO<sub>2</sub> will not be displayed either. When the waveform and numeric data display for the gas module is set to OFF, the respiration rate measured by the gas module will not be displayed.
  - If "Save Data to Table" is set to OFF on the alarm setup menu, data at alarm occurrence will not be stored in the table.
  - Depending on the data stored in the table (alarm data, NIBP manual measurement data, or NIBP continuous measurement data), the total duration of the table will differ.
  - Do not set the same remote control bed ID to more than one monitors on the same floor. Otherwise, it may cause to 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 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.
  - On a wired network (DS-LANII/III) system, if the discharge procedure is performed on the central monitor, the alarm setting on the bedside monitor will be initialized to the value set on the "Admit Setup" of the central monitor.
- 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.
  - When the electrodes are properly attached, the reference waveform setup will be automatically performed. To display the correct ST data, the reference point and measurement point must be set.

 CAUTION

- 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.
  - Maintenance
    - 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 to use mild acidic or alkaline cleaning solution.
    - A special coating is applied to the surface of the touch panel. Do not wipe the surface with a cloth or gauze with coarse texture. Wipe the surface with a soft cleaning cloth provided as optional accessory or with an eyeglass cleaning cloth.
    - 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 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.
    - For MGU-701/MGU-702, do not sterilize the airway adapter using autoclave methods.
    - For MGU-701/MGU-702, do not reuse / re-sterilize the disposable airway adapter.
    - For MGU-701/MGU-702, water traps are single use only. Do not attempt to drain the water trap when full.
    - For MGU-801P/MGU-802/MGU-803, do not use other than specified cleaning methods for the water trap.
    - For MGU-801P/MGU-802/MGU-803, do not clean or wash the filter housing of the water trap.
    - For MGU-801P/MGU-802/MGU-803, never allow alcohol to enter the filter housing.
    - For MGU-801P/MGU-802/MGU-803, never force air through the water trap.
    - Do not open the housing.
    - Do not allow liquids such as alcohol or cleaning solution enter the equipment or connectors.
    - If you accidentally wet the device, dry it completely and verify it operates safely before usage.
- Replace the components periodically as specified.

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

 <b>WARNING</b>	<ul style="list-style-type: none"><li>● Do not connect unspecified device to a wired network.</li><li>● 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.</li><li>● Before setting the bed ID, make sure that the DS-LAN (DS-LANII/DS-LANIII) is correctly set on the Initial Settings 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.</li></ul>
 <b>CAUTION</b>	<ul style="list-style-type: none"><li>● 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.</li><li>● The Operation Room 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.</li><li>● When connected to the wired network, verify that the Operation Room ID is not duplicated with other monitors. Otherwise, monitoring on the central monitor for both monitors will not be possible.</li><li>● Make sure to set the Monitor ID in the following range.<ul style="list-style-type: none"><li>• For DS-LANII network: 001 to 048</li><li>• For DS-LANIII network: 001 to 100</li></ul></li><li>● Precautions about the DS-LANII Network System<ul style="list-style-type: none"><li>• Arrhythmia alarm of TACHY, BRADY, COUPLET, PAUSE, TRIGEMINY will not be transmitted.</li><li>• Arrhythmia alarm of "SLOW VT" will be transmitted as "VT".</li><li>• 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.</li><li>• If "HR/PR Alarm Source" is PR, and "PR Source" is BP, ECG waveform will not be transmitted on a wired network. On the central monitor, PR-IBP value will be displayed for HR. However, HR value from ECG will be displayed for the NIBP list and ST measurement table.</li><li>• If the "RR Alarm Source" selection is other than <b>Impedance</b>, respiration waveform will not be transmitted on a wired network.</li><li>• If the "RR Alarm Source" selection is other than <b>GAS</b>, CO<sub>2</sub> waveform will not be transmitted on a wired network.</li><li>• For numeric data displayed as "xxx", maximum or minimum value of measurable range will be transmitted.</li><li>• The numeric data displayed as "—" will be treated as not measured data.</li></ul></li></ul>

 CAUTION

- Precautions about the DS-LANIII Network System
  - 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 “DS-LAN Setup” for all bedside monitors and central monitors are set to DS-LANII before connecting the monitor 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-LAN III network construction, make sure to use a switching HUB recommended by Fukuda Denshi.
  - The displayable waveform, numeric data, and alarm will differ depending on the central monitor model type. Refer also to the operation manual for the respective central monitor.
  - On the DS-LANIII system, the patient data search function using the patient data server can be used depending on the monitor model type and software version. For details, refer to our service representative.
- When DS-5800N/NX/NX<sup>MB</sup> is used as a central monitor, recall, trend/table, data 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<sup>MB</sup> until 15 minutes elapses since the reference waveform is set on the DS-7000.
- As the DS-7000 do not have the arrhythmia template display and 12-lead ST display function, these display on the central monitor will not be supported.
- 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-7000, it will be synchronized with the time/date of the central monitor.
- If ECG lead (ECG1 or ECG 2) is changed on the DS-7000 while monitoring ST display on the central monitor, the ST display will be distorted. Redrawing the ST display will return the display to normal.
- The respiration waveform and RR value based on the RR source selected on the DS-7000 will be displayed on the central monitor. The monitoring RR and APNEA will be the same as the one monitored on the DS-7000.

**⚠ CAUTION**

- There are following restrictions when recording the DS-7000 data on the central monitor recorder or the AU-5500N 8ch Recorder.
  - Only manual recording, alarm recording, periodic recording, and recall recording can be performed on the AU-5500N.
  - 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 “xxx” will be recorded as “---” on the central monitor recorder.
  - The QRS symbol, “S” printed on the built-in recorder will be printed as “N” on the central recorder and AU-5500N.
  - For the waveform recording and trend recording, some parameters may not be able to be recorded depending on the scale.
  - When performing table recording or trend recording on the central recorder, some numeric data may not be recorded depending on the parameter. Also, there are some trend scales that cannot be recorded.
  - If **[PR]** is set for the “HR Alarm Source” and **[BP]** is set for the “PR Source”, ECG will not be recorded on the central recorder. PR-IBP value will be printed instead for the HR value.
  - 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.
  - If the “RR Alarm Source” selection is other than **[Impedance]**, respiration waveform will not be output on the central recorder.
  - If the “RR Alarm Source” selection is other than **[GAS]**, CO<sub>2</sub> waveform will not be output on the central recorder.
  - When trend recording, table recording, or NIBP list recording is output on the central monitor recorder from the DS-7000, HR value derived from ECG will be recorded for the HR value and ST trend.

## Precautions about the Wireless Network System

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### DANGER

When monitoring a patient with wireless telemetry, make sure the patient data is properly received at the central monitor. Pay special attention if 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 the channel, verify it will not interfere with other channels.
- Make sure the telemetry manager of your system is aware of any changes to the telemetry channels.
- If transmitters are used in a neighboring medical facility, your facility and neighboring facility must make agreements on the setting of telemetry channels to prevent telemetry interference.

### CAUTION

- If performing telemetry transmission, configure the display so that the numeric data corresponds to the waveform 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 cannot be properly transmitted. When transmitting the BP waveform, check the displayed BP waveform scale.
- On a wireless network system, O<sub>2</sub>, N<sub>2</sub>O, AGT alarm will not be transmitted to the central monitor.
- On a wireless network system, the alarm generated on the DS-7000 will be transmitted to the central monitor with some delay. For details, refer to the operation manual for the central monitor.

## Precautions about the Ventilator Monitoring

<b>⚠ WARNING</b>	<ul style="list-style-type: none"><li>● The ventilator alarm on this monitor should be used as supplementary function. Check the patient's condition, ventilator alarm sound and message occasionally.</li><li>● The ventilator alarm sound is set to OFF at factory default setting. The alarm sound can be turned ON on the volume setup menu.</li><li>● If the DS-7000 does not generate an alarm even though the ventilator is generating an alarm, or if any other malfunction occurs, immediately check the ventilator, DS-7000, cable, and replace the cable if necessary. If the malfunction persists, stop using the device.</li><li>● After connecting the ventilator and the DS-7000, ensure that "Vent. Online" message is displayed for the connection status. Otherwise, the DS-7000 will not detect the ventilator alarm.</li><li>● The alarm generation on the DS-7000 is not assured if the alarm other than specified generates on the Servo-i.<ul style="list-style-type: none"><li>• airway pressure upper limit alarm, high continuous pressure alarm, O<sub>2</sub> concentration lower limit alarm, expiratory minute volume upper/lower limit alarm, apnea alarm, gas supply alarm, O<sub>2</sub> supply alarm, battery alarm, no battery alarm, limited battery alarm, overrange alarm, expiratory cassette disconnected alarm, backup ventilation alarm, regulation pressure limited alarm, respiratory rate alarm, PEEP low alarm, EtCO<sub>2</sub> upper limit alarm, EtCO<sub>2</sub> lower limit alarm</li></ul></li></ul>
<b>⚠ CAUTION</b>	<ul style="list-style-type: none"><li>● The ventilator operation should be performed by well-trained and authorized personnel.</li><li>● For connecting the DS-7000 and ventilator, use only the specified connection cable.</li><li>● Verify that the DS-7000 and the ventilator are properly connected.</li><li>● When connecting the cable, verify that the main power of the DS-7000 and the ventilator is OFF.</li><li>● Check occasionally the communication status of the DS-7000 and the ventilator.</li><li>● Verify that the ventilator alarm is not generated, and the "Vent. Online" message is displayed.</li><li>● The "Check external alarm" will be displayed until proper communication with the ventilator is resumed. When the communication is resumed, the screen will automatically return to the home display.</li><li>● When disconnecting the ventilator and the DS-7000, make sure to select <b>OFF</b> on the "Check external alarm" display which appears when the power of the ventilator is turned OFF, or when the cable is disconnected.</li></ul>

## Precautions for Use of SpO<sub>2</sub> Sensor

<b>⚠ DANGER</b>	<p>Burn Risk in Using SpO<sub>2</sub> Sensor</p> <p>In SpO<sub>2</sub> 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.</p> <p>If there are any questions regarding the sensor/relay cable use for SpO<sub>2</sub> measurements of this device, please contact Fukuda Denshi service representative.</p>
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## Precautions for Masimo® Model: DS-7000M

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<b>⚠ CAUTION</b>	No Implied License 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.
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## Precautions for Use of NIBP Cuff

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<b>⚠ CAUTION</b>	Some of the NIBP cuffs used for this equipment contain 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.)
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## Disposing of Equipment, Accessories, or Components

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<b>⚠ CAUTION</b>	When disposing the equipment, accessories, or components, use an industrial waste distributor. Do not dispose of as ordinary waste.
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## Precautions about Transportation

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For transporting the DS-7000, pack it up with the specified packing materials.



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

## Precautions about RTC or Data Backup

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<b>⚠ CAUTION</b>	<ul style="list-style-type: none"><li>The DS-7000 is equipped with a built-in clock. When the power of the DS-7000 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.</li><li>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.</li></ul>
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## To Prepare for Emergency Use

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### Accessories / Optional Accessories

- (1) The ECG electrodes are consumables. Always prepare extra supplies of electrodes.
- (2) Check if there is any damage on the patient cables once a week.

## Electromagnetic Compatibility

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

## Precautions for Safe Operation under Electromagnetic Influence

 CAUTION	<p>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.</p> <p>The following are examples of the common cause and countermeasures.</p> <ul style="list-style-type: none"><li>● <u>Cellular Phone</u> 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.</li><li>● <u>Static Electricity</u> In a dry environment (room), static electricity is likely to occur. Take the following countermeasures.<ul style="list-style-type: none"><li>• Both operator and patient should remove any static electricity before entering the room.</li><li>• Humidify the room.</li></ul></li><li>● <u>Lightning</u><ul style="list-style-type: none"><li>• A lightning nearby may induce excessive voltage to the equipment. If any danger is suspected, use the uninterruptible power supply system.</li></ul></li><li>● <u>High frequency noise interference from other device through the power outlet</u><ul style="list-style-type: none"><li>• Check where the noise is originated and remove it using filtering device, etc.</li><li>• Stop using the device that is originating the noise.</li><li>• Use other power outlet.</li></ul></li></ul>
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## EMC Guidance

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

Therefore, this equipment should be used in a location specified by each medical institution.

If any unexpected noise interferes with 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-7000 is tested under the following electromagnetic environment.

<b>Emissions Test</b>	<b>Compliance</b>	<b>Electromagnetic Environment – Guidance</b> (The DS-7000 is intended for use in the electromagnetic environment specified below.)
RF Emissions CISPR 11	Group 1	The equipment uses RF energy that is necessary for the 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 equipment is suitable for use in all establishments other than domestic and those directly connected to a low-voltage power supply network which 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-7000 is tested under the following electromagnetic environment.

<b>Immunity Test</b>	<b>IEC60601-1-2 Test Level</b>	<b>Compliance Level</b>	<b>Electromagnetic Environment – Guidance</b> (The DS-7000 is intended for use in the electromagnetic environment specified below.)
Electrostatic Discharge (ESD) IEC 61000-4-2	±2, 4, 6kV contact ±2, 4, 8kV air	±2, 4, 6kV contact ±2, 4, 8kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient / burst IEC 61000-4-4	±2kV for power supply lines ±1kV for input/output lines	±2kV for power supply lines ±1kV input/output lines	Power supply quality should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Surge IEC 61000-4-5	±0.5, 1kV : differential mode ±0.5, 1, 2kV : common mode	±0.5, 1kV: differential mode ±0.5, 1, 2kV: common mode	Power supply quality should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines. IEC 61000-4-11	<5% U <sub>T</sub> (>95% dip in U <sub>T</sub> ) for 0.5 cycle  40% U <sub>T</sub> (60% dip in U <sub>T</sub> ) for 5 cycles  70% U <sub>T</sub> (30% dip in U <sub>T</sub> ) for 25 cycles  <5% U <sub>T</sub> (>95% dip in U <sub>T</sub> ) for 5sec.	<5% U <sub>T</sub> (>95% dip in U <sub>T</sub> ) for 0.5 cycle  40% U <sub>T</sub> (60% dip in U <sub>T</sub> ) for 5 cycles  70% U <sub>T</sub> (30% dip in U <sub>T</sub> ) for 25 cycles  <5% U <sub>T</sub> (>95% dip in U <sub>T</sub> ) for 5sec.	Power supply quality should be at levels characteristic of a typical location in a typical commercial or hospital environment.  If it is required to continuously operate the DS-7000 during power failure, it is recommended to operate on an uninterrupted power supply.
Power Frequency (50/60Hz) Magnetic Field IEC 61000-4-8	3A/m	3A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Note : U<sub>T</sub> is the AC mains voltage prior to application of the test level.

## ●Compliance to the Electromagnetic Immunity (2)

The DS-7000 is tested under the following electromagnetic environment.

<b>Immunity Test</b>	<b>IEC60601-1-2 Test Level</b>	<b>Compliance Level</b>	<b>Electromagnetic Environment - Guidance</b> (The DS-7000 is intended for use in the electromagnetic environment specified below.)
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-7000, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.  Recommended Separation Distance $d = 1.2 \sqrt{P}$

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.

<sup>a</sup> Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast can not be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which this monitor should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating this monitor.

<sup>b</sup> 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-7000

The DS-7000 is intended for use in an environment in which radiated RF disturbances are controlled. The electromagnetic interference can be prevented by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the DS-7000 as recommended below, according to the maximum output power of the communications equipment.

<b><i>Rated Maximum Output Power of Transmitter (W)</i></b>	<b><i>Separation Distance according to Frequency of Transmitter (m)</i></b>		
	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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2. Basic Operation	Describes the basic operation for monitoring.
3. Vital Application	Describes the procedure for vital application, etc.
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. Installation	Describes about the environment for use, wireless system, etc.
9. Initial Settings	Describes the procedure to set the initial settings which should be preprogrammed before monitoring a patient.
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.

## Preface

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# Chapter 4

## Monitoring Setup

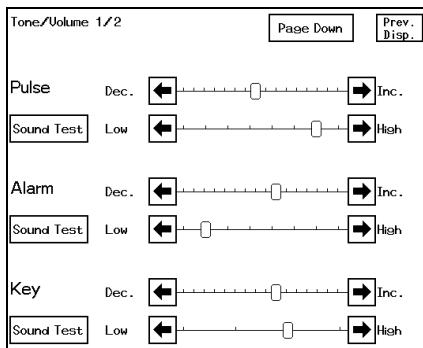
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● Numeric Data Box Display (for all parameters)	4-24	Full Disclosure Waveform Recording Setup	4-76	
● Numeric Data Box Display (for each parameter)	4-25	To Format the CF Card for Full Disclosure Waveform Recording	4-76	
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## Tone/Volume Setup

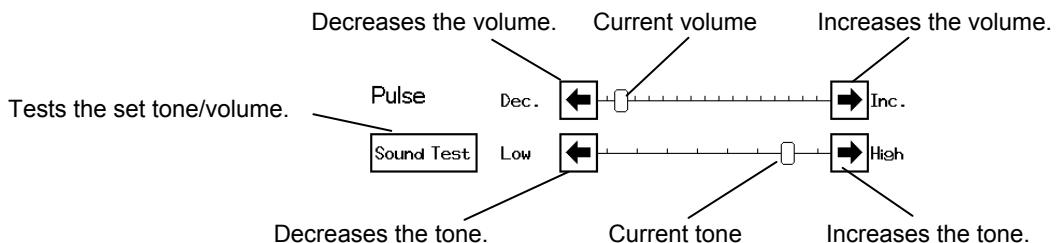
This menu allows tone/volume setup of the pulse tone, alarm sound, key sound and other monitor alarm sound. The ON/OFF of ventilator alarm sound can be also selected.

- 1 Press the **Menu** → **Settings** → **Tone/Volume** keys.

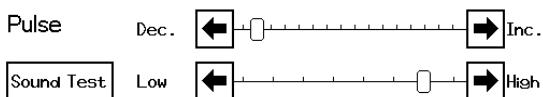


The tone/volume setup menu will be displayed.

<Tone/Volume Setup Menu>



- 2 Set the tone/volume for the pulse sound.

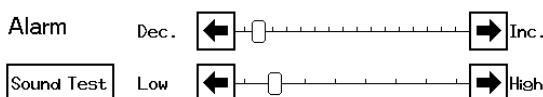


The HR synchronized sound, SpO<sub>2</sub> synchronized sound (volume only), BP synchronized sound can be adjusted.

**NOTE**

The tone setup is only effective for HR synchronized sound and BP synchronized sound. The tone for SpO<sub>2</sub> synchronized sound will change according to the SpO<sub>2</sub> value. The tone will increase as the SpO<sub>2</sub> value increases and decreases as the SpO<sub>2</sub> value decreases.

- 3 Set the tone/volume for the alarm sound.

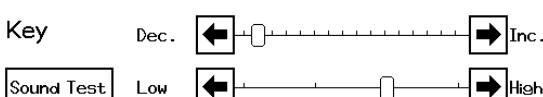


The volume of the numeric data alarm, arrhythmia alarm, equipment status alarm can be adjusted.

**CAUTION**

Pay attention not to set the alarm volume too low to avoid missing any important alarms.

- 4 Set the tone/volume for the key sound.

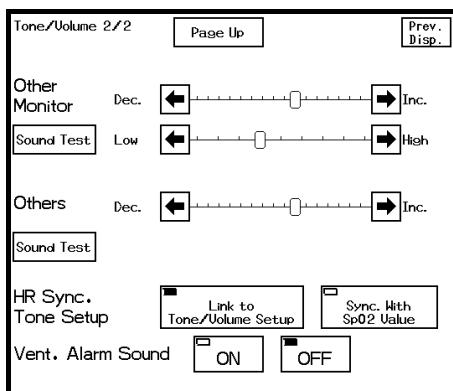


The tone/volume of the key sound can be adjusted.

**NOTE**

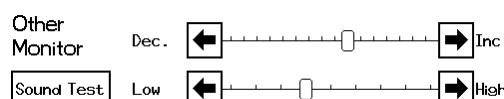
The pulse sound and key sound will be silenced if set to the minimum volume.

- 5** Press the **Page Down** key and adjust the tone/volume of the other monitor alarm sound and other sound.



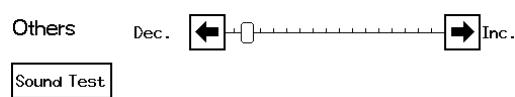
Adjust the tone/volume of the other monitor alarm and other sound.

- 6** Set the tone/volume for the other monitor alarm sound.



The tone/volume of the other monitor alarm sound can be adjusted.

- 7** 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.

- 8** Set the HR synchronized tone.



Select **Sync. with SpO<sub>2</sub> Value** to synchronize the pulse sound to the SpO<sub>2</sub> value.

Select **Link to Tone/Volume Setup** to use the tone set for the pulse sound.

- 9** Select ON/OFF for the ventilator alarm sound.



If the ventilator alarm sound is not necessary, select **OFF**.

To generate an alarm sound in a same volume with the numeric data alarm and arrhythmia alarm, select **ON**.

**NOTE**

The ventilator alarm sound setting will not be displayed unless **Servo-i** is selected for serial communication setting. For procedure to connect the Servo-i, refer to "8. Installation Ventilator Connection".

## ● Sound Pressure (Decibel) of the Alarm Sound

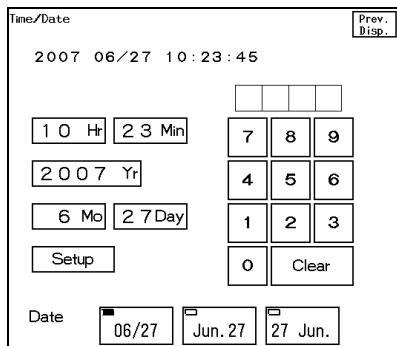
### Alarm Level 1 to 3

Volume	Tone	Sound Pressure (dB)
Highest	Highest	77.2
	Lowest	76.6
Lowest	Highest	41.1
	Lowest	46.5

## Time/Date Setup

Set the date and time of the bedside monitor.

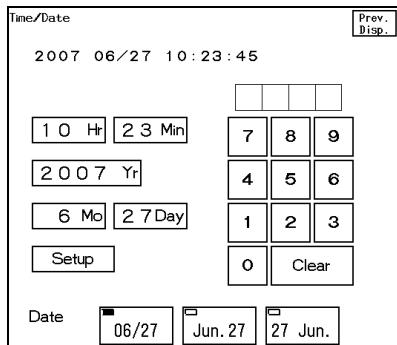
- 1 Press the **Menu** → **Settings** → **Time/Date** keys.



The time/date setup menu will be displayed.

<Time/Date Setup Menu>

- 2 Set the date and time.



Enter the time/date using the numeric keypad, and press the corresponded key.

For example, to change the time from 23min to 25min, enter **25** on the numeric keypad.

Next, press the **23 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 time/date will be synchronized with the central monitor.  
Even if the time/date is changed on the DS-7000, it will be corrected to the time/date of the central monitor.

- 3 Set the date format.

Date

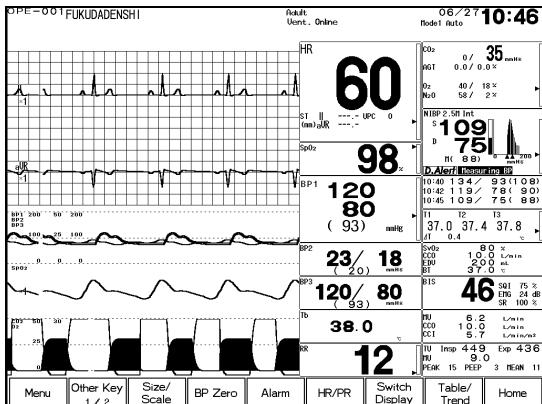
06/27      Jun. 27      27 Jun.

Selects the date format for display and recording.

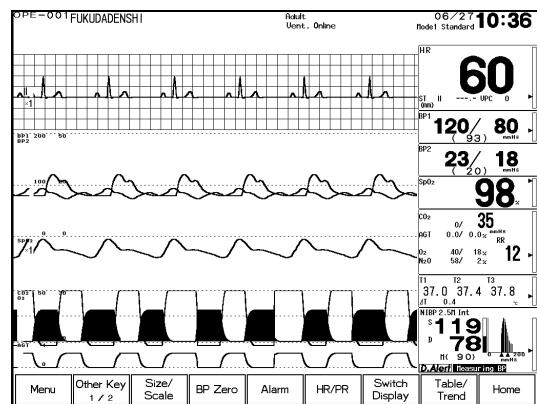
# Display Configuration Setup

# For Easier View

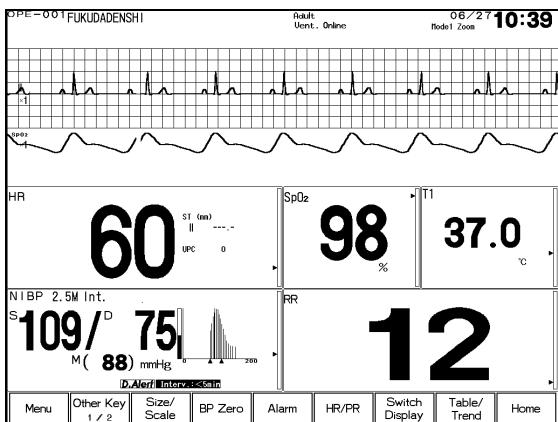
The monitoring display can be configured according to the monitoring purpose. There are 4 types of basic display mode, which are (1) Auto Mode, (2) Standard Mode, (3) Zoom Mode and (4) Extended Mode.



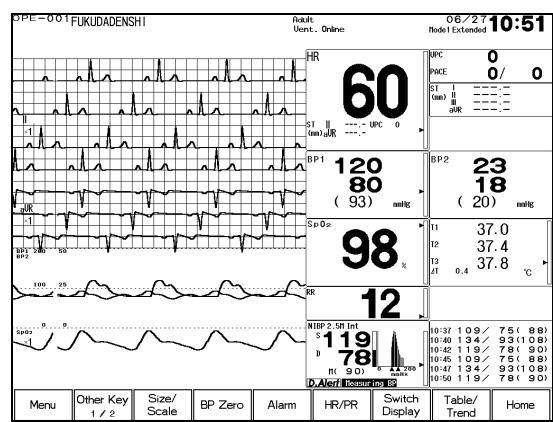
(1) Auto Mode



(2) Standard Mode

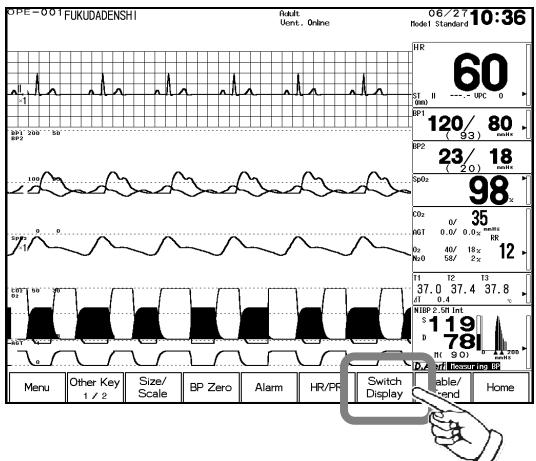


(3) Zoom Mode



(4) Extended Mode

The Home Display can be switched each time the **Switch Display** key is pressed in the order of Home Display (1)→(2)→(3)→(4)→(1).



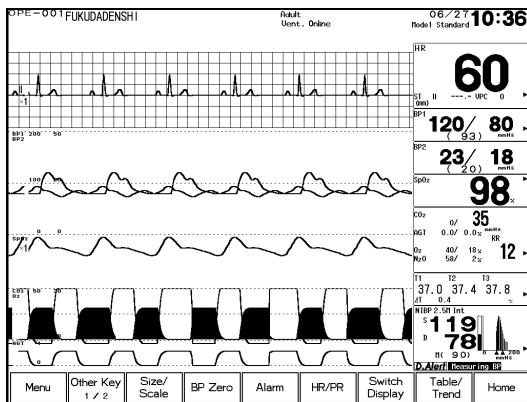
For display mode setup procedure, refer to "9. Initial Settings –Display Mode Setup–"

Reference

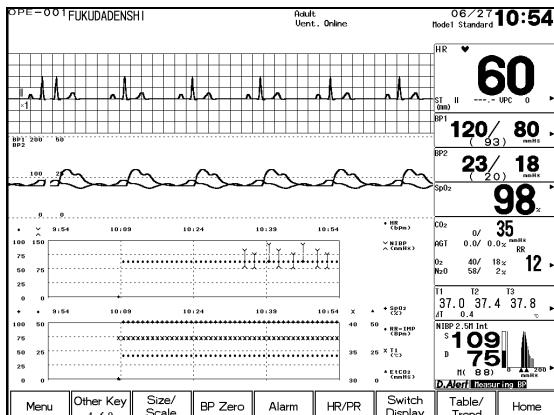
## To Configure the Display

## Standard Mode

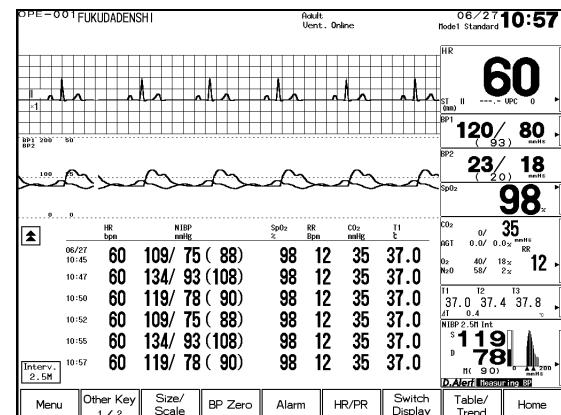
For the standard mode, maximum of 12 waveforms and 10 numeric data can be displayed. On the waveform display area, trend, table, ventilator, OCRG can be also displayed. If block cascade is selected, waveform of longer duration can be displayed.



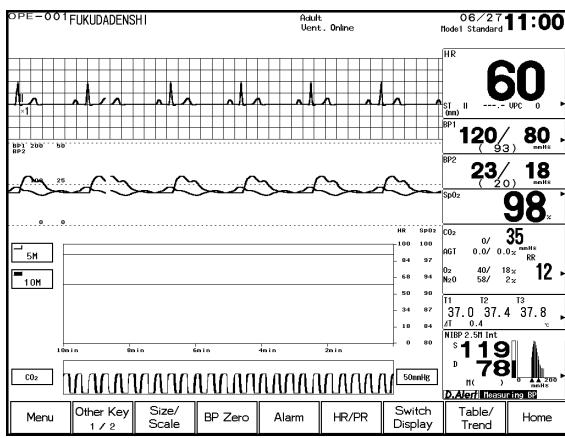
<Standard>



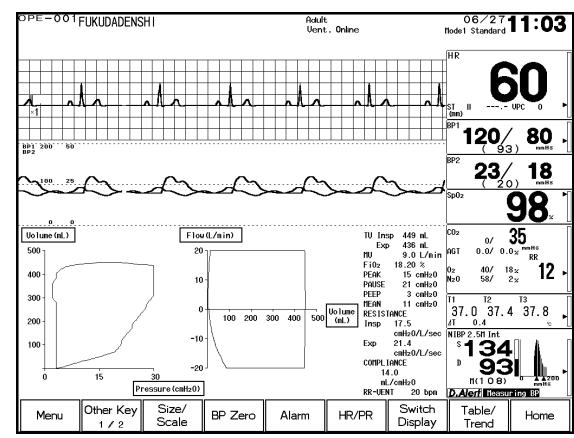
<Standard (Trend)>



<Standard (Table)>

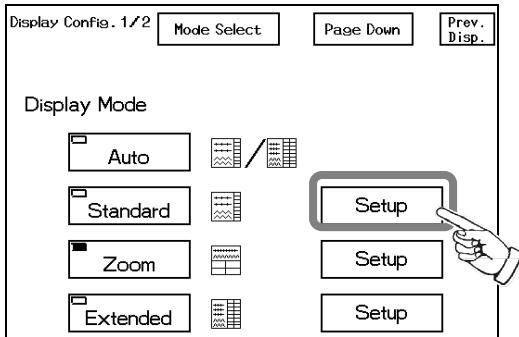


<Standard (OCRG)>



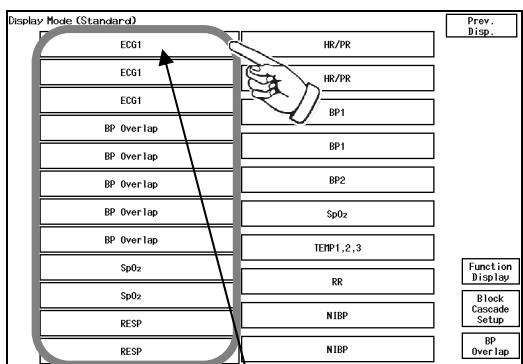
<Standard (Ventilator)>

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

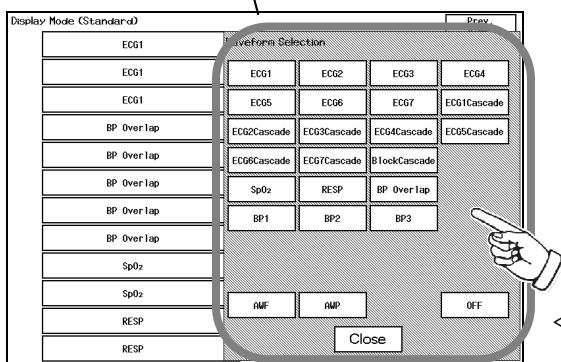


Press the **Setup** key.

**2 Select the waveform to display.**



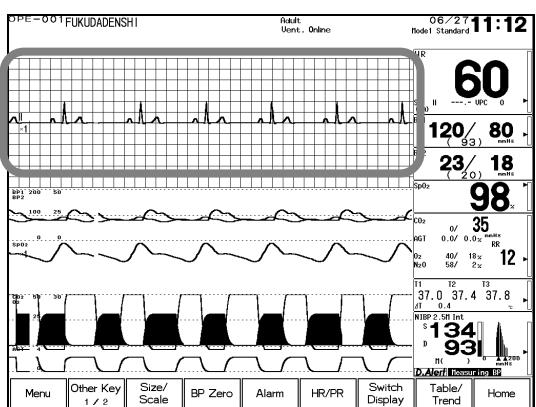
Pressing one of the waveform display location will display the waveform selection window to select a parameter.



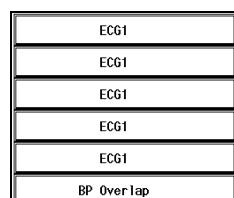
Selecting the parameter on the waveform selection window will sequentially assign the parameter from the top. To change the selection, pressing the waveform display location key will allow reselecting the parameter for that location.

<Waveform Display Location>

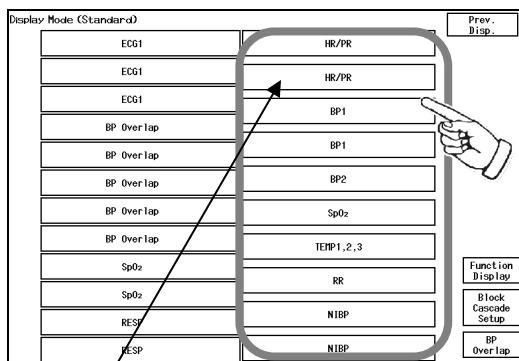
<Waveform Selection>



If the same parameter is repeatedly selected, the waveform display area for that parameter will be enlarged.



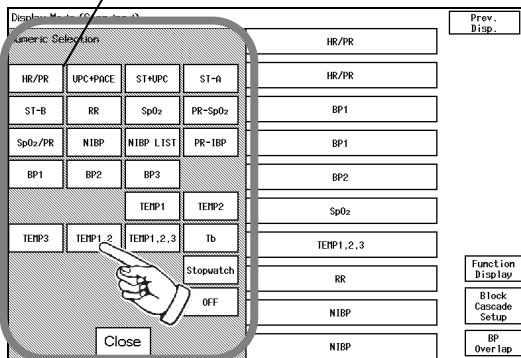
### 3 Select the numeric data to display.



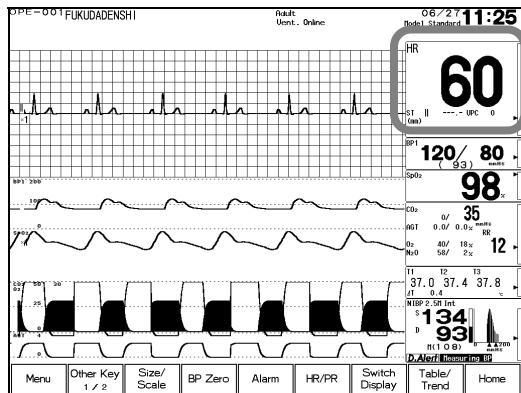
Pressing one of the numeric data display location will display the numeric data selection window to select a parameter.

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>

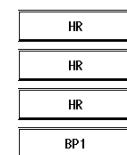


<Numeric Data Selection Window>

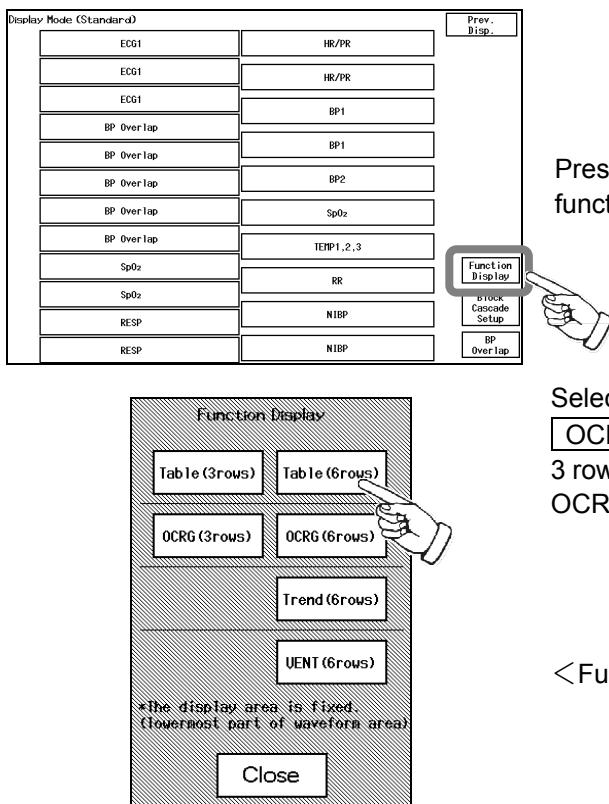


The numeric data display layout can be changed. By repeatedly selecting the same parameter, the numeric data display area for that parameter will be enlarged.

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



#### 4 Select the function display.



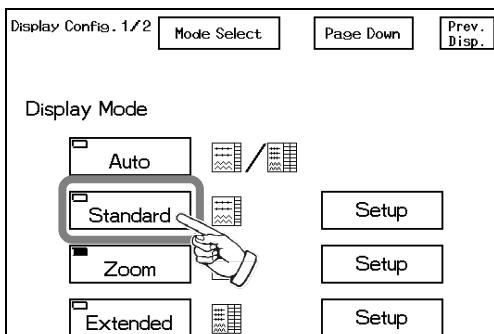
Press the **Function Display** key to display the function display selection window.

Select the function display from **Trend**, **Table**, **OCRG**, **VENT**.

3 rows / 6 rows indicates the size to display the table and OCRG.

<Function Display Tool>

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



Press the **Prev. Disp.** key to return to the display configuration menu.

Then, press the **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.

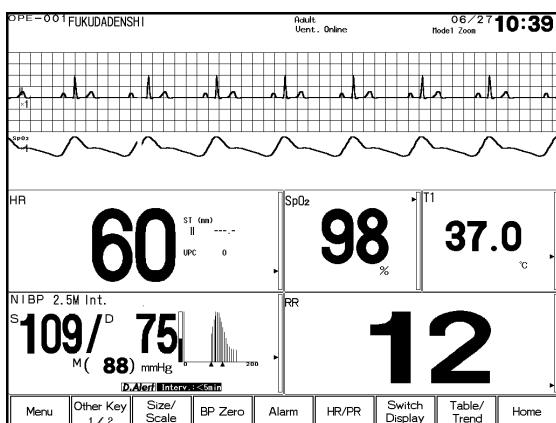
#### NOTE

- After configuring the display, press the **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 **ON** for "Backup at Discharge" on the "Discharge Setup" under the Initial Settings.  
For display mode setup procedure, refer to "9. Initial Settings –Display Mode Setup–".

## To Configure the Display

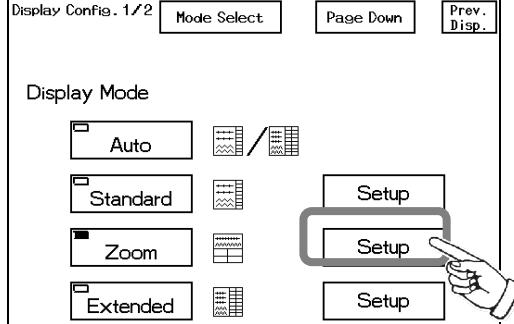
## Zoom Mode

The “Zoom Mode” displays the numeric data in enlarged format. Maximum of 5 waveforms and 4 numeric data can be displayed. The waveform display duration is about 12 seconds.



- 1 Press the **Menu** → **Settings** → **Display Config.** keys and press the **Setup** key for the Zoom Mode.

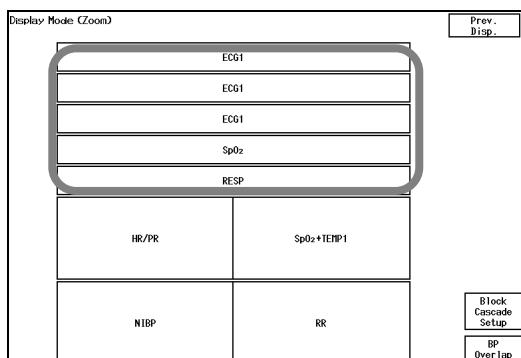
The display configuration menu will be displayed.



<Display Configuration Menu>

- 2 Select the waveform to display.

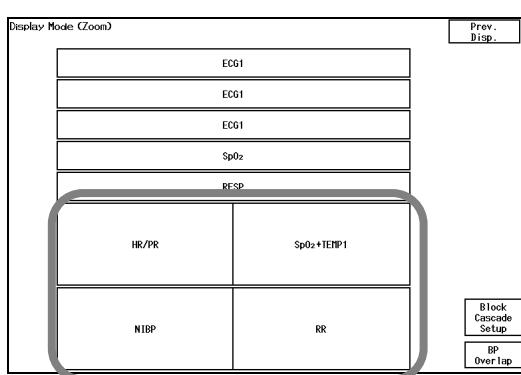
Pressing the waveform display location key will display the waveform parameter selection window to select a parameter.



<Waveform Display Location>

- 3 Select the numeric data to display.

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



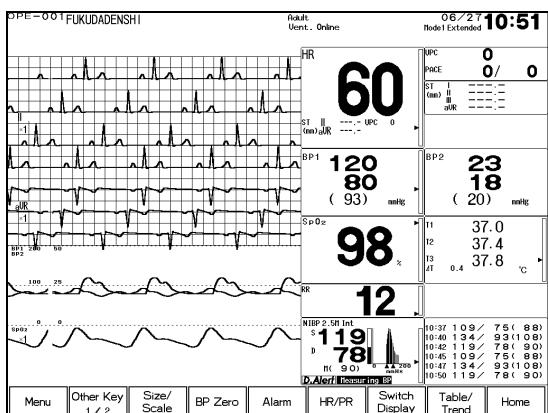
<Numeric Data Display Location>

<b>CAUTION</b>	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.
<b>NOTE</b>	<ul style="list-style-type: none"><li>● After configuring the display, press the <b>Home</b> key to verify the programmed display configuration.</li><li>● 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 <b>ON</b> for “Backup at Discharge” on the “Discharge Setup” under the Initial Settings. For display mode setup procedure, refer to “9. Initial Settings –Display Mode Setup–”.</li></ul>

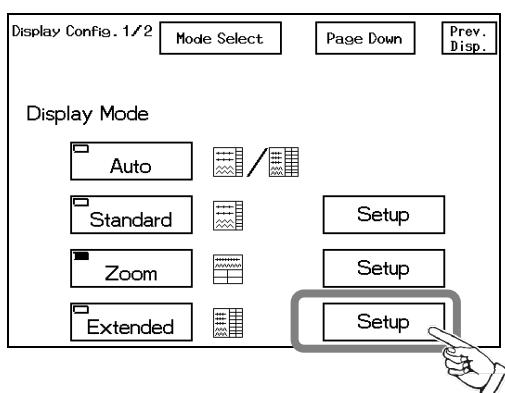
## To Configure the Display

## Extended Mode

Maximum of 12 waveforms and 20 numeric data can be displayed. The waveform display duration is about 6.5 seconds.



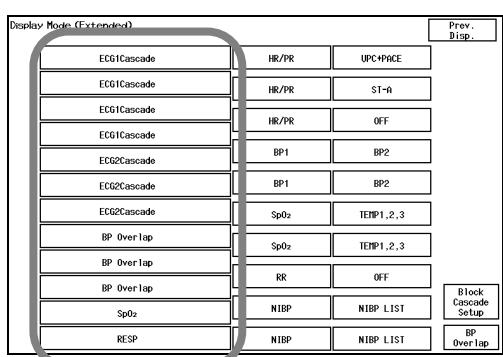
- 1** Press the **Menu** → **Setting** → **Display Config.** keys and press the **Setup** key for the Extended mode.



The display configuration menu will be displayed.

## <Display Configuration Menu>

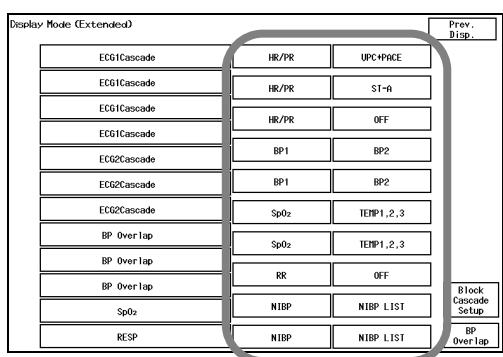
- ## 2 Select the waveform to display.



Pressing the waveform display location key will display the waveform parameter selection window to select a parameter.

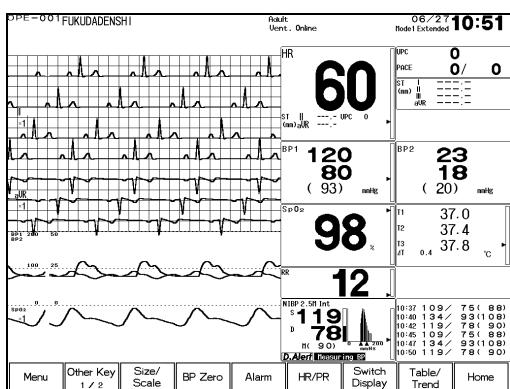
<Waveform Display Location>

- ### **3 Select the numeric data to display.**

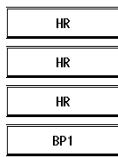


Pressing one of the numeric data display location will display the numeric data selection window to select a parameter.

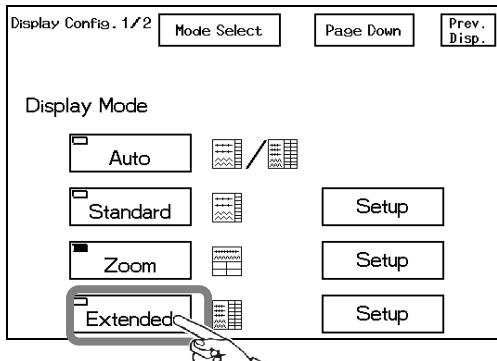
<Numeric Data Display Location>



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.



#### 4 Select Extended mode for the display mode.



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.

<b>NOTE</b>	<ul style="list-style-type: none"> <li>● After configuring the display, press the <b>Home</b> key to verify the programmed display configuration.</li> <li>● 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 <b>ON</b> for “Backup at Discharge” on the “Discharge Setup” under the Initial Settings. For display mode setup procedure, refer to “9. Initial Settings –Display Mode Setup–”.</li> </ul>
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Press the **Prev. Disp.** key to return to the display configuration menu.

Then, press the **Extended** key for the display mode.

## To Configure the Display

### Auto Mode

The home display layout can be automatically configured.

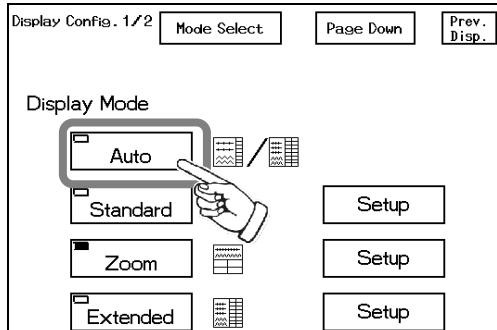
The display will be automatically configured to either “Standard” mode or “Extended” mode depending on the quantity of the measured parameters.

#### NOTE

- The parameter that is not measured will not be displayed.
- The low priority parameter may not be displayed.
- The Agent waveform for the gas unit will not be displayed on the auto mode display configuration. To display the Agent waveform, set the display configuration manually.

#### 1 To set Auto mode for display configuration, press the **Menu** → **Settings** →

#### **Display Config.** keys to 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 priority.

Each time the probe or sensor is plugged/unplugged, the home display will be reconfigured.

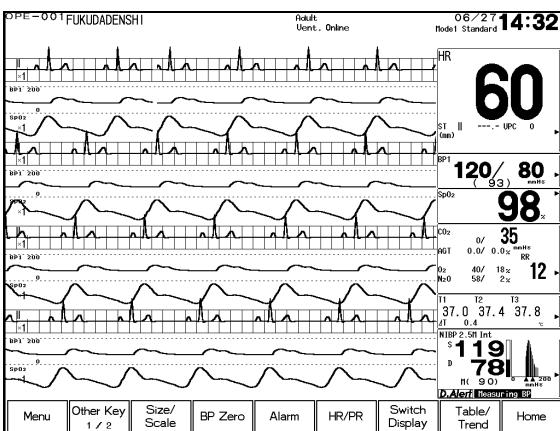
#### NOTE

- The optimized display configuration will be overwritten to the current display configuration (Standard / Extended).
- 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 **ON** for “Backup at Discharge” on the “Discharge Setup” under the Initial Settings.  
For display mode setup procedure, refer to “9. Initial Settings –Display Mode Setup–”.

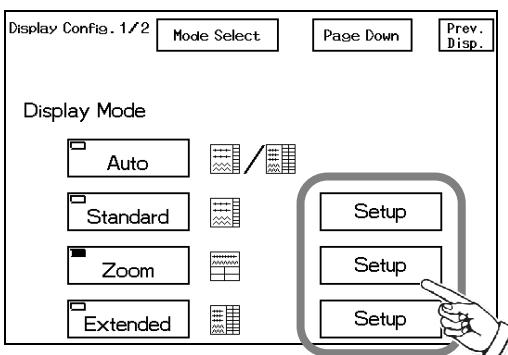
## To Configure the Display

## Block Cascade

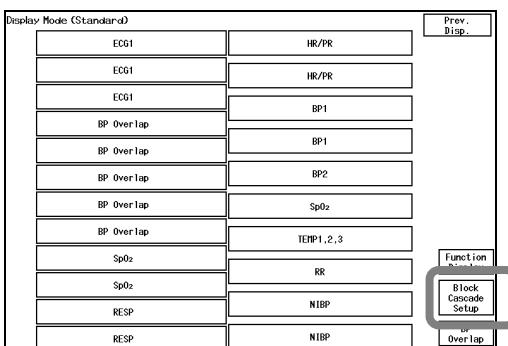
For the standard, extended and enlarge mode, block cascade waveform can be displayed. When the display configuration is standard mode with 2 waveforms block cascade, the waveform display duration is about 54 seconds (6 blocks x 9 sec.). When the display configuration is extended mode with 2 waveforms block cascade, the waveform display duration is about 39 seconds (6 blocks x 6.5 sec.).



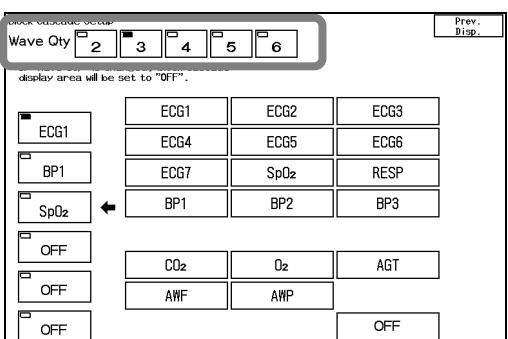
- 1 Press the **Menu** → **Setting** → **Display Config.** keys and press the **Setup** key for the display mode to set the block cascade.



- 2 Set the block cascade.

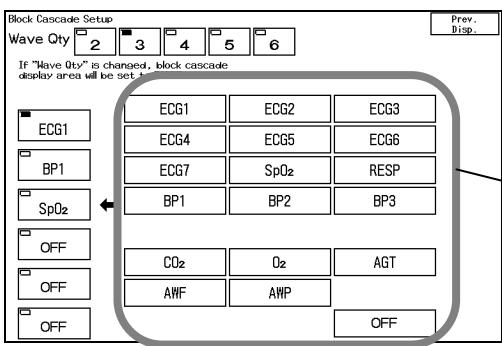


Pressing the **Block Cascade Setup** key will display the block cascade setup menu. Select the waveform quantity and parameter for the block cascade display.



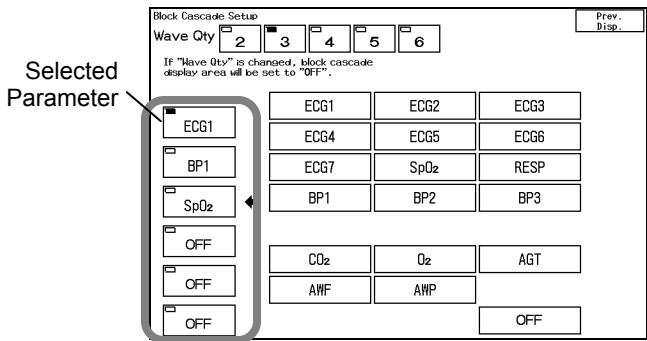
Select the waveform quantity for the block cascade from **2**, **3**, **4**, **5**, **6**.

<Block Cascade Setup Menu>



Select the parameter from the right.  
The selected parameter will be programmed to the key location with the LED lighted.

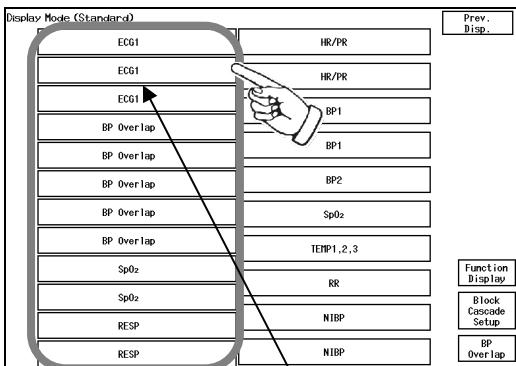
Parameter



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

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

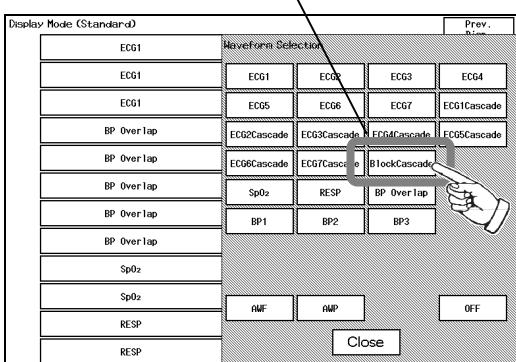
### 3 Select block cascade for the displaying waveform.



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

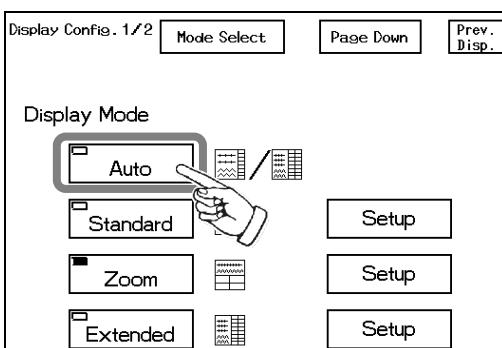
Pressing the block cascade key will set the block cascade for the set quantity.

<Waveform Display Location>



<Waveform Selection>

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



Press the **Prev. Disp.** key to access the display configuration menu.

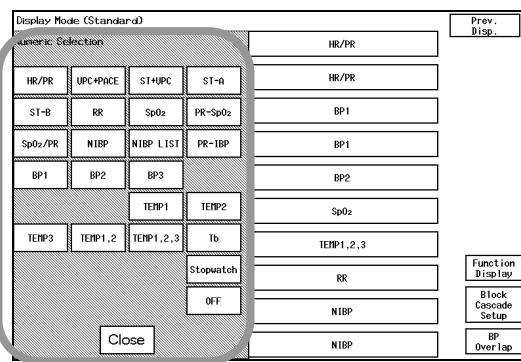
Then, select the display mode which the block cascade was set.

<b>CAUTION</b>	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.
----------------	---

<b>NOTE</b>	<ul style="list-style-type: none"> <li>After configuring the display, press the <b>Home</b> key and verify the programmed display configuration.</li> <li>The block cascade setup is common for all display modes.</li> </ul>
-------------	---

## The Corresponding Key for Each Numeric Data Box

The numeric data to be displayed can be selected on the numeric data selection tool 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 Selection Tool>



For details of the displayed data for each numeric data box, refer to “–Description of the Display–  
●Numeric Data Box Display (for each parameter)”.

**[Numeric Data Selection Tool / 1st Page]**

Numeric Selection 1/2		Close	Page Down
HR/PR	HR	UPC+PACE	ST+UPC
ST-A	ST-B	RR	SpO <sub>2</sub>
PR-SpO <sub>2</sub>	SpO <sub>2</sub> /PR	NIBP	NIBP LIST
PR-IBP	BP1	BP2	BP3
BP4	BP5	BP6	TEMP1
Stopwatch		Alarm	
SvO <sub>2</sub> +CO	UENT		OFF

HR/PR Heart Rate

HR **60**

UPC+PACE VPC, Pace Beat

UPC **0**

PACE **0 / 60**

ST+UPC ST Level, VPC

ST (mm) II **0.0**

UPC **0**

ST-A ST-B ST Level

ST I **0.5**

II **0.2**

III **—**

aUR **—**

RR RR (I)

RR **20**

SpO<sub>2</sub> SpO<sub>2</sub> Value

SpO<sub>2</sub> **98**

PR-SpO<sub>2</sub> Pulse Rate (SpO<sub>2</sub>)

PR-SpO<sub>2</sub> **61**

Tb Blood Temperature  
(When CO is measured)

Tb **38.0**

°C

NIBP NIBP Value

NIBP 2.5M **119/d**

D.Alert **78**

SpO<sub>2</sub>/PR SpO<sub>2</sub> value/Pulse  
Rate

SpO<sub>2</sub> **98**

PR **61**

%

For Nellcor Model

NIBP LIST NIBP List

13:45 119/ 78( 90)  
13:46 109/ 75( 88)  
13:47 134/ 93(108)

PR-IBP Pulse Rate (BP)

PR-IBP **62**

BP1 to BP6 BP Value

BP1 **120/ 80**

( 93 ) mmHg

TEMP1 to TEMP3

T1 **37.0**

°C

TEMP Value

T1 **37.0**

T2 **37.0**

°C

TEMP1, 2

T1 **37.0**

T2 **37.0**

°C

TEMP1, 2, 3

T1 **37.0**

T2 **37.0**

T3 **37.0**

°C

TEMP1, 2, 3

T1 **0.0**

T2 **0.0**

T3 **0.0**

°C

STOP WATCH Stopwatch

H M S

TIMER1 **00:00:00**

TIMER2 **00:00:00**

STOP WATCH

14:36 Lower HR Alarm

Alarm Alarm List

BIS **43**

SQI 88 %

EMG 40 dB

SR 25 %

BIS

SvO<sub>2</sub> **80** %

CCO 1.00 L/min

EDU 2.00 mL

BT 37.0 °C

SvO<sub>2</sub>

CCO

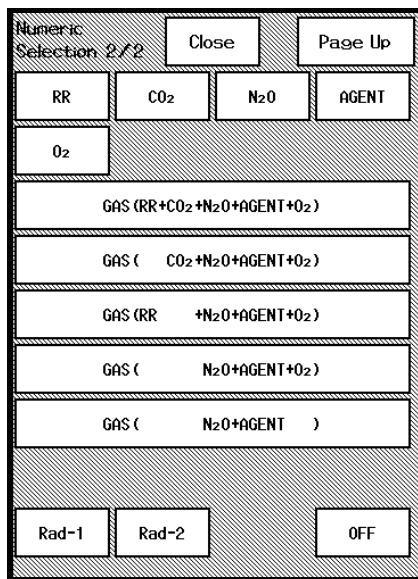
EDU

BT

Oximeter Data

\*Displayed data will differ  
depending on the used  
oximeter.

**[Numeric Data Selection Tool / 2nd Page]**

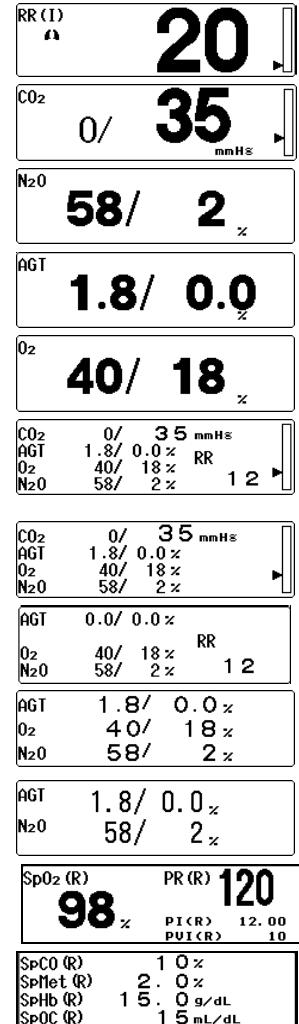


- |  |                                |
|--|--------------------------------|
| RR   | Respiration Rate               |
| CO <sub>2</sub>  | CO <sub>2</sub> Concentration  |
| N <sub>2</sub> O   | N <sub>2</sub> O Concentration |
| AGENT  | Agent Concentration            |
| O <sub>2</sub>   | O <sub>2</sub> Concentration   |
| <b>GAS (RR+CO<sub>2</sub>+N<sub>2</sub>O+AGENT+O<sub>2</sub>)</b>            |                                |
| Multigas data (RR, CO <sub>2</sub> , N <sub>2</sub> O, AGT, O <sub>2</sub> ) |                                |
| <b>GAS (CO<sub>2</sub>+N<sub>2</sub>O+AGENT+O<sub>2</sub>)</b>               |                                |
| Multigas data (CO <sub>2</sub> , N <sub>2</sub> O, AGT, O <sub>2</sub> )     |                                |
| <b>GAS (RR+N<sub>2</sub>O+AGENT+O<sub>2</sub>)</b>                           |                                |
| Multigas data (RR, N <sub>2</sub> O, AGT, O <sub>2</sub> )                   |                                |
| <b>GAS (N<sub>2</sub>O+AGENT+O<sub>2</sub>)</b>                              |                                |
| Multigas data (N <sub>2</sub> O, AGT, O <sub>2</sub> )                       |                                |
| <b>GAS (N<sub>2</sub>O+AGENT)</b>  |                                |
| Multigas data (N <sub>2</sub> O, AGT)  |                                |
| Rad-1  | Radical-7 Parameter 1          |
| Rad-2  | Radical-7 Parameter 2          |

**VENT** Ventilator Data

MU	9.0	
CCO	10.0	L/min
CCI	5.7	L/min/m <sup>2</sup>

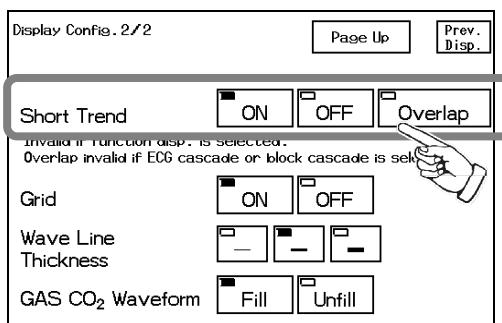
TU	Insp	44.9	Exp	43.6
MU		9.0		
PEAK	21	PEEP	3	MEAN 11



## To Display the Short Trend

The short trend can be displayed on the home display.

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

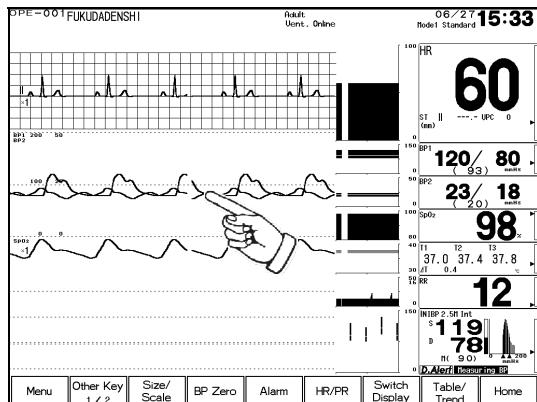


### Short Trend Selection

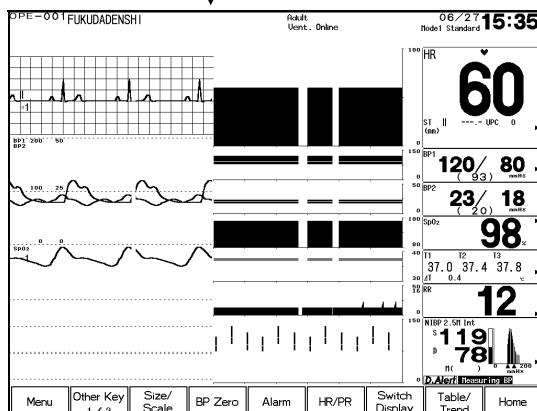
- ON** will display the short trend on the home display.
- OFF** will not display the short trend on the home display.
- Overlap** will display the waveform and short trend overlapped.

<Display Configuration Menu>

- 2 Select the display type for the short trend.



The display shown on the left is when **ON** is selected for "Short Trend".



The short trend can be displayed in 5 minutes increments from 0 minute to 30 minutes.

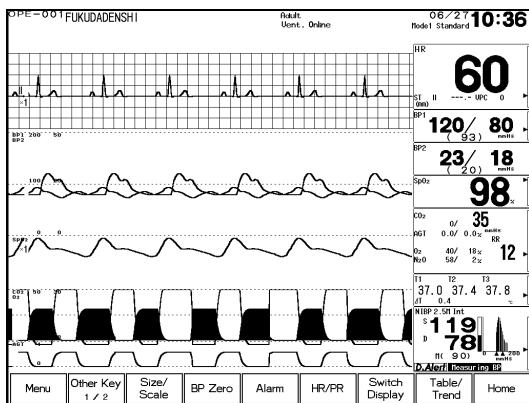
Pressing the waveform display area will change the short trend display duration according to the pressed location.

### NOTE

The short trend can be displayed only for the standard display mode. However, if trend, ventilator, OCRG, or table is displayed, short trend cannot be displayed.

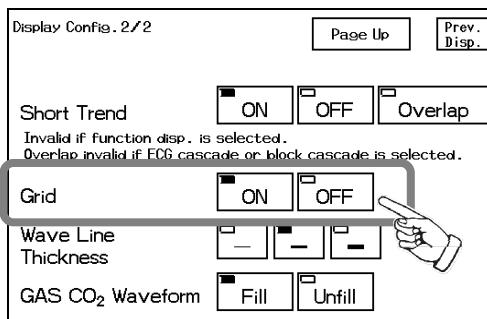
## Waveform Grid Display

The ECG waveform can be displayed on a grid.



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

The display configuration menu will be displayed.



### Grid Selection

**ON** will display the grid on the home display.

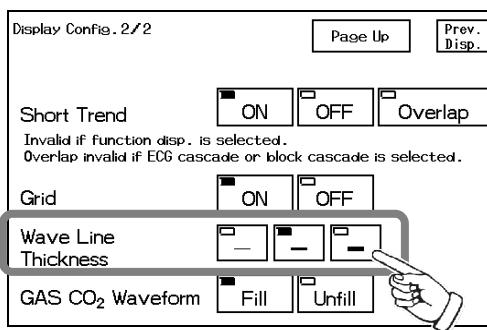
**OFF** will not display the grid on the home display.

<Display Configuration Menu>

## Wave Line Thickness

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

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

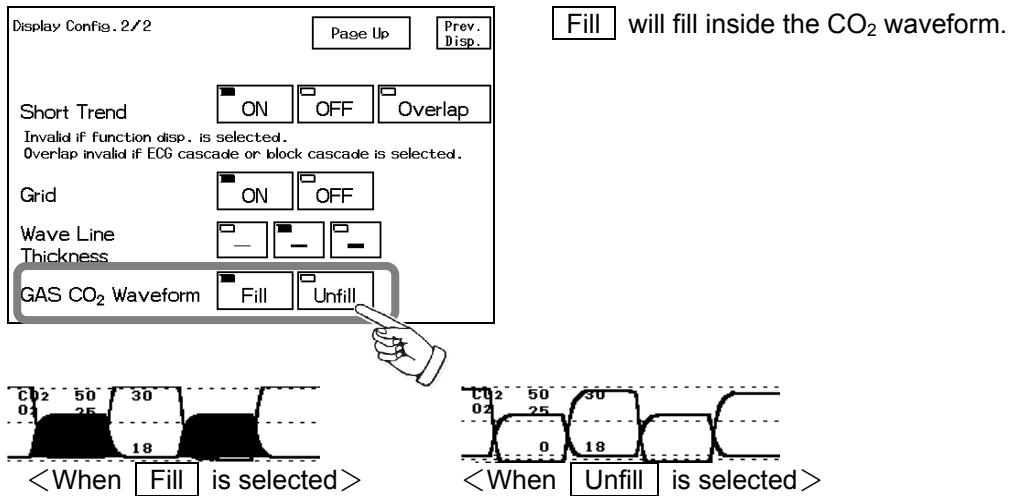


Select the wave line thickness from 3 levels.

## Gas CO<sub>2</sub> Waveform Fill/Unfill Setup

Whether or not to fill inside the CO<sub>2</sub> waveform can be selected.

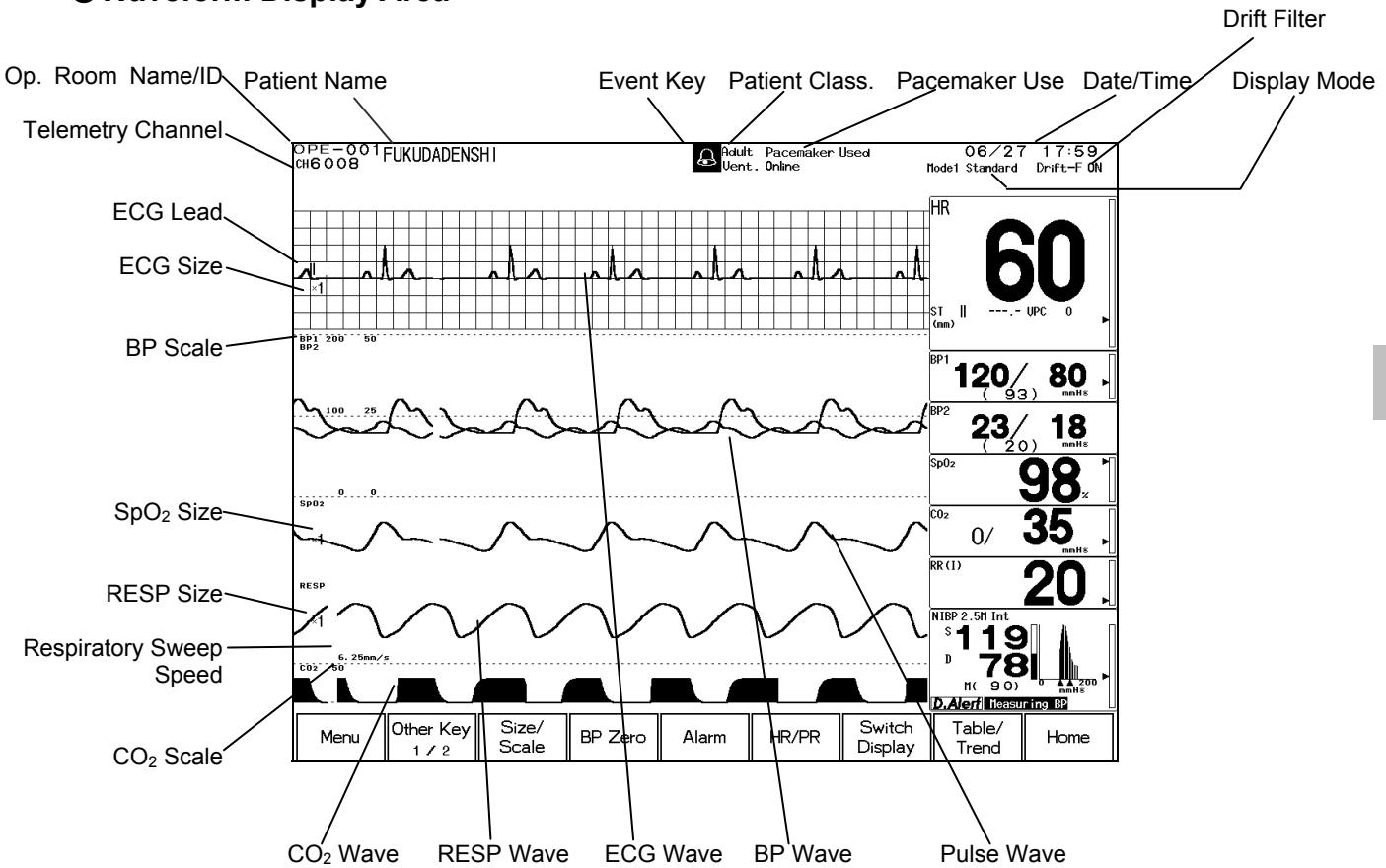
- 1 Press the **Menu** → **Settings** → **Display Config.** → **Page Down** keys.



## Description of the Display

This section explains the displayed item on the home display.

### ●Waveform Display Area



#### Operation Room Name/ID

Displays the 3-digit operating room name and 3-digit (000 to 999) operating room ID.

#### Telemetry Channel (When HLX-561 is connected)

Displays the telemetry channel ID.

#### Patient Name / Patient Classification

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

#### Pacemaker Use

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

#### Display Mode

Displays the display mode (Mode 1 to 5) for the current home display and the display configuration (Standard/Zoom/Extended/Auto).

#### Date/Time, Drift Filter

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

Depending on the setup, the date/time display size can be reduced to display the drift filter status.

**06/27 17:59** <When drift filter display is set>  
**Drift-F ON**



For procedure to select the drift filter or enlarged time display, refer to "–Display Setup–" in this chapter.

#### Respiratory Sweep Speed

Displays the sweep speed for the impedance respiration waveform, CO<sub>2</sub>/O<sub>2</sub>/AGENT waveform, AWP, AWF waveform.

### Event Key

This touch key will be displayed at alarm occurrence. Even when the alarm is resolved, this key will remain 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.



For ON/OFF of Event Key, refer to “–Display Setup–” in this chapter.

### ● 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.



For procedure to select ON/OFF of message icon display, refer to “–Display Setup–” in this chapter.



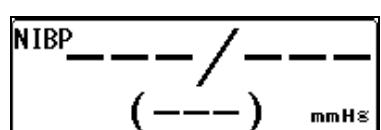
#### Alarm OFF Mark

Displayed when the alarm is set to OFF.



#### Out of Range (XXX)

Displayed when the measurement is out of range.



#### Cannot Measure (---)

NIBP: measurement error

## ● Numeric Data Box Display (for each parameter)



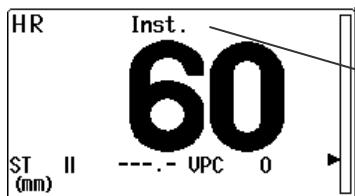
For the corresponding numeric data selection key (display configuration setup menu) for each of the following numeric data box, refer to “–Corresponding Key for Each Numeric Data Box–” in this chapter.



### HR / PR Parameter

Displays HR / PR value.

When the value exceeds the measurable range, “xxx” will be displayed.

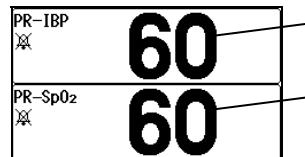


### HR / PR Synchronization Mark

Synchronizing to the set HR/PR alarm source, a mark will be displayed.

### HR Average (Instant / Average)

Displays the averaging method of HR. (“HR Average” on ECG setup menu)



### PR Value (BP)

### PR Value (SpO<sub>2</sub>)

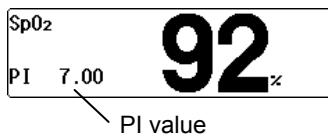


### SpO<sub>2</sub> Value

Displays the arterial oxygen saturation measurement value.

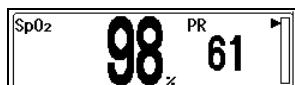
### SEC Alarm Indicator (For Nellcor Model)

Displayed when the SEC alarm is set.

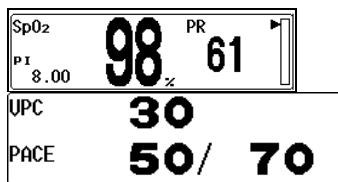


### PI value (For Masimo Model)

Displayed when the “PI Display” is set to ON.



### SpO<sub>2</sub> value/Pulse Rate (For Nellcor Model)



### SpO<sub>2</sub> value/Pulse Rate (For Masimo Model)

### VPC Value (1 minute)

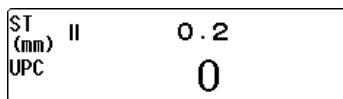
Displays the VPC rate for the last 1 minute.

“— — —” 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.



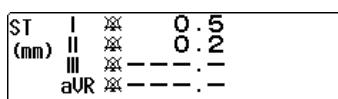
### ST Level

ST levels will be displayed.

### VPC Value (1 minute)

Displays the VPC rate for the last 1 minute.

“— — —” 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 the reference waveform is not set for ST measurement.



The lead to display inside the ST data box can be changed.  
For setup procedure, refer to “–Lead Selection for ST Data Box–” in this chapter.



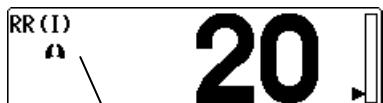
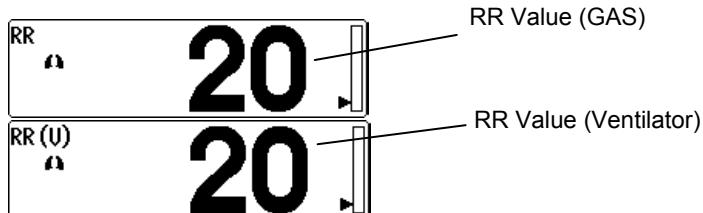
RR Value  
(Impedance)

### RR Value

Displays the impedance RR / GAS RR / Ventilator RR measurement value corresponding to the respiration synchronization source.

When the measurable range is exceeded, “xxx” will be displayed.

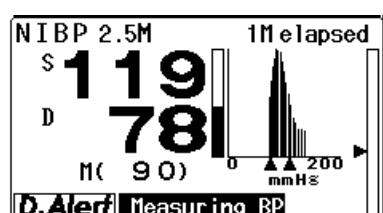
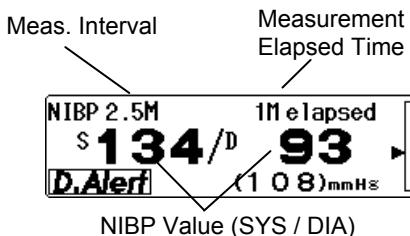
When the ECG relay cable for electrosurgical knife is used, or when impedance measurement is set to OFF, impedance RR will not be displayed.



RR Sync. Mark

### RR Synchronization Mark

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



### NIBP Measurement Interval

The NIBP measurement interval will be displayed. If the measurement interval is set to OFF, “OFF” will be displayed.

### NIBP Measurement Elapsed Time

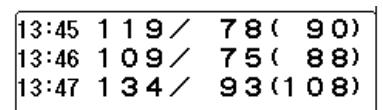
Displays the elapsed time of the NIBP measurement.

### NIBP Value/NIBP Cuff Pressure

Displays the NIBP measurement value (systolic/diastolic/mean).

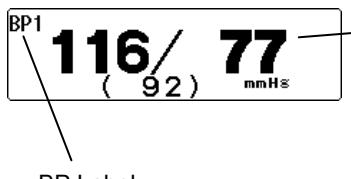
The mean NIBP display can be set to ON or OFF on the NIBP configuration menu. The value will be displayed as “---” when the preprogrammed NIBP erase time has elapsed.

Displays the cuff pressure during NIBP measurement.



### NIBP List

The latest 3/6/9 data of NIBP list will be displayed. The number of displaying data depends on the size of the parameter box.



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, “xxx” will be displayed. Also, when the transducer is not connected, “Transducer OFF”, and when BP zero balance is not performed, “Zero Required” will be displayed.

### BP Label

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

PAP	34 / 21	mmHg
PCWP	23	11:11
IAP	45 / 32	mmHg
PDP	( 37 )	mmHg
ICP	48	mmHg
CPP	44	mmHg

**PCWP Value, PCWP Measured Time**

When the BP label is PAP, PCWP (Pulmonary Capillary Wedge Pressure) and the 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 has not been measured, or the zero balance has not been performed for ICP or ART, the value will be displayed as “—”. Also, the alarm cannot be set for CPP.

BP1	Mean Wave
120 / 80	mmHg

( 93 )

**Mean Wave**

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

T1	T2
36.1	37.2

°C

**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, “xxx” will be displayed.

Tb	38.0
----	------

°C

**Blood Temperature**

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

**Gas Unit Data**

When a gas unit is connected, the gas data (CO<sub>2</sub> / anesthetic gas / O<sub>2</sub> / N<sub>2</sub>O concentration) will be displayed.

CO <sub>2</sub>	0 / 36	mmHg
AGT	1.8 / 0.0 %	
O <sub>2</sub>	38 / 9 %	
N <sub>2</sub> O	59 / 2 %	

When mixed anesthetic gas is used, primary anesthetic gas concentration, secondary anesthetic gas concentration will be displayed.

ISO	1.8 / 0.0 %	MAC
HAL	1.2 / 0.4 %	
O <sub>2</sub>	40 / 40 %	
N <sub>2</sub> O	58 / 2 %	0.6

When “MAC Value Display” is set to ON, the MAC value will be displayed.

CO <sub>2</sub>	0 / 36	mmHg
O <sub>2</sub>	43 / 9	%
N <sub>2</sub> O	55 / 2	%
AGT	1.8 / 0.0	%

The gas unit data can be individually displayed inside each numeric data box.

- InspCO<sub>2</sub> value / EtCO<sub>2</sub> value
- FiO<sub>2</sub> value / ExO<sub>2</sub> value
- InspN<sub>2</sub>O value / ExN<sub>2</sub>O value
- InspAGT value / ExAGT value

The CO<sub>2</sub> measurement unit can be selected from mmHg/kPa/% on the “Initial Settings” menu.

TU	Insp	400	Exp	416
MU		6.2		
PEAK	2	PEEP	0	MEAN 1

**Ventilator Measurement**

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

SvO <sub>2</sub>	8.3 %
CO AVG	5.3 L/min
CI AVG	2.8 L/min/m <sup>2</sup>

### Oximeter Data

When oximeter (Vigilance / Vigilance CEDV / Vigilance II / Vigileo / OXIMETRIX3 / Q-vue / Q2 Computer) is connected, the oximeter data (SvO<sub>2</sub>, CO, etc.) will be displayed.

The displayed data will differ depending on the used oximeter.

<b>Oximeter</b>	<b>Displayed Data</b>				
Vigilance (CCO mode / STAT OFF / Index OFF)	SvO <sub>2</sub> (ScvO <sub>2</sub> )	CCO	EDV	BT	—
Vigilance (CCO mode / STAT ON / Index OFF)	SvO <sub>2</sub> (ScvO <sub>2</sub> )	CCO STAT	EDV STAT	BT	—
Vigilance (CCO mode / STAT OFF / Index ON)	SvO <sub>2</sub> (ScvO <sub>2</sub> )	CCI	EDVI	BT	—
Vigilance (CCO mode / STAT ON / Index ON)	SvO <sub>2</sub> (ScvO <sub>2</sub> )	CCI STAT	EDVI STAT	BT	—
Vigilance (ICO mode)	SvO <sub>2</sub> (ScvO <sub>2</sub> )	CO AVG	CI AVG	—	—
Oximetrix3	SvO <sub>2</sub>	CO AVG	CI AVG	—	—
Q-vue (CCO mode)	—	CCO	CCI	BT	—
Q-vue (CCO not measured)	—	CO AVG	CI AVG	—	BSA
Oximetrix3 + Q-vue (CCO mode)	SvO <sub>2</sub>	CCO	CCI	BT	—
Oximetrix3 + Q-vue (CCO not measured)	SvO <sub>2</sub>	CO AVG	CI AVG	—	BSA
Q2 Computer (CCO mode)	SvO <sub>2</sub>	CCO	CCI	BT	—
Q2 Computer (CCO not measured)	SvO <sub>2</sub>	CO AVG	CI AVG	—	BSA

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

### Stopwatch Key

Functions as a stopwatch.

BIS	SQI 88 %
<b>43</b>	EMG 40 dB
	SR 25 %

### 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%, the BIS value and SR value will disappear.

### Radical-7 (Rad-1) Value

When the Radical-7 is connected, arterial oxygen saturation (SpO<sub>2</sub>(R)), pulse rate (PR(R)), perfusion index (PI(R)), pleth variability index (PVI(R)) will be displayed.

SpO <sub>2</sub> (R)	PR (R)	120
<b>98</b> %	PI (R)	12.00
	PVI (R)	10

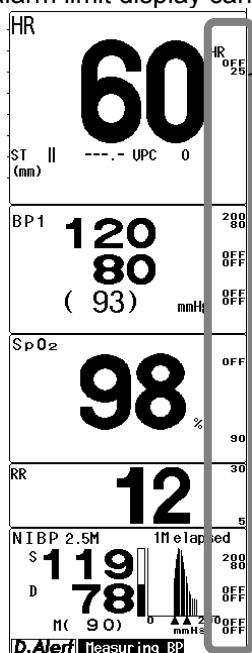
### Radical-7 (Rad-2) Value

When the Radical-7 is connected, carboxyhemoglobin concentration (SpCO(R)), methemoglobin concentration (SpMet(R)), total hemoglobin concentration (SpHb(R)), oxygen content (SpOC(R)) will be displayed.

SpO <sub>2</sub> (R)	PR (R)	120
<b>98</b> %	PI (R)	12.00
	PVI (R)	10

## ● Alarm Limit Display/Bar Graph Display

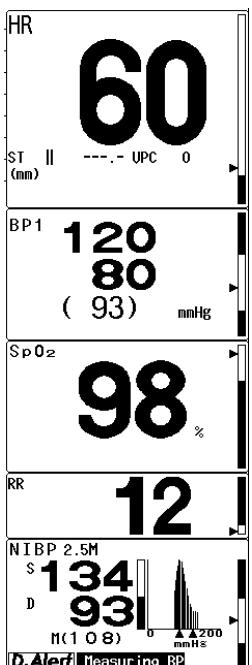
The alarm limit display can be selected from ON, OFF, or Bar Graph Display.



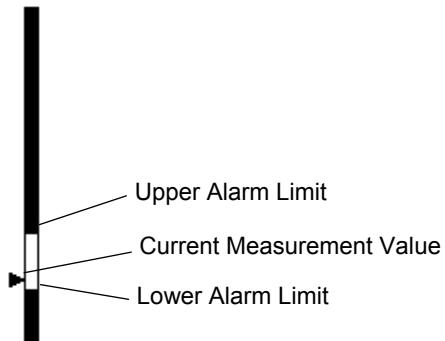
### Alarm Limit

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.



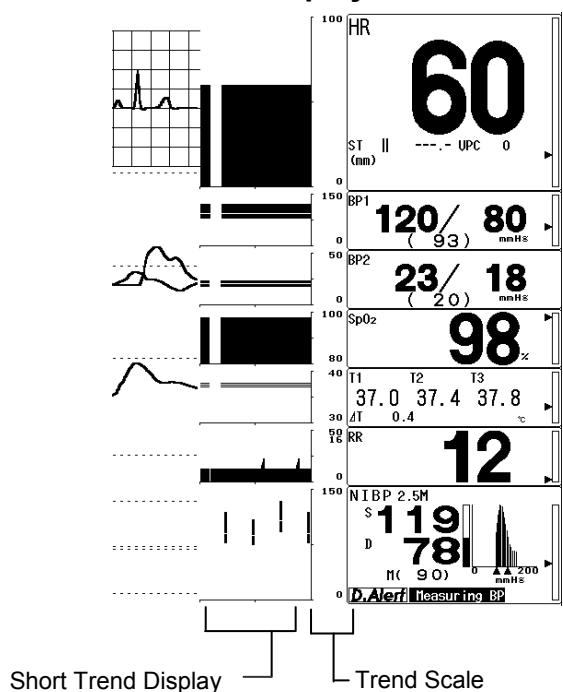
### Alarm Limit Bar Graph Display



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

<b>NOTE</b>	<ul style="list-style-type: none"> <li>The alarm limit cannot be displayed inside the numeric data box for the following parameter.           <ul style="list-style-type: none"> <li>GAS (CO<sub>2</sub>+AGT+O<sub>2</sub>+N<sub>2</sub>O)</li> <li>GAS (AGT+O<sub>2</sub>+N<sub>2</sub>O)</li> <li>GAS (N<sub>2</sub>O+AGT)</li> </ul> </li> <li>The alarm limit bar graph can be displayed for HR/PR, BP1 or ART, NIBP, SpO<sub>2</sub>, T1, RR, and CO<sub>2</sub>. It cannot be displayed for other parameters.</li> </ul>
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## ●Short Trend Display



### 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 the measurement data.

The displayed scale will be in accordance with the scale set on the graphic trend menu.

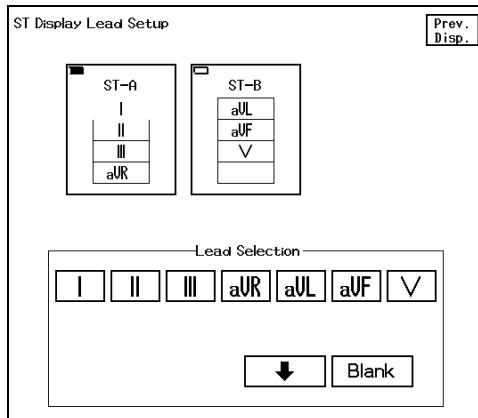
## ●Lead Selection for ST Data Box

The ST value for 4 leads can be displayed in the ST data box. 2 groups (A, B) of lead combination can be programmed.

ST	I	※	0.5
(mm)	II	※	0.2
	III	※	0.1

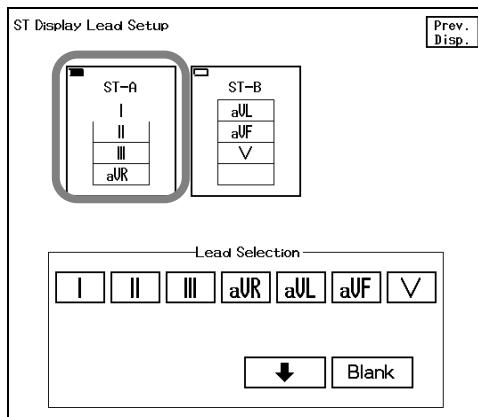
aUR   ※-----.-

- 1 Press the **Menu** → **Function** → **ST** → **ST Display Lead Setup** keys.

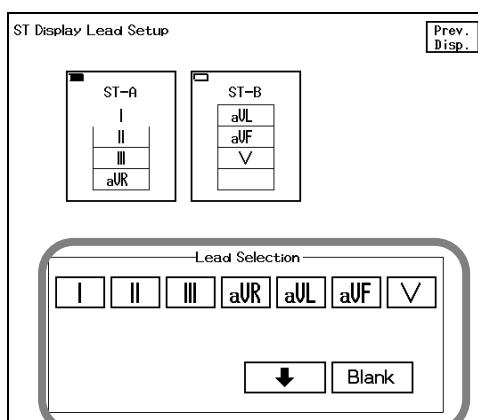


The ST Display Lead Setup menu will be displayed.  
Set the displaying lead for each group.

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



Select the group from **[ST-A]**, **[ST-B]**.



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

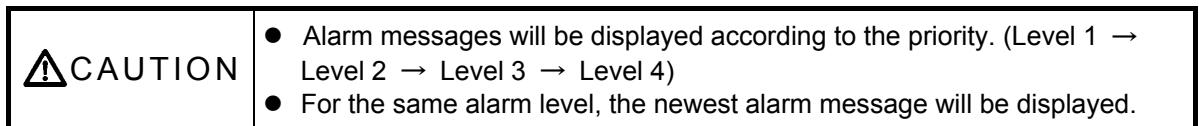
This section explains about the message displayed on the home display.

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.

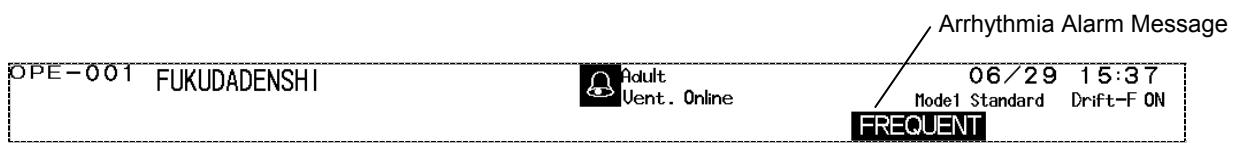
The color of the displayed messages are red for level 1, yellow for level 2, blue for level 3, and white for level 4.

Alarm Level	Description	Tone	Displayed Color
Level 1	Life Threatening Alarm	Continuous beep tone	Red
Level 2	Cautionary Alarm	Beep tone every 5 seconds	Yellow
Level 3	Treatment Needed Alarm	Single beep tone	Blue
Level 4	Notification Alarm	Display Only	White

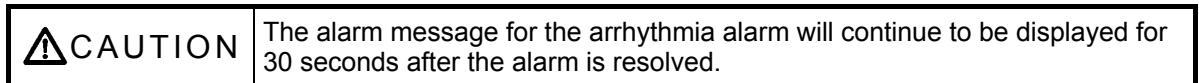


### ● Vital Alarm Message

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



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 newest alarm will be displayed.



**Life Threatening Alarm (Alarm Level 1)**

<b>Parameter</b>	<b>Message</b>
HR	“Lower HR Alarm” “Upper HR Alarm”
Respiration (Impedance, GAS, Ventilator)	“Apnea Alarm” “Lower RR Alarm” “Upper RR Alarm”
PR (PR-SpO <sub>2</sub> , PR-IBP)	“Lower PR Alarm” “Upper PR Alarm”
BP (BP1/ART)	“Lower BP1 Alarm” or “Lower ART Alarm” “Upper BP1 Alarm” or “Upper ART Alarm”
SpO <sub>2</sub>	“Lower SpO <sub>2</sub> Alarm” “Upper SpO <sub>2</sub> Alarm”
NIBP	“Lower NIBP Alarm” “Upper NIBP Alarm”
Multigas Unit	“Upper In-CO <sub>2</sub> Alarm” “Lower EtCO <sub>2</sub> Alarm” “Upper EtCO <sub>2</sub> Alarm” “Lower FiO <sub>2</sub> Alarm” “Upper FiO <sub>2</sub> Alarm” “Upper Ex-O <sub>2</sub> Alarm” “Lower Ex-O <sub>2</sub> Alarm” “Upper In-N <sub>2</sub> O Alarm” “Lower In-N <sub>2</sub> O Alarm” “Upper Ex-N <sub>2</sub> O Alarm” “Lower Ex-N <sub>2</sub> O Alarm” “Upper In-HAL Alarm” “Lower In-HAL Alarm” “Upper Ex-HAL Alarm” “Lower Ex-HAL Alarm” “Upper In-ISO Alarm” “Lower In-ISO Alarm” “Upper Ex-ISO Alarm” “Lower Ex-ISO Alarm” “Upper In-ENF Alarm” “Lower In-ENF Alarm” “Upper Ex-ENF Alarm” “Lower Ex-ENF Alarm” “Upper In-SEV Alarm” “Lower In-SEV Alarm” “Upper Ex-SEV Alarm” “Lower Ex-SEV Alarm” “Upper In-DES Alarm” “Lower In-DES Alarm” “Upper Ex-DES Alarm” “Lower Ex-DES Alarm”
Arrhythmia	“ASYSTOLE” “VF” “VT” “SLOW VT” “TACHY” “BRADY” “RUN”

### Cautionary Alarm (Alarm Level 2)

Parameter	Message
BP2 to BP6	“Lower BP* Alarm” or “Lower (label) Alarm”
	“Upper BP* Alarm” or “Upper (label) Alarm”
ST	“Lower ST (Lead) Alarm”
	“Upper ST (Lead) Alarm”
TEMP1 to TEMP3	“Lower TEMP* Alarm” or “Lower (label) Alarm”
	“Upper TEMP* Alarm” or “Upper (label) Alarm”
Temperature (Tb)	“Lower Tb Alarm”
	“Upper Tb Alarm”
Gas Unit	“MAC Alarm”
Arrhythmia	“PAUSE”
	“COUPLET”
	“BIGEMINY”
	“TRIGEMINY”
	“FREQUENT”

\* indicates the channel no. of BP and TEMP.

### Treatment Needed Alarm (Alarm Level 3)

Parameter	Message
Respiration (Impedance, GAS, Ventilator)	“Apnea Alarm”

### Notification Alarm (Alarm Level 4)

Parameter	Message
Arrhythmia	“LEARN”

## ●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.



**Cautionary Alarm (Alarm Level 2)**

<i>Item</i>	<i>Message</i>
ECG Impedance Respiration	"Check Electrodes"
Option Unit	"Option Unit * Disconnect" (*: Option Unit No.)
Connector Off	"ECG Disconnect"
	"BP * Disconnect" (*: BP Channel No.)
	"SpO <sub>2</sub> Disconnect"
	"TEMP * Disconnect" (*: TEMP Channel No.)
	"CO Disconnect"
Device	"FAN Error Inoperative"
	"FAN Error Short Circuit"
	"Board Temp. Error"
Built-in Recorder	"Check Rec. Connection"

 <b>WARNING</b>	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.
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<b>NOTE</b>	The "Connector Off" alarm can be cancelled by pressing the  (Alarm Silence) key. Before silencing the alarm, make sure that the disconnected connector is unnecessary.
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**Treatment Needed Alarm (Alarm Level 3)**

<i>Item</i>	<i>Message</i>
Option Unit	"Option Unit * Error" (*: Option Unit No.)

**Notification Alarm (Alarm Level 4)**

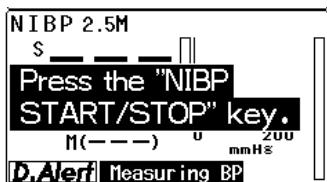
<i>Item</i>	<i>Message</i>
Operation	"Waveform Frozen (* sec.)"
	"Touch Key OFF"
	"Night Mode"
	"All alarms are silenced."
	"RR/Apnea Alarm Suspended"
ECG	"ECG Failed"
	"Artifact"
ECG, Impedance Respiration	"Check Electrodes"
Temperature (TEMP1 to 3)	"Noise Interference"
Capnostat5 CO <sub>2</sub> (HPD-800)	"CO <sub>2</sub> Unit Error"
	"CO <sub>2</sub> Sensor Failure"
	"CO <sub>2</sub> Warm Up"
	"CO <sub>2</sub> Cal. Required"
	"Check CO <sub>2</sub> Adapter"
	"Unknown CO <sub>2</sub> Sensor"
	"Out of range"
	"CO <sub>2</sub> Zeroing"
	"Recorder Error"
Built-in Recorder	"Paper Out"
	"Check Paper Cassette."
	"Recorder Busy"
	"DS-7000 Hardware Error"
Main Unit	"Analog Board Error"
	"SpO <sub>2</sub> Unit Error"
	"ECG Unit Error"
	"TEMP * Unit Error" (*: TEMP Channel No.)
	"Set DS-7000 Rotary SW0"*
	"Set DS-7000 Rotary SW1"*
	"Set DS-7000 Rotary SW2"*

<i>Item</i>	<i>Message</i>
Network Recorder	“Recorder Error (8ch)”
	“Recorder Busy (8ch)”
	“Check Paper Cassette (8ch)”
	“Paper Out (8ch)”
	“Recorder Busy (Central)”
	“Paper Out (Central)”
Power Voltage	“Power* Voltage Rise” (*: 1 to 4)
	“Power* Voltage Drop” (*: 1 to 4)
Battery	“Battery* Voltage Rise” (*: 1, 2)
	“Battery* Voltage Drop” (*: 1, 2)

\*Set the rotary switch to 0 and restart the system.

## ●Message Displayed Inside the Numeric Data Box

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



### HR

<b>Alarm Level</b>	<b>Message</b>
2	"Disconnect"
2	"Check Electrodes"
3	"Pacemaker Error"
4	"Out of Range"
1	"Upper HR Alarm"
1	"Lower HR Alarm"
2	"Lower ST Alarm"
2	"Upper ST Alarm"
4	"ECG Failed"
4	"Artifact"
4	"Check Electrodes"
4	"ECG Unit Error"

### ST

<b>Alarm Level</b>	<b>Message</b>
2	"Lower ST Alarm"
2	"Upper ST Alarm"

### BP1 to BP6

<b>Alarm Level</b>	<b>Message</b>
2	"Disconnect"
2	"Transducer OFF"
4	"Zero Required"
4	"Zero in Progress"
4	"Out of Range"
1*	"Lower BP Alarm"
1*	"Upper BP Alarm"

\*For BP1, ART: Level 1, For other label: Level 2

### PR (BP Source)

<b>Alarm Level</b>	<b>Message</b>
1	"Upper PR Alarm" (BP)
1	"Lower PR Alarm" (BP)

**NIBP**

<b>Alarm Level</b>	<b>Message</b>	<b>Description</b>
2	"Communication Error"	
1	"Measurement Start Error"	
1	"Cannot Measure (C02)"	<ul style="list-style-type: none"> <li>Could not measure although the pressure dropped to the minimum deflating pressure. (When not using quick measurement or during quick measurement).</li> </ul>
1*	"Exhaust Error (C03)"	<ul style="list-style-type: none"> <li>Exhaust was suspended for 15 seconds due to body motion.</li> <li>Deflation speed of 1mmHg/sec. continued for 5 seconds.</li> <li>20 seconds elapsed since the exhaust started, but a deflation of 30mmHg was not achieved.</li> <li>10 seconds elapsed since the exhaust started, but the target deflation speed was not achieved.</li> </ul>
1*	"Insuff. Inflation (C04)"	<ul style="list-style-type: none"> <li>The first 5 pulse amplitude was on a decreasing trend.</li> <li>SYS cannot be measured.</li> <li>Pressure difference between the pulses is too large.</li> </ul>
1*	"Osc. Pattern Err. (C05)"	<ul style="list-style-type: none"> <li>Pressure difference between the pulses is too large.</li> <li>Too much pulse compensation.</li> </ul>
1*	"Meas. Error (C06)"	<ul style="list-style-type: none"> <li>Set inflation value&gt;systolic&gt;mean&gt;diastolic was not achieved.</li> <li>Systolic pulse amplitude is too small.</li> <li>Pulse pressure is too small.</li> <li>Diastolic pulse amplitude is too small.</li> </ul>
1*	"Meas. Timeout(C07)"	Measurement Timeout
1*	"PR Over (C08)"	Measured PR value is too large.
1*	"Overinflation (C09)"	Maximum pressure has been exceeded.
1*	"Pulse Amp. Error (C10)"	<ul style="list-style-type: none"> <li>Pulse amplitude is too large.</li> <li>Pulse amplitude is too small.</li> </ul>
1*	"Check Cuff Size (C11)"	<ul style="list-style-type: none"> <li>Neonate cuff is detected with adult mode.</li> <li>Infant cuff is detected with adult mode.</li> <li>Neonate cuff is detected with child mode.</li> </ul>
4	"Motion Artifact"	Body motion was detected during measurement.
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 (E08-8)"	Rapid Exhaust Error
2	"System Error (E09-A)"	Maximum cuff pressure has been exceeded.
2	"System Error (E09-B)"	Inflation time has been exceeded.
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

<b>Alarm Level</b>	<b>Message</b>	<b>Description</b>
2	"System Error (E09-I)"	ROM Test Error
2	"System Error (E09-J)"	RAM Test Error
2	"System Error (E09-L)"	Clock transmission has 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 has been 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
4	"Out of Range"	
2	"Lower NIBP Alarm"	
2	"Upper NIBP Alarm"	
2	"Inflation Timeout (C01)"	

\*: When NIBP measurement is repeated: Level 4, when measurement is not repeated: Level 1.

\*1 will be displayed for only Level 1

#### SpO<sub>2</sub> (Nellcor® Model: DS-7000)

<b>Alarm Level</b>	<b>Message</b>
4	"SpO <sub>2</sub> Unit Error"
2	"Disconnect"
2	"SpO <sub>2</sub> Sensor Defective"
2	"Check SpO <sub>2</sub> Sensor"
4	"Motion Artifact"
3	"No Pulse Detect"
3	"Pulse Search"
1	"Lower SpO <sub>2</sub> Alarm"
1	"Upper SpO <sub>2</sub> Alarm"

#### SpO<sub>2</sub> (Masimo® Model: DS-7000M)

<b>Alarm Level</b>	<b>Message</b>
4	"SpO <sub>2</sub> Unit Error"
2	"Disconnect"
2	"SpO <sub>2</sub> Sensor Defective"
2	"Check SpO <sub>2</sub> Sensor"
3	"Low Perfusion"
3	"Pulse Search"
3	"SpO <sub>2</sub> Noise"
3	"Check SpO <sub>2</sub> Sensor"
3	"Unknown SpO <sub>2</sub> Sensor"
3	"Low Signal IQ"
1	"Lower SpO <sub>2</sub> Alarm"
1	"Upper SpO <sub>2</sub> Alarm"

**PR-SpO<sub>2</sub>**

<b>Alarm Level</b>	<b>Message</b>
1	"Upper SpO <sub>2</sub> Alarm" (SpO <sub>2</sub> )
1	"Lower SpO <sub>2</sub> Alarm" (SpO <sub>2</sub> )

**TEMP1 to TEMP3**

<b>Alarm Level</b>	<b>Message</b>
4	"Unit Error"
2	"Disconnect"
4	"Out of Range"
4	"Noise Interference"
2	"Upper TEMP Alarm"
2	"Lower TEMP Alarm"

**Tb**

<b>Alarm Level</b>	<b>Message</b>
2	"Disconnect"
4	"Out of Range"
2	"Upper Tb Alarm"
2	"Lower Tb Alarm"

**Respiration Rate (Impedance)**

<b>Alarm Level</b>	<b>Message</b>
4	"Check ECG Cable"
2	"Check Electrodes"
2	"ECG Disconnect"
3	"CVA Detected"
4	"Out of Range" (Impedance)
1	"Apnea Alarm" (Impedance)
1	"Upper RR Alarm" (Impedance)
1	"Lower RR Alarm" (Impedance)
4	"Suspended"

**Respiration Rate (Ventilator)**

<b>Alarm Level</b>	<b>Message</b>
1	"Apnea Alarm" (Ventilator)
1	"Upper RR Alarm" (Ventilator)
1	"Lower RR Alarm" (Ventilator)

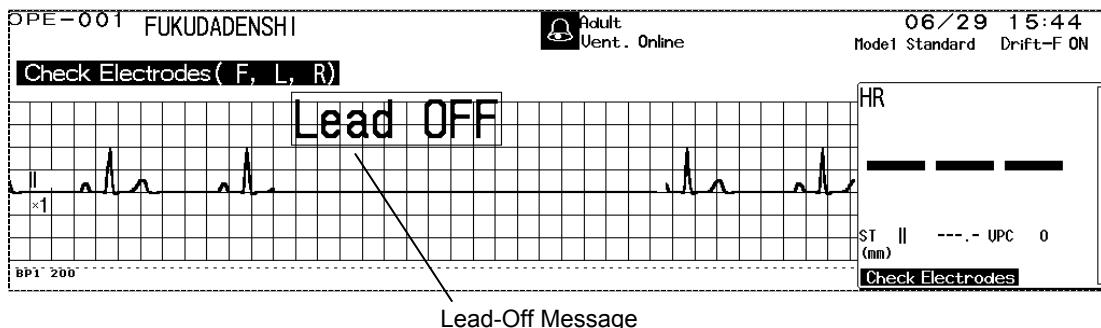
**Respiration Rate (Gas)**

<b>Alarm Level</b>	<b>Message</b>
1	"Apnea Alarm" (Gas)
1	"Upper RR Alarm" (Gas)
1	"Lower RR Alarm" (Gas)

For details of the multigas message, refer to P4-41.

## ●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 condition may not be noticed. Take prompt action when the lead-off condition is detected.



### ⚠ 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 condition. Promptly check the electrodes when this message is displayed.

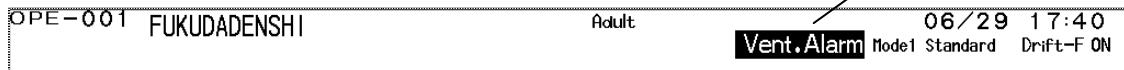
## ●Ventilator Alarm Message

When a ventilator is connected to the DS-7000, ventilator alarm and the connection status alarm can 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 (Servo-i)	“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 “Tone/Volume Setup”.

### NOTE

“Vent. Alarm” will not be generated for Fabius GS (Drager).

### 【Connection Status Alarm Message】

Connection Status Alarm Message



### Life Threatening Alarm (Alarm Level 1)

Parameter	Message
Ventilator (Servo-i)	“Vent. Offline”

### Cautionary Alarm (Alarm Level 2)

Parameter	Message
None	

### Treatment Needed Alarm (Alarm Level 3)

Parameter	Message
Ventilator (Drager)	"Vent. Offline"

NOTE	"Vent. Offline" alarm for Fabius GS (Drager) will not be transmitted to central monitors or other monitors.
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### Notification Alarm (Alarm Level 4)

Parameter	Message
Ventilator	"Vent. Data Unavailable"
	"Vent. Online"

## ●Gas Alarm Message

When monitoring the gas data by connecting the multigas unit, the following alarm messages may be displayed according to the condition.

If more than one alarm generate at the same time, maximum of 25 alarms will be stacked, and sequentially displayed in 2 seconds interval.



### Life Threatening Alarm (Alarm Level 1)

Equipment	Message
None	

### Cautionary Alarm (Alarm Level 2)

Equipment	Message
Multigas Unit MGU-701 MGU-702 (CSI® Model)	"Gas Unit Failure 1" *
	"Gas Unit Failure 3" *
	"Cal. Error" *
	"O <sub>2</sub> Sensor Failure" *
	"O <sub>2</sub> Module Failure" *
	"Exhaust Blocked" *
	"Insert Water Trap" *
	"Occlusion" *
	"Identification Error" *
Multigas Unit MGU-801P MGU-802 MGU-803 (ARTEMA® Model)	"Insert Water Trap" *
	"Pump Off" *
	"Flow Rate Error" *
	"Occlusion" *
	"Replace Water Trap" *
	"Zeroing Failure" *
	"Gas Unit Failure (E00)" *
	"Gas Unit Failure (E01)" *
	"Gas Unit Failure (E02)" *
	"Gas Unit Failure (E03)" *
	"Gas Unit Failure (E04)" *
	"Gas Unit Failure (E05)" *
	"Gas Unit Failure (E06)" *
	"Gas Unit Failure (E07)" *

	“Gas Unit Failure (E08)”	*
	“Gas Unit Failure (E09)”	*
	“Gas Unit Failure (E10)”	*
	“Gas Unit Failure (E11)”	*
	“Gas Unit Failure (E12)”	*
	“Gas Unit Failure (E13)”	*
	“Gas Unit Failure (E14)”	*
	“Gas Unit Failure (E15)”	*
	“Gas Unit Failure (E16)”	*
	“Gas Unit Failure (E17)”	*
	“Gas Unit Failure (E18)”	*
	“Gas Unit Failure (E19)”	*
	“Gas Unit Failure (E20)”	*
	“Gas Unit Failure (E21)”	*
	“Gas Unit Failure (E22)”	*
	“Gas Unit Failure (E23)”	*
	“Gas Unit Failure (E24)”	*
	“Gas Unit Failure (E25)”	*
	“Gas Unit Failure (E26)”	*
	“Gas Unit Failure (E27)”	*
	“Gas Unit Failure (E28)”	*
	“Gas Unit Failure (E29)”	*
	“Gas Unit Failure (E30)”	*
	“Gas Unit Failure (E31)”	*
	“Gas Unit Failure (E32)”	*
	“Gas Unit Failure (E33)”	*
	“Gas Unit Failure (E34)”	*
	“Gas Unit Failure (E35)”	*
	“Gas Unit Failure (E36)”	*
	“Gas Unit Failure (E37)”	*
	“Gas Unit Failure (E38)”	*
	“Gas Unit Failure (E39)”	*
	“Gas Unit Failure (E40)”	*
	“Gas Unit Failure (E41)”	*
	“Gas Unit Failure (E42)”	*
	“Gas Unit Failure (E43)”	*
	“Gas Unit Failure (E44)”	*
	“Gas Unit Failure (E45)”	*
	“Gas Unit Failure (E46)”	*
	“Gas Unit Failure (E47)”	*
	“O <sub>2</sub> Sensor Failure (E01)”	*
	“O <sub>2</sub> Sensor Failure (E02)”	*
	“O <sub>2</sub> Sensor Failure (E03)”	*
	“O <sub>2</sub> Sensor Failure (E04)”	*
	“O <sub>2</sub> Sensor Failure (E05)”	*

### Treatment Needed Alarm (Alarm Level 3)

<b>Equipment</b>	<b>Message</b>
Multigas Unit MGU-701 MGU-702 (CSI® Model)	“Disconnected” *
	“Gas Unit Failure 4”
	“Mixed Agents”
	“Replace Water Trap” *
	“Auto Cal in Progress”
	“Warming Up”
Multigas Unit MGU-801P MGU-802 MGU-803 (ARTEMA® Model)	“Disconnected” *
	“Purging” *
	“Mixed Agents”
Gas Unit Capnostat 5	“Disconnected” *

### Notification Alarm (Alarm Level 4)

<b>Equipment</b>	<b>Message</b>
Multigas Unit MGU-801P MGU-802 MGU-803 (ARTEMA® Model)	“Warming Up”
	“Regulating Pump Flow”
	“Zeroing in Progress”
	“Zeroing Required”
	“Uncalibrated”
	“Communication Error”
	“Out of Range (CO <sub>2</sub> )”
	“Out of Range (N <sub>2</sub> O)”
	“Out of Range (O <sub>2</sub> )”
	“Out of Range (HAL)”
	“Out of Range (ISO)”
	“Out of Range (ENF)”
	“Out of Range (SEV)”
	“Out of Range (DES)”
	“Out of Range (RR)”
Gas Unit Capnostat 5	“CO <sub>2</sub> Unit Error” *
	“CO <sub>2</sub> Sensor Failure” *
	“CO <sub>2</sub> Warm Up” *
	“CO <sub>2</sub> Cal. Required”
	“CO <sub>2</sub> Zeroing ” *
	“Check CO <sub>2</sub> Adapter” *
	“Unknown CO <sub>2</sub> Sensor” *
	“Out of range”

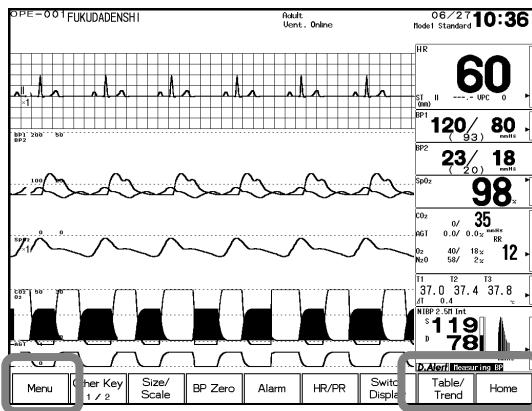
The \*mark indicates the message which will be displayed inside the numeric data box.

## Key Setup

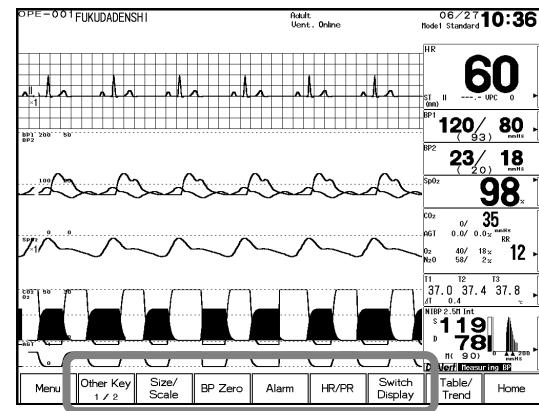
## For Easier Use

Other than the fixed keys located at the right side of the display unit, the DS-7000 is provided with touch keys at the lower part of the display.

There are 3 fixed touch keys (**Menu**, **Table/Trend**, **Home**) and 6 user programmable touch keys which users can assign frequently used functions. (2pages can be set, so in total 12 user keys can be programmed.)



<Fixed Touch Keys>



<User Touch Keys>

In addition to the user keys, the menu key layout can be changed (Menu Key Setup) or unnecessary keys on the function menu or settings menu can be erased (Key Mask Setup) for easier use.



- “9. Initial Settings –User Keys–“
- “9. Initial Settings –Menu Key Layout–“
- “9. Initial Settings –Key Mask Setup–“

## ●User Key Function

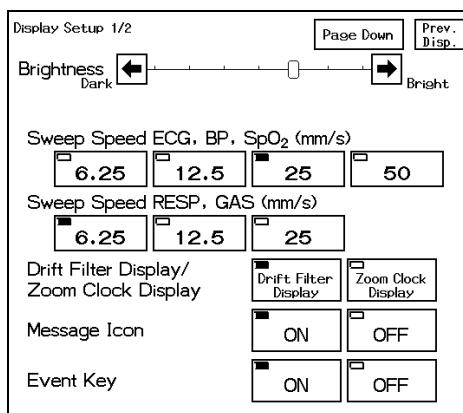
User Key	Function
Admit / Discharge	Displays admit/discharge menu.
Monitor Suspend	Displays the confirmation display whether to suspend monitoring or not.
Freeze	Temporarily stops the waveform trace. By pressing the (Record START/STOP) key during freeze mode, the waveform in freeze mode can be recorded.
Key Lock	Turns ON/OFF the touch key operation. This function can be used when cleaning the touch screen.
Size/Scale	Displays the keys to adjust the size, scale, and the baseline position of the displayed waveform.
BP Zero	Performs zero balance of BP1 to BP6.
HR/PR	Switches display between HR and PR. For PR display, "PR-IBP" or "PR-SpO <sub>2</sub> " will be displayed depending on the "PR Source" setting in the BP setup menu or SpO <sub>2</sub> setup menu.
Switch Display	Switches the display mode of the home display. (Auto→Standard→Zoom→Extended→Auto)
Display Config.	Displays the display configuration menu.
OCRG	Displays OCRG.
Mode Select	Displays the mode selection menu.
Parameter	Displays the parameter setup menu.
Alarm	Displays the alarm setup menu.
Alarm Auto	Automatically determines the alarm range from the current measurement value.
Record	Displays the recording setup menu.
Tone/Volume	Displays the tone/volume setup menu.
Time/Date	Displays the time/date setup menu which allows to adjust the date and time.
Stopwatch	Displays the stopwatch which allows to perform stopwatch measurement.
Night Mode	Turns ON / OFF the night mode.
Other Monitor	Displays the other monitor display menu.
Recall	Displays recall event.
ST	Displays the ST measurement menu.
ST Table	Displays the ST value in tabular format.
ST Trend	Displays the ST graphic trend.
Cardiac Output	Displays the CO measurement menu.
Hemodynamics	Displays the Hemodynamics calculation menu.
PCWP	Displays the PCWP measurement menu.
Resp. Table	Displays the respiration measurement value in tabular format.
Vigilance Table	Displays the Vigilance data table when the Vigilance (or Vigilance CEDV/VigilanceII/Vigileo) oximeter is used.
NICO Table	Displays the NICO data table when the NICO Monitor is used.
BIS Table	Displays the BIS data table when the BIS Monitor is used.
Ventilator	Displays the P-V, F-V menu.
Alarm Silence	Silences the alarm.
NIBP START/STOP	Starts/stops the NIBP measurement.
NIBP Auto Mode	Displays the NIBP measurement interval selection.
Record START/STOP	Starts/stops the recording.
Full Disclosure Waveform Rec.	When the CF card for full disclosure waveform recording is inserted, full disclosure waveform will be displayed.
Calculator	Calculator screen will be displayed.
Disp mode 1	Switches display mode.
Disp mode 2	
Disp mode 3	
Disp mode 4	
Disp mode 5	
RR Alarm Suspend	Suspends RR/APNEA alarm.
Other Key	Switches the first page and second page of the user key.
OFF	User key will not be displayed.

## Display Setup

## Brightness/Sweep Speed

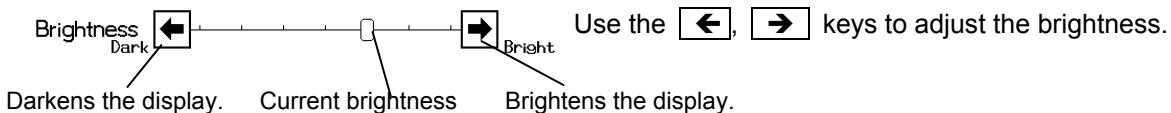
On the display setup menu, display brightness, waveform sweep speed, etc. can be set.

- 1 Press the **Menu** → **Settings** → **Display Setup** keys.



The display setup menu will be displayed.

- 2 Adjust the brightness of the display.

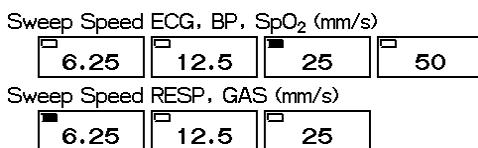


Use the **←**, **→** keys to adjust the brightness.

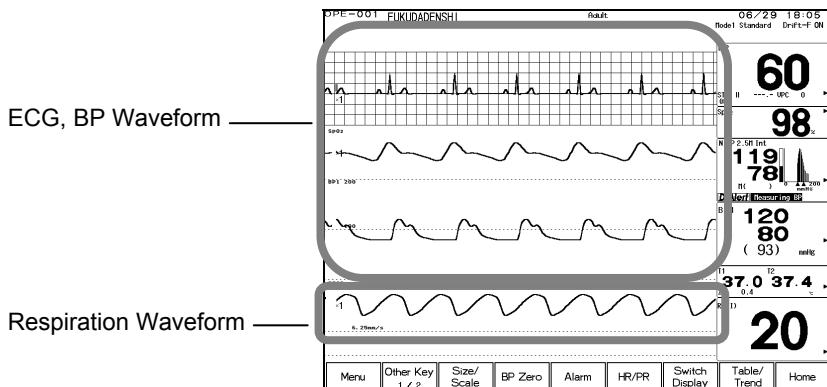


The display panel utilizes exclusive fluorescent light for the backlight. Since this fluorescent light deteriorates with its life cycle, the display may become dark, scintillate, or may not light in long term use. In such case, contact your nearest service representative.

- 3 Select the sweep speed for the displayed waveforms.



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



Display Mode Selection	Display Duration		
	For 1 Numeric Data Box Display	For 2 Numeric Data Boxes Display	For Zoom Display
50mm/s	3.95 sec.	2.78 sec.	5.12 sec.
25mm/s	7.9 sec.	5.56 sec.	10.24 sec.
12.5mm/s	15.8 sec.	11.12 sec.	20.48 sec.
6.25mm/s	31.6 sec.	22.24 sec.	40.96 sec.

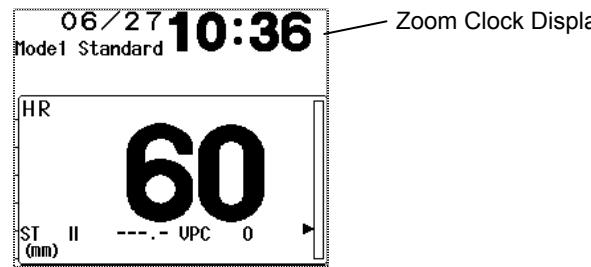
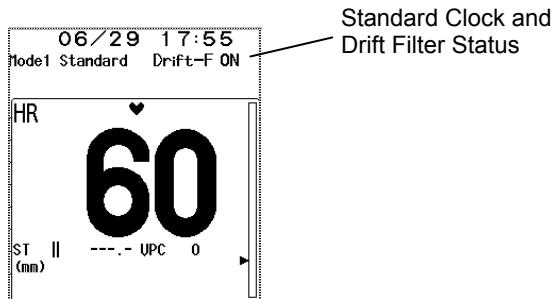
#### 4 Select whether to display the drift filter status or not.

Drift Filter Display/  
Zoom Clock Display



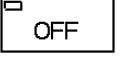
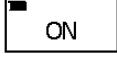
**Drift Filter Display** will display the drift filter status along with the standard size time display.

**Zoom Clock Display** will not display the drift filter status and displays the enlarged time instead.



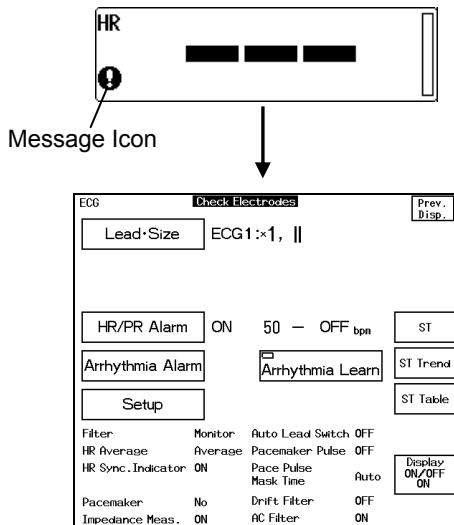
#### 5 Select ON/OFF of message icon display.

Message Icon



**ON** will display the message icon.

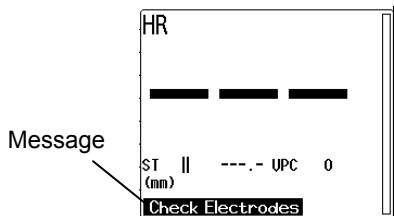
**OFF** will not display the message icon.



When there are many numeric data display, the numeric data box size will be reduced and may disable the message to be displayed inside it.

In such case, an icon will be displayed inside the numeric data box to indicate that there is a message.

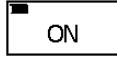
The message can be checked by pressing the numeric data box with the icon. It will be displayed in the parameter setup menu.



If the numeric data box size is large enough, the message will be displayed inside it.

#### 6 Select ON/OFF of event key display.

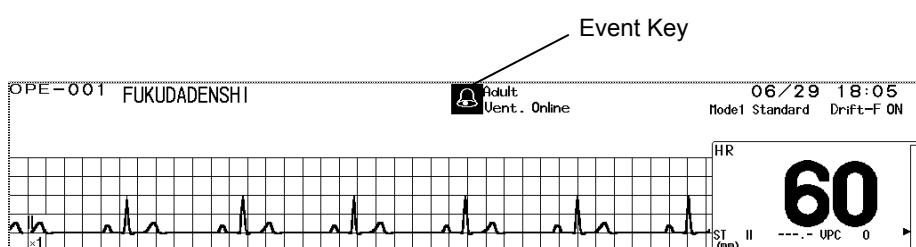
Event Key



**ON** will display the event key on the home display at alarm occurrence.

**OFF** will not display the event key on the home display.

Pressing the event key will silence the alarm and display the recall menu.



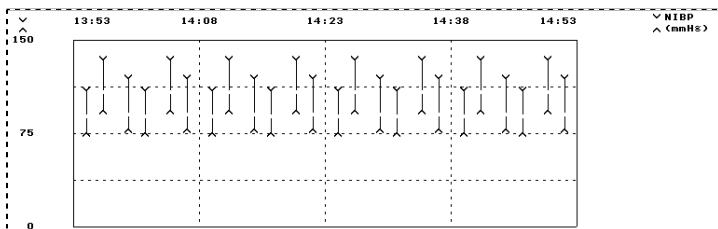
- 7** On the second page of the display setup menu, select whether to draw a line between systolic and diastolic value on the trend display.

Draw Line  
Between SYS/DIA

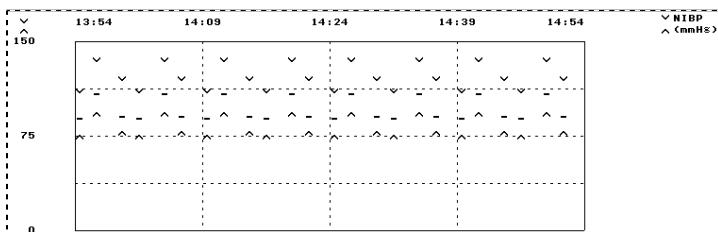
<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
--	------------------------------

**ON** will draw a line between systolic and diastolic value on the trend display.

**OFF** will not draw a line.



<When ON is selected>



<When OFF is selected>

- 8** On the second page of the display setup menu, select whether to display the table in descending order or ascending order.

Table Order

<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF
-----------------------------	---

**Descend** will display the latest data at the top.

**Ascend** will display the latest data at the bottom.

		Print.	Print All	Setup	Interval	1M	<input checked="" type="checkbox"/>	→	Prev. Disp.
Time	HR/PR bpm	NIBP mmHg	SpO <sub>2</sub> %	T1 °C	BP1 mmHg	BP2 mmHg	RR-CO <sub>2</sub> Bpm	CO <sub>2</sub> mmHg	O <sub>2</sub> %
04/18 14:52	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
14:51	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
14:50	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
14:49	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
14:48	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
14:47	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
14:46	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
14:45	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
14:44	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
14:43	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18

<When Descend is selected>

		Print.	Print All	Setup	Interval	1M	<input checked="" type="checkbox"/>	→	Prev. Disp.
時刻	HR/PR bpm	NIBP mmHg	SpO <sub>2</sub> %	T1 °C	BP1 mmHg	BP2 mmHg	RR-CO <sub>2</sub> Bpm	CO <sub>2</sub> mmHg	O <sub>2</sub> %
04/18 14:55	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
14:56	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
14:57	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
14:58	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
14:59	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
15:00	60 61	134/ 93 (106)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)		12	0/ 35	41/ 18
15:01	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
15:02	60 61	---/---	(--)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)	12	0/ 35	41/ 18
15:03	60 61	119/ 78 ( 90)	98	37.0 120/ 80 ( 93)	23/ 18 ( 27)		12	0/ 35	41/ 18

<When Ascend is selected>

<b>NOTE</b>	The “Table Order” setting will be also applied to ST Table, Resp. Table, BIS Table, NIBP Table, Alarm Table, and Recall Table.
-------------	--

## Alarm Setup

## To Set the Alarm Condition

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.

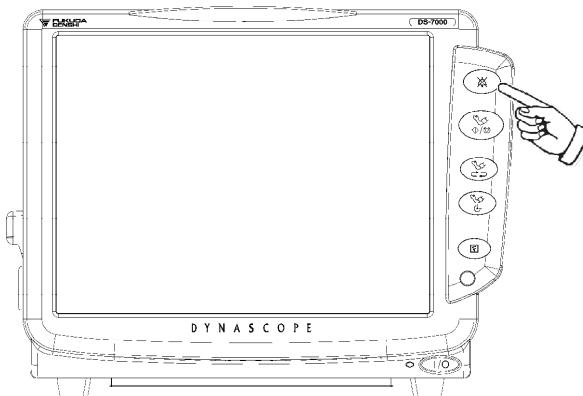


For alarm mode setup procedure, refer to "9. Initial Settings –Alarm Mode Setup–"

## To Silence the Alarm

By pressing the  (Alarm Silence) key at alarm generation, the alarm 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 preprogrammed alarm silence duration, the alarm sound will generate again. If another alarm generates during the alarm silence duration, alarm sound will generate regardless of the alarm level.



### ●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 duration, the alarm will remain silenced. The recall and alarm recording will not function during this duration.
- If another alarm generates during the alarm silence duration, alarm sound will generate regardless of the alarm level. Alarm sound will generate even for the low priority alarm.
- If the  (Alarm Silence) key is pressed for the alarm of another parameter which occurred during the alarm silence duration, the alarm silence duration 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 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.
  - When automatic alarm is set.
- 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 set 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 duration unless a new status alarm generates.

### ●To Preprogram the Alarm Silence State

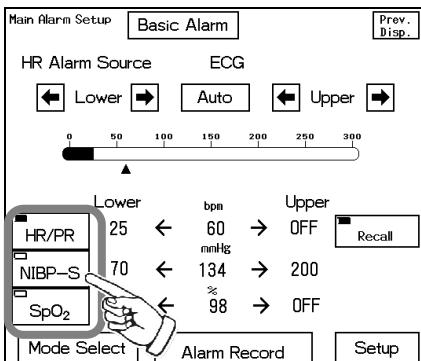
Pressing the  (Alarm Silence) key for more than 3 seconds will silence the alarm for a preprogrammed duration (10min / 30min / 60min / 90min / 120min). Alarm monitoring (alarm message, alarm indicator) will continue even when the monitor is in the alarm silence state.

The alarm silence state can be cancelled by pressing the  (Alarm Silence) key during the alarm silence state.

## 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.

- 1 Press the **Menu** → **Settings** → **Alarm** keys.

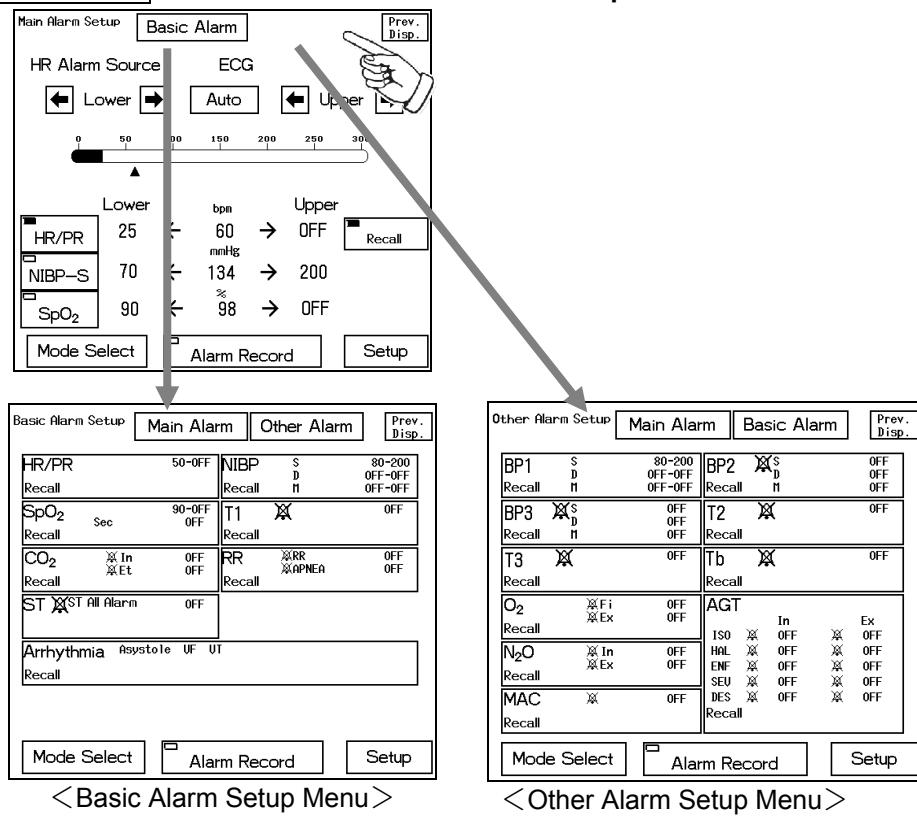


On the first page, main alarm setup menu will be displayed.  
On this menu, the alarm range for the following parameters can be set.

- HR/PR
- NIBP-S
- SpO<sub>2</sub>

Key	Item	Description
		Select the parameter to perform the alarm setup.
		Displays the upper and lower alarm limit and the current value (▲). The limits can be adjusted by directly pressing the bar display or using the arrow keys.
	Lower      bpm      Upper 25    ←    60    →    OFF	Displays lower limit←current value→upper limit.
	Lower Limit	Sets the lower alarm limit. It will be turned OFF when a value below the range is selected.
	Upper Limit	Sets the upper alarm limit. It will be turned OFF when a value above the range is selected.
	Automatic Setup	Automatically sets the limits corresponding to the current value. The alarm will be automatically set even if the lower limit or upper limit is set to OFF.

- 2** **Basic Alarm** will allow to set the alarm for basic parameters.  
**Other Alarm** will allow to set the alarm for other parameters.



- 3** Select ON/OFF and set upper and lower alarm limit for the parameter alarm.

#### 【Basic Alarm Setup】

Numeric Data Key	Item	Description				
HR/PR 25-0FF Recall	HR/PR/BPR	ON, OFF	20 to 300bpm			
NIBP S 80-200 D OFF-OFF Recall M OFF-OFF	NIBP	S	ON, OFF	60 to 250mmHg (Adult)		
		M	ON, OFF	40 to 180mmHg (Child)		
		D	ON, OFF	30 to 120mmHg (Neonate)		
			ON, OFF	45 to 235mmHg (Adult)		
			ON, OFF	30 to 160mmHg (Child)		
			ON, OFF	15 to 100mmHg (Neonate)		
			ON, OFF	40 to 200mmHg (Adult)		
			ON, OFF	20 to 150mmHg (Child)		
			ON, OFF	10 to 90mmHg (Neonate)		
SpO <sub>2</sub> Sec 90-0FF OFF Recall	SpO <sub>2</sub>	ON, OFF	70 to 100%			
T1 X OFF Recall	TEMP1	ON, OFF	30 to 50°C			
CO <sub>2</sub> X In OFF X Et OFF Recall	EtCO <sub>2</sub>	ON, OFF	1 to 115mmHg 0.1 to 15.0kPa 0.1 to 15.0%			
	InspCO <sub>2</sub> (Upper Limit)	ON, OFF	1 to 24mmHg 0.1 to 3.0kPa 0.1 to 3.0%			
RR RR 5- 30 APNEA 60 Recall	RR	ON, OFF	5 to 150Bpm (Adult) 2 to 150Bpm (Child, Neonate)			
	APNEA (Upper Limit)	ON, OFF	10 to 60sec.			

ST <input checked="" type="checkbox"/> ST All Alarm <input type="checkbox"/> OFF	ST	ST All Alarm ON, OFF Individual Alarm ON, OFF -2.0 to 2.0mV -20.0 to 20.0mm
Arrhythmia Asystole VF VT Recall <input type="checkbox"/> Frequent		ASYSTOLE, VF, VT, SLOW VT, RUN, COUPLET, PAUSE, BIGEMINY, TRIGEMINY, FREQUENT, TACHY, BRADY

**[Other Alarm Setup]**

<i>Numeric Data Key</i>	<i>Item</i>	<i>Description</i>
BP1 <input type="checkbox"/> S 80-200 <input type="checkbox"/> D OFF-OFF Recall <input type="checkbox"/> M OFF-OFF	BP1 (BP2 to BP6)	ON, OFF 0 to 300mmHg
T2 <input checked="" type="checkbox"/> OFF Recall <input type="checkbox"/>	TEMP2 (TEMP3)	ON, OFF 30 to 50°C
Tb <input checked="" type="checkbox"/> OFF Recall <input type="checkbox"/>	Tb	ON, OFF 30 to 45°C
O <sub>2</sub> <input checked="" type="checkbox"/> Fi OFF <input checked="" type="checkbox"/> Ex OFF Recall <input type="checkbox"/>	O <sub>2</sub> -E (%) O <sub>2</sub> -I (%)	ON, OFF 10 to 100% ON, OFF 18 to 100%
N <sub>2</sub> O <input checked="" type="checkbox"/> In OFF <input checked="" type="checkbox"/> Ex OFF Recall <input type="checkbox"/>	N <sub>2</sub> O-I (%) N <sub>2</sub> O-E (%)	ON, OFF 0 to 100%
AGT <input type="checkbox"/> In Ex ISO <input checked="" type="checkbox"/> OFF <input checked="" type="checkbox"/> OFF HAL <input checked="" type="checkbox"/> OFF <input checked="" type="checkbox"/> OFF ENF <input checked="" type="checkbox"/> OFF <input checked="" type="checkbox"/> OFF SEV <input checked="" type="checkbox"/> OFF <input checked="" type="checkbox"/> OFF DES <input checked="" type="checkbox"/> OFF <input checked="" type="checkbox"/> OFF Recall <input type="checkbox"/>	ISO-E (%) HAL-E (%) ENF-E (%) ISO-I (%) HAL-I (%) ENF-I (%) DES-E (%) DES-E (%) SEV-E (%) SEV-I (%)	ON, OFF 0.5 to 6.0% ON, OFF 0.5 to 6.0% ON, OFF 0.5 to 6.0% ON, OFF 0.5 to 6.0% ON, OFF 0.5 to 20.0% ON, OFF 0.5 to 20.0% ON, OFF 0.5 to 8.0% ON, OFF 0.5 to 8.0%
MAC <input checked="" type="checkbox"/> OFF Recall <input type="checkbox"/>	MAC (Upper Limit)	ON, OFF 0.1 to 9.9

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  ON for "Discharge Mode" of Initial Settings.

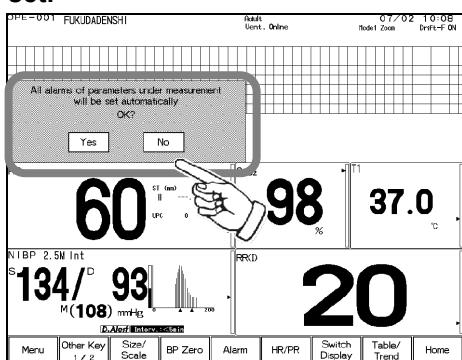
<b>⚠ CAUTION</b>	For the following case, O <sub>2</sub> , N <sub>2</sub> O, AGT, MAC alarm will not generate on the central monitor. <ul style="list-style-type: none"> <li>When wired system (DS-LAN II) is constructed, and the DS-7600 system is used for the central monitor.</li> <li>When wireless system is constructed.</li> </ul>
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## Automatic Alarm Setup

The alarm limits for all measured parameters can be set all at once automatically.

- 1 Press the **Menu** → **Settings** → **Alarm Auto** keys.

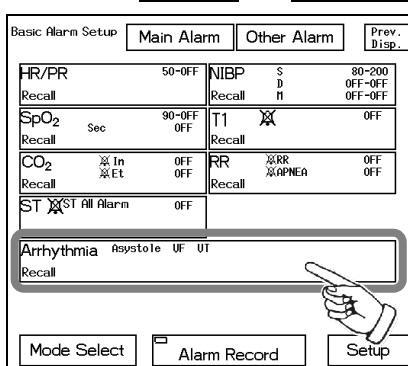
On the displayed confirmation display, press the **Yes** key. The alarm will be automatically set.



## Arrhythmia Alarm Setup

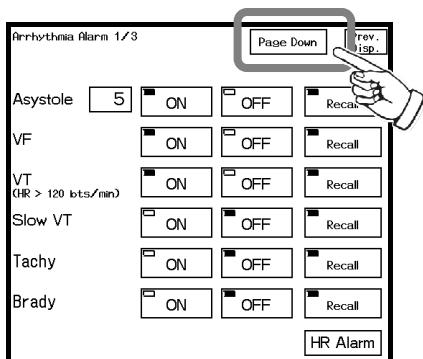
The arrhythmia alarm can be turned ON or OFF, and arrhythmia detection level can be set.

- 1 Press the **Menu** → **Settings** → **Alarm** → **Basic Alarm** keys.

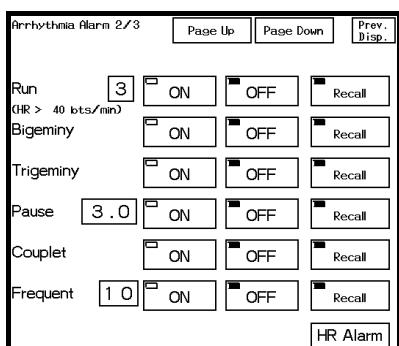


The basic alarm setup menu will be displayed.

- 2 Press the **Arrhythmia** key to display the arrhythmia alarm setup menu.



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



The alarm setup menu for Run, Couplet, Bigeminy, Trigeminy, Pause, Frequent will be displayed.

## ●To Set ON/OFF of Arrhythmia Alarm

**ON**     **OFF**

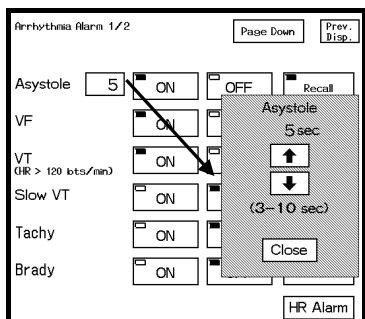
Selecting **ON** will generate the arrhythmia alarm.  
Selecting **OFF** will not generate the arrhythmia alarm.

<b>Page</b>	<b>Item</b>	<b>Selection</b>
Page 1/2	Asystole	ON (ON)
	VF	ON (ON, OFF)
	VT	ON (ON, OFF)
	Slow VT	ON (ON, OFF)
	Tachy	ON, OFF
	Brady	ON, OFF
Page 2/2	Run	ON, OFF
	Couplet	ON, OFF
	Bigeminy	ON, OFF
	Trigeminy	ON, OFF
	Pause	ON, OFF
	Frequent	ON, OFF

## ●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.



- 2 Set the detection level.

<b>Item</b>	<b>Range</b>
Asystole	3 to 10 sec.
Run	2 to 8 beats
Pause	1.5 to 5 sec.
Frequent	1 to 50 beats/min.

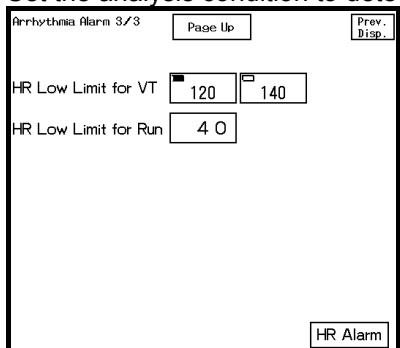
- 3 Close the window to set the detection level.

**Close**

Press the **Close** key.

## ● To Set the HR Low Limit for VT

Set the analysis condition to detect VT.

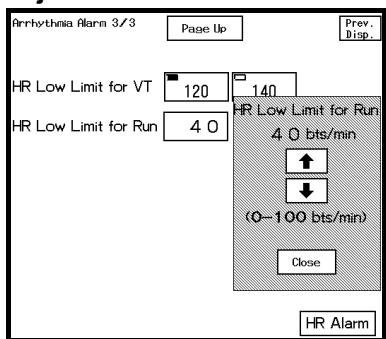


Select the HR low limit to detect VT from 120 or 140bpm.  
If HR is below the set value, it will be detected as Slow\_VT.

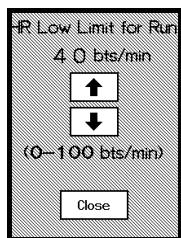
## ● To Set the HR Low Limit for RUN

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.



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.



Press the [Close] key.



- 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.
- When a wired network (DS-LANII/DS-LANIII) is constructed, the setups for "HR Low Limit for VT" and "HR Low Limit for Run" cannot be performed on some central monitors depending on the model type or software version.

## ●Alarm Limit for TACHY, BRADY

The arrhythmia detection level for tachycardia (Tachy) and bradycardia (Brady) alarm is linked 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.

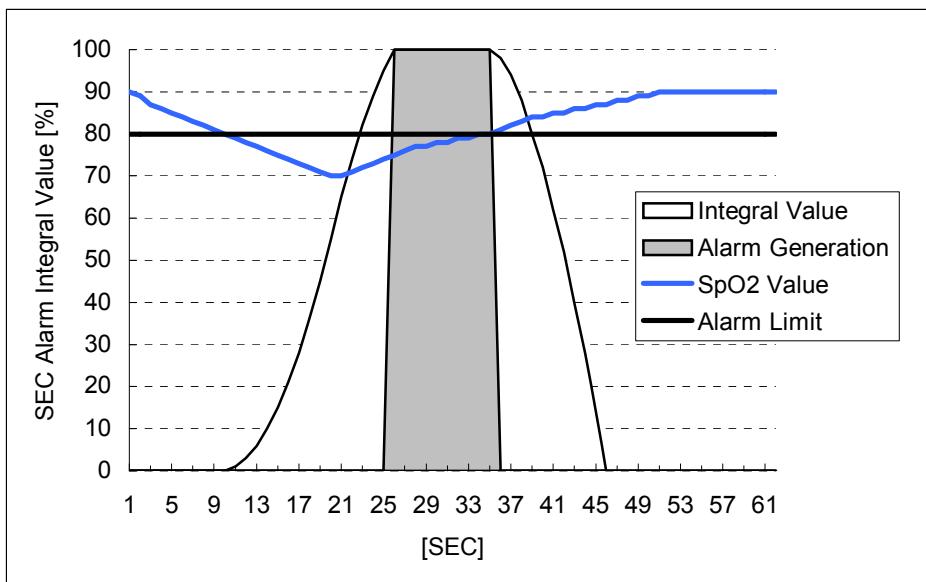
The bradycardia (Brady) alarm generates when the measurement is below the HR / PR lower alarm limit. When the lower alarm limit is OFF, alarm will not generate.

## SpO<sub>2</sub> SEC Alarm Setup (For Nellcor Model: DS-7000)

When the SpO<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> value returns to the level within the alarm limit, and at the same time, the integral value begins to decrease.  $\{( \text{Alarm limit} ) - ( \text{SpO}_2 \text{ value} )\} \times 2$  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<sub>2</sub> value frequently falls below the alarm limit but does not last long enough to reach the SEC alarm threshold.

If the SpO<sub>2</sub> 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.

### ⚠ CAUTION

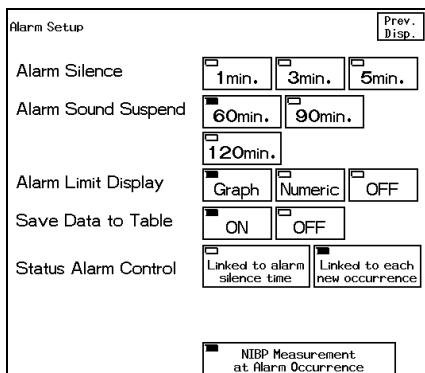
- Whether to use the SEC alarm function and its threshold selection should be based on the patient's clinical indication portent and medical evaluation.
- If the SpO<sub>2</sub> alarm and SEC alarm setup is set to OFF, the SEC alarm integral value will be set to 0.

## Alarm Setup

On the “Alarm Setup” menu, the following items can be set.

- Alarm Silence Duration
- Alarm Sound Suspend (ON/OFF)
- Alarm Sound Suspend Duration
- Alarm Limit Display
- Save Data to Table
- Status Alarm Control
- NIBP Measurement at Alarm Occurrence

**1 Press the [Menu] → [Settings] → [Alarm] → [Setup] keys.**



The alarm setup menu will be displayed.

**2 Select the duration for “Alarm Silence”.**

The duration to silence the currently generating alarm when the (Alarm Silence) key is pressed can be selected.

Alarm Silence

1min.  3min.  5min.

Select the appropriate duration to silence the generating alarm.

**3 Select ON/OFF for “Alarm Sound Suspend”.**

Whether or not to use the alarm sound suspend function can be selected.

ON will suspend the alarm sound in advance by pressing the (Alarm Silence) key for more than 3 seconds.

Alarm Sound Suspend

ON  OFF

OFF will not suspend the alarm sound even if the (Alarm Silence) key is pressed for more than 3 seconds.

**4 Select the duration for “Alarm Sound Suspend”.**

The duration to silence future generating alarms when the (Alarm Silence) key is pressed for more than 3 seconds can be selected from 3min, 10min, 30min, 60min, 90min, or 120min. During this duration, only the alarm sound will be silenced and alarm monitoring will continue.

Alarm Sound Suspend Time

3min.  10min.  30min.  
 60min.  90min.  120min.

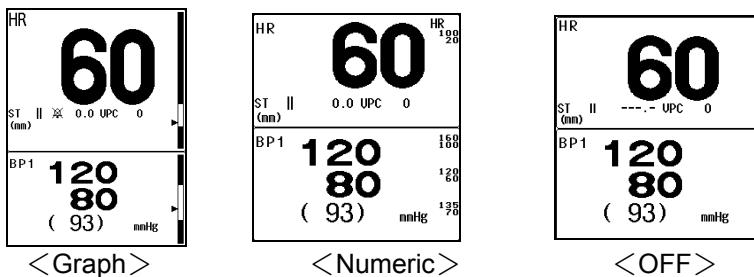
Select the appropriate duration to suspend the alarm sound.

**5 Select the display format for alarm limit.**

Alarm Limit Display

Graph  Numeric  OFF

Graph will display the alarm limit in bar graph.  
 Numeric will display the alarm limit in numeric form.



NOTE	<ul style="list-style-type: none"> <li>● The alarm limit cannot be displayed inside the numeric data box for the following parameter.           <ul style="list-style-type: none"> <li>• GAS (CO<sub>2</sub>+AGT+O<sub>2</sub>+N<sub>2</sub>O)</li> <li>• GAS (AGT+O<sub>2</sub>+N<sub>2</sub>O)</li> <li>• GAS (N<sub>2</sub>O+AGT)</li> </ul> </li> <li>● The alarm limit bar graph can be displayed for HR/PR, BP1 or ART, NIBP, SpO<sub>2</sub>, T1, RR, and CO<sub>2</sub>. It cannot be displayed for other parameters.</li> </ul>
------	--

## 6 Select ON/OFF for “Save Data to Table”.

By selecting ON for “Save Data to Table”, the measurements at alarm occurrence can be saved in tabular format.

Save Data to Table



## 7 Select the alarm silence duration for the equipment status alarm.

Status Alarm Control



Sets the alarm silence duration for the equipment status alarm.



For types of equipment status alarm, refer to "Description of Alarm Message and Alarm Sound ● Equipment Status Alarm Message" in this chapter.

**Linked to alarm silence time** will silence the alarm when the (Alarm Silence) key is pressed for fixed amount of duration for "Alarm Silence".

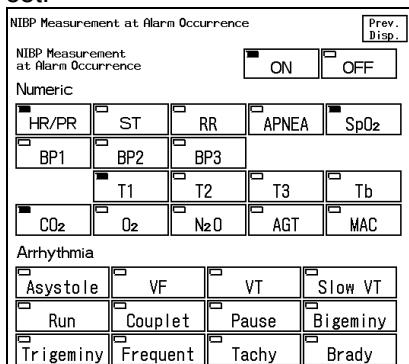
- If the alarm cause still remains at completion of silence duration, the alarm sound will generate again.
- If the same alarm occurs during the alarm silence duration, the alarm sound will not generate.
- If the new alarm occurs during the alarm silence duration, the alarm sound for the new alarm will 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 duration, the alarm silence state will be cancelled.
- If the same alarm generates again during the alarm silence duration, the alarm sound will generate.

**8 Pressing the [NIBP Measurement at Alarm Occurrence] key will display the following menu.**

Whether or not to perform NIBP measurement at alarm occurrence of the selected parameter can be set.



[ON] will start the NIBP measurement at alarm occurrence.  
[OFF] will not start the NIBP measurement.

If [ON] is selected, select the parameters. More than one parameter can be selected.



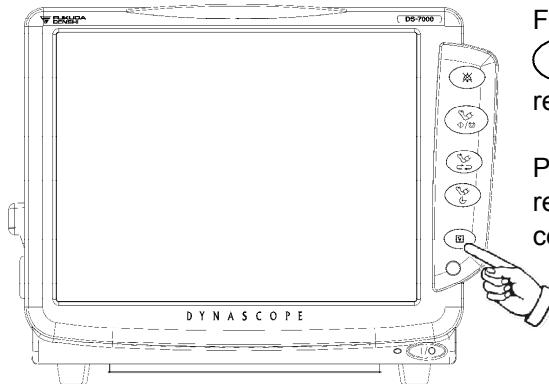
- If the NIBP measurement has not been performed since the power was turned ON, the “NIBP measurement at alarm occurrence” function will not be effective.
- Depending on the combination of the used option unit, [NIBP measurement at Alarm Occurrence] key may not be displayed.

On the DS-7000, the waveform can be recorded using manual recording, periodic recording, alarm recording, and freeze recording. Graphic recording of trend and table is also possible. This section describes the procedure for the following recording.

- Manual Recording
- Periodic Recording
- Alarm Recording
- Freeze Recording
- Graphic Recording (Trend, Table, Recall, 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.

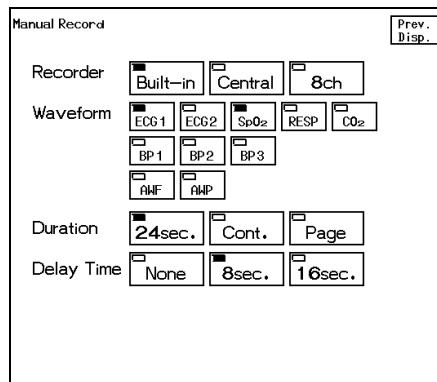
The LED located next to the  (Record Start/Stop) key will light in green during recording. It will light in orange when the paper cassette is empty or open.

### ● 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** → **Settings** → **Record** → **Manual Record** keys.



The manual recording setup menu will be displayed.

## 2 Select the output recorder.

Recorder



**Built-in** will record on the DS-7000 built-in recorder.

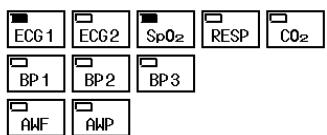
**Central** will record on the 3ch recorder connected to the central monitor.

**8ch** will record on the 8ch recorder connected to the wired network.

The central monitor recorder will be the one with the smallest central ID. 8ch recorder selection can be performed on the recorder setup menu.

## 3 Select the waveform for recording.

Waveform



Up to 3 waveforms can be selected. If the output recorder is 8ch recorder, up to 8 waveforms can be selected.

The waveform position will be automatically adjusted when recording.

## 4 Select the duration for recording.

Duration



Select the duration from **24sec.** or **Cont.**.

**24sec.** will automatically stop the recording after 24 seconds.

If 8ch recorder is selected as output recorder, **Page** can be selected. Page recording prints out one page.

## 5 Select the delay time for recording.

Delay Time



**None** will start the recording from the time the (Record Start/Stop) key is pressed.

**8sec.**, **16sec.** will start the recording 8 sec. / 16 sec. prior to the time the key is pressed.

### NOTE

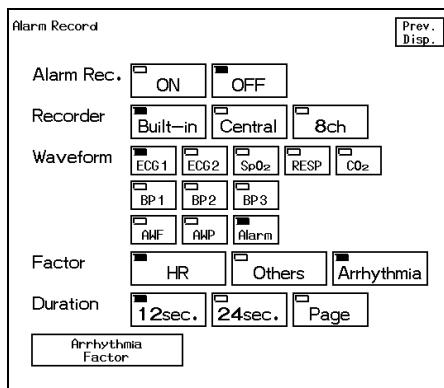
If **None** is selected for the manual recording delay time, QRS classification will not be printed. To record the QRS classification, select **8sec.** or **16sec.** for the delay time.

## Alarm Recording

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

NOTE	<ul style="list-style-type: none"> <li>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.</li> <li>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 newest generated alarm recording data. The stored data will be erased when recorded.</li> <li>Priority of alarm recording factor ; ASYSTOLE &gt; VF &gt; VT &gt; SLOW VT &gt; TACHY &gt; BRADY &gt; RUN &gt; HR( HR / PR-SpO<sub>2</sub> / PR-IBP ) &gt; APNEA &gt; BP1(or ART) &gt; SpO<sub>2</sub> &gt; NIBP &gt; RR(RR-IMP / RR-GAS / RR-VENT) &gt; GAS(EtCO<sub>2</sub> / In-CO<sub>2</sub> / Ex-AGT / In-AGT / Ex-O<sub>2</sub> / FiO<sub>2</sub> / Ex-N<sub>2</sub>O / In-N<sub>2</sub>O) &gt; PAUSE &gt; COUPLET &gt; BIGEMINY &gt; TRIGEMINY &gt; FREQUENT &gt; BP2 &gt; BP3 &gt; BP4 &gt; BP5 &gt; BP6 &gt; ST &gt; TEMP &gt; Tb &gt; MAC</li> <li>If recording on the central monitor recorder or AU-5500N 8ch recorder, alarm recording and recall recording cannot be performed for the following alarm factor; TACHY, BRADY, SLOW VT, COUPLET, PAUSE, TRIGEMINY.</li> </ul>
------	---

### 1 Press the **Menu** → **Settings** → **Record** → **Alarm Record** keys.



The alarm recording setup menu will be displayed.

### 2 Select the output recorder

Recorder       Built-in     Central     8ch

Built-in will record on the DS-7000 built-in recorder.

Central will record on the 3ch recorder connected to the central monitor.

8ch will record on the 8ch recorder connected to the wired network.

The central monitor recorder of the smallest ID will be used. 8ch recorder selection can be performed on the recorder setup menu.

### 3 Select the waveform for recording.

Waveform       ECG1     ECG2     SpO<sub>2</sub>     RESP     CO<sub>2</sub>  
 BP1     BP2     BP3  
 AWF     AWP     Alarm

Up to 3 waveforms can be selected. If the output recorder is 8ch recorder, up to 8 waveforms can be selected.

The waveform position will be automatically adjusted when recording.

Alarm will record the waveform which generated the alarm.

#### 4 Select the recording factor.

Factor  HR  Others  Arrhythmia

Select the recording factor for alarm recording.

HR will start the alarm recording when a HR or PR alarm is generated.

Others will start the alarm recording when a numeric alarm other than HR and PR alarm is generated.

Arrhythmia will start the alarm recording when an arrhythmia alarm is generated.

#### 5 Select the recording duration.

Duration  12sec.  24sec.  Page

Select the recording duration from  12sec.,  24sec..

The recording will automatically stop after the selected time.  
If 8ch recorder is selected as the output recorder,  Page can be selected.

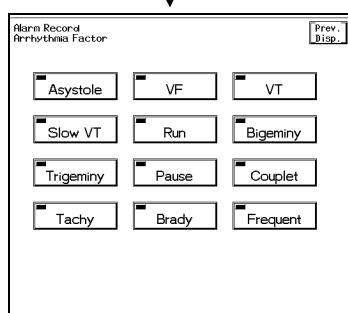
NOTE	The delay time differs depending on the recording duration.																										
	<table border="1"><thead><tr><th rowspan="2">Recording Duration</th><th colspan="3">Delay Time</th><th rowspan="2">Neonate</th></tr><tr><th>Adult</th><th>Child</th><th>Numeric Alarm</th></tr></thead><tbody><tr><td>12 sec.</td><td>12 sec.</td><td>12 sec.</td><td>8 sec.</td><td>12 sec.</td></tr><tr><td colspan="5">8 sec. for multigas unit alarm</td></tr><tr><td>24 sec.</td><td>16 sec.</td><td>16 sec.</td><td>16 sec.</td><td>16 sec.</td></tr></tbody></table>					Recording Duration	Delay Time			Neonate	Adult	Child	Numeric Alarm	12 sec.	12 sec.	12 sec.	8 sec.	12 sec.	8 sec. for multigas unit alarm					24 sec.	16 sec.	16 sec.	16 sec.
Recording Duration	Delay Time			Neonate																							
	Adult	Child	Numeric Alarm																								
12 sec.	12 sec.	12 sec.	8 sec.	12 sec.																							
8 sec. for multigas unit alarm																											
24 sec.	16 sec.	16 sec.	16 sec.	16 sec.																							

#### 6 Select the arrhythmia type.

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

Arrhythmia Factor

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.

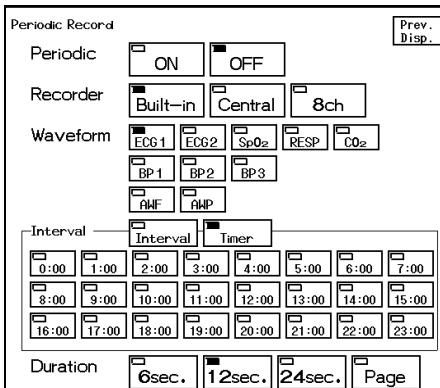
## Periodic Recording

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** → **Settings** → **Record** → **Periodic Record** keys.



The periodic recording setup menu will be displayed.

### 2 Select the output recorder.

Recorder       Built-in     Central     8ch

Built-in will record on the DS-7000 built-in recorder.

Central will record on the central monitor recorder .

8ch will record on the 8ch recorder.

The central monitor recorder of the smallest central ID will be used. 8ch recorder selection can be performed on the recorder setup menu.

### 3 Select the waveform for recording.

Waveform       ECG1     ECG2     SpO<sub>2</sub>     RESP     CO<sub>2</sub>  
 BP1     BP2     BP3  
 AWF     AMP

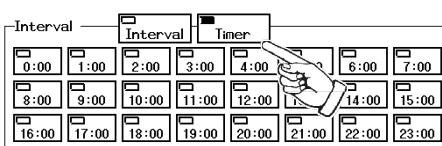
Up to 3 waveforms can be selected. If the output recorder is 8ch recorder, up to 8 waveforms can be selected.

The waveform position will be automatically adjusted when recording.

### 4 Select the periodic interval.

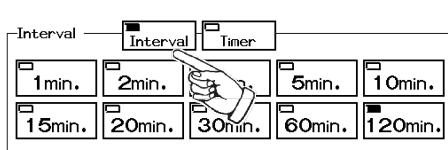
Interval       Interval     Timer

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



Press the **Timer** key.

The recording will automatically start at the programmed time. Select the time to start recording.



Press the **Interval** key.

The recording will automatically start with the selected interval. If 5 min. is selected, recording will start at 10:00, 10:05, ... 10:25.

If 60 min. is selected, recording will start at 10:00, 11:00, ... 12:00.

## 5 Select the recording duration.

Duration  6sec.  12sec.  24sec.  Page

Select the duration from **6sec.**, **12 sec.**, **24 sec.**, **Page** keys.

The recording will automatically stop after the selected time. If **8ch** is selected for the recorder, **Page** can be selected.

## 6 Start the periodic recording.

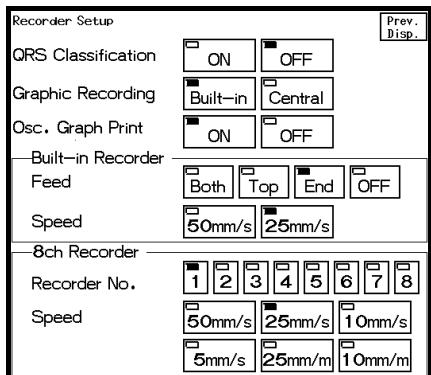
Periodic  ON  OFF

**ON** will activate the periodic recording with the selected interval. If periodic recording is not necessary, select **OFF**.

# Recorder Setup

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

## 1 Press the **Menu** → **Settings** → **Record** → **Setup** keys.



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" (SVPC) printed on the built-in recorder will be printed as "N" (normal beat) on the central recorder and AU-5500N.

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

Graphic Recording  Built-in  Central

**Built-in** will record on the built-in recorder.

**Central** will record on the central monitor recorder.

The central monitor recorder of the smallest ID will be used.

#### 4 Select ON/OFF of oscillation graph printing.

Osc. Graph Print

<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
--	------------------------------

ON will print the oscillation graph (NIBP data) after the waveform.

OFF will not print the oscillation graph.

#### 5 Set the recorder operation for the built-in recorder.

Set the paper feed operation for the recorder.

Both will start the recording from the perforation, and feeds the paper to the next perforation after recording 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.

Built-in Recorder  
Feed

<input checked="" type="checkbox"/> Both	<input type="checkbox"/> Top	<input type="checkbox"/> End	<input type="checkbox"/> OFF
--	------------------------------	------------------------------	------------------------------

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

<input checked="" type="checkbox"/> 50mm/s	<input type="checkbox"/> 25mm/s
--	---------------------------------

Set the recording speed for the built-in recorder.

#### 6 Select the 8ch recorder and recording speed.

8ch Recorder

Recorder No.

<input checked="" type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8
---------------------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------	----------------------------

The wired network system is capable of connecting maximum of eight 8ch recorders. Select the recorder number if a 8ch recorder is selected as output recorder. The recorder number which is not connected to the network cannot be selected.

Speed

<input checked="" type="checkbox"/> 50mm/s	<input type="checkbox"/> 25mm/s	<input type="checkbox"/> 10mm/s
<input type="checkbox"/> 5mm/s	<input checked="" type="checkbox"/> 25mm/m	<input type="checkbox"/> 10mm/m

Set the recording speed for the 8ch recorder.

## Freeze Recording

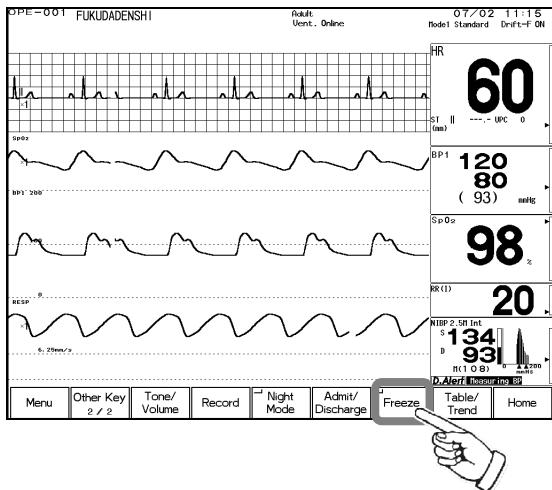
The waveform display can be frozen and recorded from 12 seconds prior to the frozen point.

The recording duration is fixed as 12 seconds.

To freeze the waveform display, the **Freeze** key needs to be assigned as 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 or HR-500 Recorder Module.  
The waveform set for the manual recording will be recorded.

## Graphic Printing (Trend, Table, etc.)

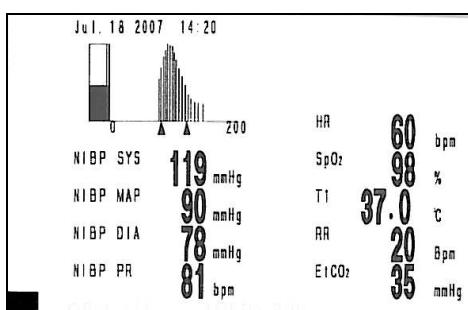
The trend, table, recall, and Vigilance display can be printed on the recorder.



Refer to respective section on "7. Function" for printing procedure.

## NIBP Data Printing

The latest NIBP data (systolic/mean/diastolic/PR), oscillation graph, HR, SpO<sub>2</sub>, TEMP1, RR, EtCO<sub>2</sub> data will be printed on the last page of the printing.

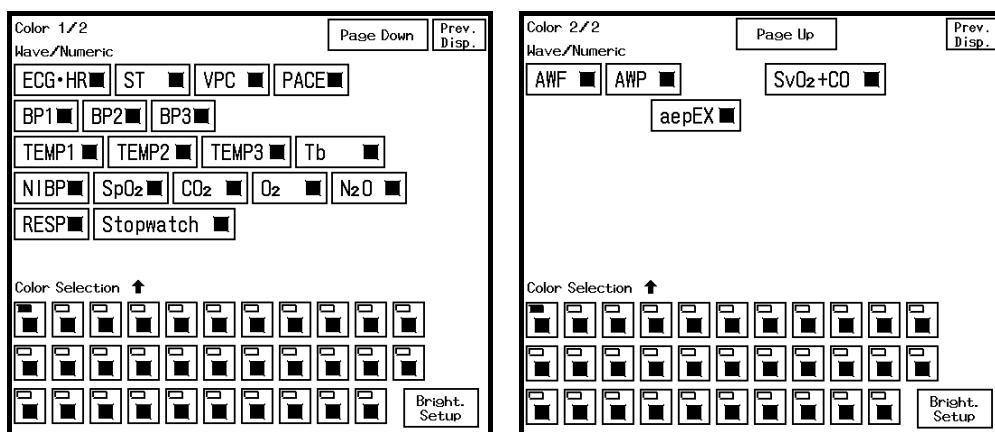


## Color Setup

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

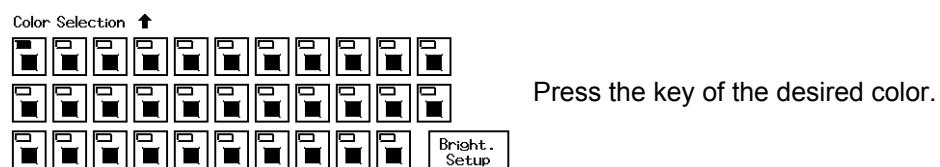
The displayed color for each parameter can be selected from the 32-color palette.

- 1 Press the **Menu** → **Settings** → **Color** keys.



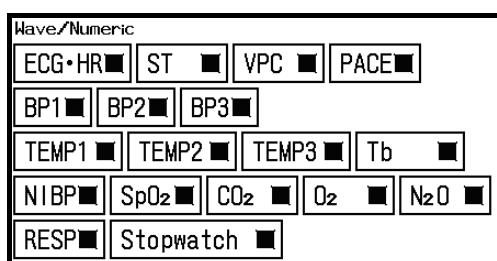
<Color Setup Menu>

- 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 key of the parameter to assign the selected color.

The selected color for the parameter will be applied to the waveform, numeric data, graphic trend, and tabular trend.

## CF Card

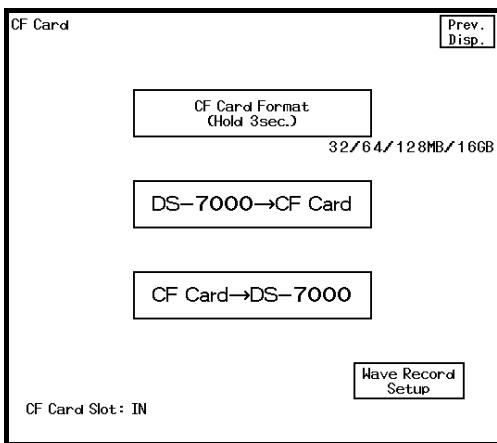
This section explains about transferring the setup data using the optional CF card. Setting all the monitors the same way (alarm setup and display configuration) may take a large amount of time. However, this process can be simplified by performing the setup on one monitor, and then copying the setup 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
- Use only the CF card formatted with this device.

**1** Press the **Menu** → **Settings** → **CF Card** keys.



The CF card menu will be displayed.

## CF Card Format

**1** Insert the CF card to the CF card slot.

**2** Format the CF card.

**CF Card Format  
(Hold 3sec.)**

Pressing the **CF Card Format** key for more than 3 seconds will automatically determine the CF card type and starts formatting.

## Data Transfer (DS-7000 → CF Card)

The data can be transferred from the monitor to the CF card.

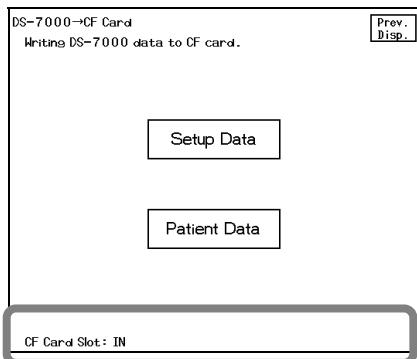
- 1 Insert the CF card to CF card slot.**
- 2 Write data to the CF card**

DS-7000→CF Card

The data will be transferred from the monitor to the CF card.

Press the DS-7000 → CF Card key to select the data type to transfer.

- 3 Select the data type.**



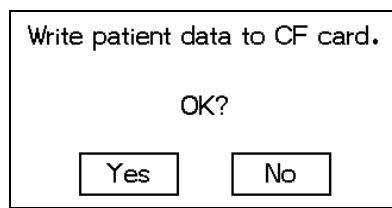
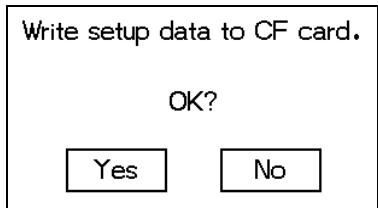
**Setup Data** key will transfer the setup data such as alarm setup, display configuration, parameter setup to the CF card.

**Patient Data** key will transfer the patient data such as admitting data (name, age, ID, etc.), table/trend data. Recall data, OCG, 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.**

Make sure that data transfer selection is correct to avoid erasing the data unintentionally.  
Press the Yes key if you are sure to overwrite the CF card data with the monitor data.



## Data Transfer (CF Card → DS-7000)

The data can be transferred from the CF card to the monitor.

### 1 Insert the CF card to the CF card slot.

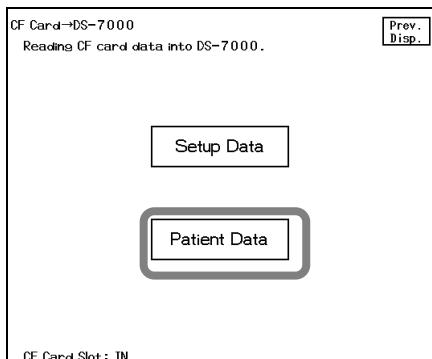
### 2 Read the data from the CF card.

The data will be transferred from the CF card to the monitor.

CF Card→DS-7000

Press the **CF Card → DS-7000** key to select the data type to transfer.

### 3 Select the data type.



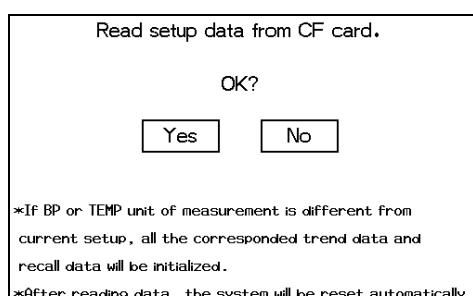
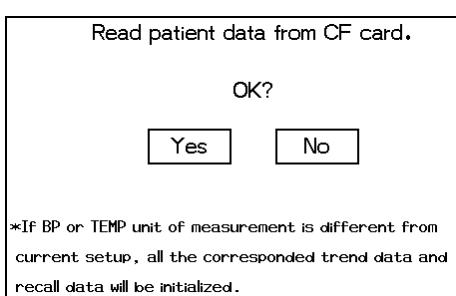
**Setup Data** key will transfer the setup data such as alarm setup, display configuration, parameter setup from the CF card.

**Patient Data** key will transfer the patient data such as admitting data (name, age, ID, etc.), table/trend data from the CF card.

If the CF card is not inserted to the card slot, a message will be displayed.

### 4 Confirm if OK to read the data from the CF card.

Make sure that data transfer selection is correct to avoid erasing the data unintentionally.  
Press the **Yes** key if you are sure to overwrite the monitor data with the CF card data.



<b>⚠ CAUTION</b>	<ul style="list-style-type: none"><li>When the setup data is read from the CF card, the system will automatically restart to validate the setup data.</li><li>Reading the patient data from the CF card will erase all previous patient data stored in the patient monitor.</li></ul>
------------------	---

## 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

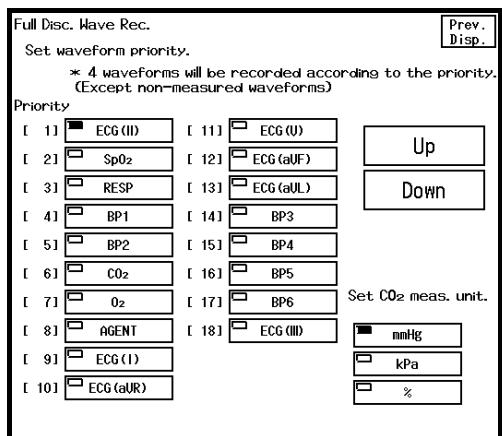
	<b>Data</b>	<b>Description</b>
Parameter Setup		Stores the monitoring condition (size, lead, etc.) for all the monitoring parameters.
Alarm Setup		Stores the alarm threshold level.
Trend Setup / Table Setup		Stores the current setup.
Function	ST Measurement	NICO Table Setup
	ST Trend Setup	BIS Table Setup
	ST Display Lead Setup	ST Table Setup
	Respiration Table Setup	Cardiac Output Setup
	Vigilance Table Setup	Ventilator Setup
	Recall Setup	OCRG Setup
	Full Disc. Waveform Recording Setup	
Setting	Record	
	Tone / Volume	
	Display Setup	
	Display Configuration	Stores the current setup.
	Color	
	Other Monitor Alarm	
	Time/Date	
Initial Settings	Alarm Mode Setup	User BP Label
	Display Mode Setup	User TEMP Label
	Night Mode Setup	Transmitting Waveform Setup
	Serial Communication Setup	Remote Control Setup
	User Key Setup	Password Setup
	Menu Setup	Alarm Indicator Setup
	Key Mask Setup	Op. Room
	Unit Setup	Discharge Operation Setup
	Telemeter Setup	Function Key Color Setup
	MAC Value	Arrhythmia Analysis
	Source Setup	Magnetic Card

### Patient Data

<b>Data</b>	<b>Description</b>
Patient Information	Stores patient information such as name, ID, age, sex, pacemaker use, and patient classification.
Table/Trend Data	Stores all table/trend data.

## Full Disclosure Waveform Recording Setup

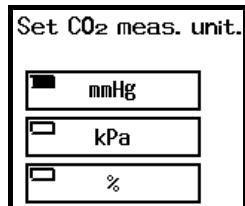
Select the waveform for full disclosure waveform recording.



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.



For the CO<sub>2</sub> waveform, select the measurement unit from mmHg/kPa/%.

## To Format the CF Card for Full Disclosure Waveform Recording

- 1** Insert the CF card (FCF-16GA) to CF card slot.
- 2** Format the CF card.



Pressing the **CF Card Format** key for more than 3 seconds will automatically determine the CF card type and starts formatting.

- 3** When the format is complete, the full disclosure waveform will be automatically recorded on the CF card.

## 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 a specified CF card into the CF card slot.

### No data on the CF card.

Cause : There is no data on the CF card.  
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-7000 main unit is older than that of the data stored in the CF card.  
Solution : The data from a newer software version cannot be read.  
Update the software version of the DS-7000.

Cause 3 : There is no more space on the CF card to write the data.  
Solution : Format the CF card.

Blank Page

## Chapter 5

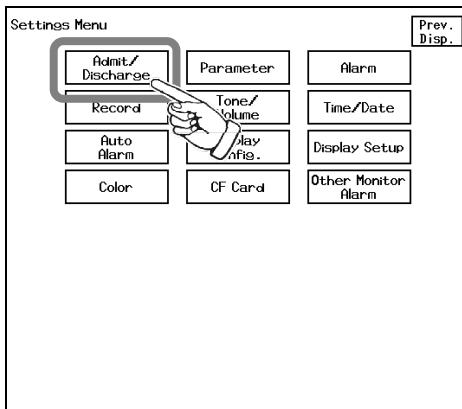
# Admit / Discharge of a Patient

This chapter describes the procedure to admit or discharge a patient to the monitor.

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## Admit / Discharge of a Patient

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



<Settings Menu>

- 1 Press the **Menu** → **Settings** → **Admit/Discharge** keys.

A screenshot of the 'Admit/Discharge' menu. The screen displays patient details: Name (FUKUDADENSHI), Sex (Male), Height (172.0 cm), Weight (80.0 kg), Age (57 Yrs), ID (01234567), and Birth Date (8/1/1949). It also shows medical history: Pacemaker (No), Filter (Monitor), and current status: Discharge, Mode Select, Monitor, and Suspend. The 'Admit Date' is listed as 6/27 2007. There are also buttons for 'Yes' and 'No' under Pacemaker.

The admit/discharge menu will be displayed.



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.

## Admitting a Patient

## Name, Sex, and Age

This menu allows entering of 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.

### Patient Name

For entering the patient's name, up to 16 letters can be used.

Admit/Discharge

Name FUKUDADENSHI

Sex Male Female Class Adult Child Neonate

Height 172.0 cm Blood O Type Rh+

Weight 80.0 kg ( BSA 1.93 m<sup>2</sup>)

Age 57Yrs 8/1 1949 Birth

ID 01234567

Pacemaker Yes No Admit Date 6/27 2007

Filter Monitor ESIS Diag.

Discharge Mode Select Monitor Suspend

- 1** Press the **Name** key.

Name FUKUDADENSHI

1 2 3 4 5 6 7 8 9 0 -

Q W E R T Y U I O P

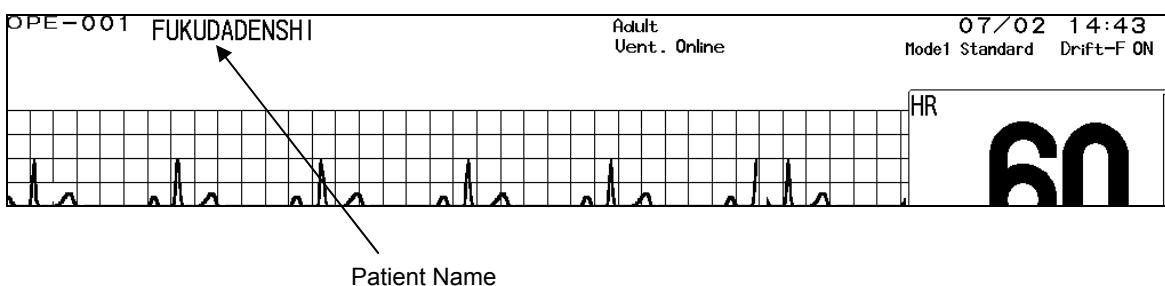
A S D F G H J K L \* ← →

Z X C V B N M , . / Delete

Height Weight Age ID

Enter the name using the alphanumeric keypad.

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



## 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.

The screenshot shows a medical monitoring device's patient information screen. At the top, it says "Admit/Discharge" and "Prev. Disp.". Below that, the "Name" field contains "FUKUDADENSII". Under "Sex", "Male" is selected. In the "Class" section, "Adult" is selected. There are fields for "Height" (172.0 cm), "Weight" (80.0 kg), "Blood O Type Rh+", and "BSA 1.93 m²". The "Age" field shows "5.7 Yrs 8/1 1949 Birth". The "ID" field is highlighted and contains "01234567". To the right, the "Admit Date" is listed as "6/27 2007". Under "Pacemaker", "Yes" is selected. Under "Filter", "Monitor" is selected. At the bottom, there are buttons for "Discharge", "Mode Select", and "Monitor Suspend".

1 Press the **ID** key.

The screenshot shows a numeric keypad interface. At the top, it says "ID" and has a "Print/Display" button. Below that, the ID "01234567" is displayed. To the right is a "ABC<-> QWERTY" switch. The keypad itself is a standard 12x4 grid with numbers 1-9, 0, and special keys like -, ., \*, and Delete. Below the keypad are buttons for "Name", "Height/Weight", "Age", and "Search Patient".

Enter the ID using the alphanumeric keypad. 20 digits can be input, but only 10 digits can be transmitted through the wired network (DS-LAN II). On the Operation Room Setup menu under the Initial Settings, set which 10 digits to send to the central monitor.



Refer to "8. Installation –Wired Network Connection– Hospital Name/OR ID Setup" for procedure to set the 10-digit patient ID.

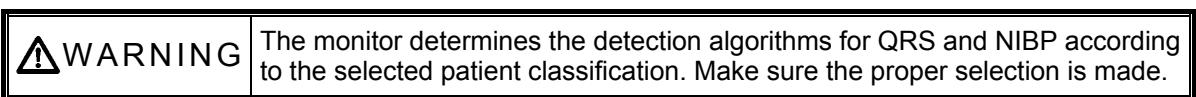
## Patient Classification

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

	<b>Adult</b>	<b>Child</b>	<b>Neonate</b>
NIBP measurement range	10 to 260mmHg	10 to 180mmHg	—
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	0.05 to 100Hz	1.6 to 100Hz
Impedance Respiration		1.5Hz	2.5Hz
Alarm delay time		5 sec.	0 sec.

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

The alarm delay time applies to the measurement data alarm for the following parameters; HR/PR, BP, RR, SpO<sub>2</sub>, TEMP, TACHY, BRADY.

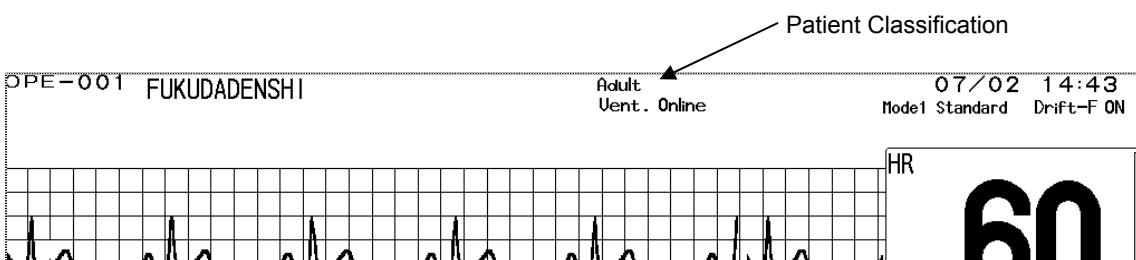


### 1 Select the patient classification.

A screenshot of a medical software interface for patient admission. In the middle section, there is a group of four radio buttons labeled "Class" with options "Adult", "Child", and "Neonate". The "Adult" button is highlighted with a red square. To the right of the buttons, the text "Select from [Adult], [Child], or [Neonate]."

Select from [Adult], [Child], or [Neonate].

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



## 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**.

The screenshot shows a software interface for entering patient data. At the top, it says "Adult/Discharge". Below that is a "Name" field containing "FUKUDADENSHI". Under "Sex", there are two options: "Male" (which is checked) and "Female". Other fields include "Height" (172.0 cm), "Weight" (80.0 kg), "Age" (57 Yrs), "ID" (01234567), "Pacemaker" (Yes, which is checked), and "Filter" (Monitor, ESIS, Diag.). At the bottom are buttons for "Discharge", "Mode Select", and "Monitor Suspend".

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

## Pacemaker Usage

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 a 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.

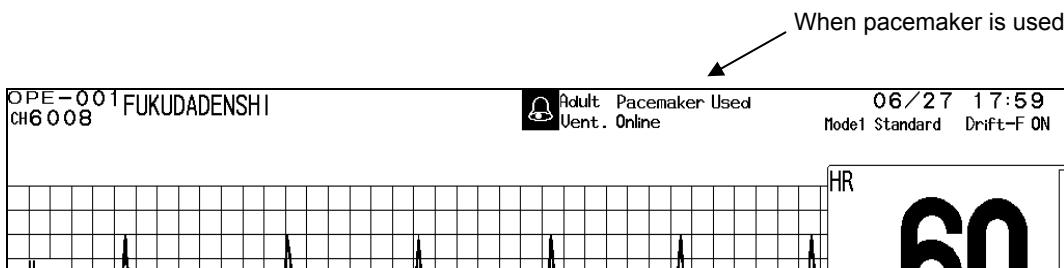


**WARNING** The pacemaker usage selection influences the precision of the QRS detection and arrhythmia analysis. Make sure the correct selection is made.

- 1 Select **Yes** or **No** for pacemaker usage.

The screenshot shows the same software interface as before, but now the "Pacemaker" field has "No" checked instead of "Yes". All other fields and buttons are identical to the previous screenshot.

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



## Patient Age

There are two ways to set the patient's age. One is to enter the birth date which will automatically calculate the age, and the other is to directly enter the age using the numeric keypad.

If **[Neonate]** is selected as patient classification, the age in days will be displayed.

The screenshot shows the 'Admit/Discharge' screen. In the 'Patient' section, the 'Age' field is highlighted with a red box. The text '5 7 Yrs' is displayed inside the field. Other fields include 'Name: FUKUDADENSHI', 'Sex: Male', 'Class: Adult', 'Height: 172.0 cm', 'Weight: 80.0 kg', 'Blood O Type: Rh+', 'Pacemaker: No', 'Filter: Monitor', and 'ID: 01234567'. At the bottom are buttons for 'Discharge', 'Mode Select', and 'Monitor Suspend'.

- 1 Press the **[Age]** key, and enter the patient's age.

The screenshot shows a numeric keypad screen. The 'Age' field is highlighted with a red box, displaying '5 7 Yrs'. Below it is a numeric keypad with digits 0-9 and a 'Clear' button. At the bottom are buttons for 'Name', 'Height/Weight', and 'ID'.

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.

Birth Date	1 9 4 9 Yr
	<b>8 Mo</b>
	<b>1 Dy</b>

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.

## **Input Height/Weight/BSA/Blood Type**

Input the height, weight, BSA or body mass index (BMI), blood type of the patient.

### **NOTE**

The unit for height and weight can be selected from "cm, kg" or "in, lb". However, if communication with the central monitor is established, unit for height and weight will be fixed as "cm, kg".

### **1 Press the **Height · Weight** key.**

Height Height  
Height 172.0 cm  
Weight 80.0 kg  
BSA 1.93 m<sup>2</sup>  
Blood A B O AB  
Rh + -  
Name Age ID

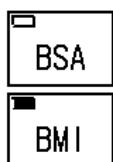
Enter the height and weight using the numeric keypad and press the [cm] ([in]) or [kg] ([lb]) key.

The BSA will be automatically calculated when the height and weight are input.

### **2 Select the blood type from A, B, O, AB, and select "+" or "-" for Rh.**

Height Height  
Height 172.0 cm  
Weight 80.0 kg  
BSA 1.93 m<sup>2</sup>  
Blood A B O AB  
Rh + -  
Name Age ID

### **3 Select the display from BSA or BMI.**



### **CAUTION**

The BMI data will not be transmitted to the central monitor. Even if "BMI" is selected to be displayed, the BSA data automatically calculated by height and weight will be transmitted to the central monitor.

## To Enter the Patient Information from the Magnetic Card or Bar Code

By using the magnetic card reader and bar code reader, patient information can be automatically entered at patient admittance.

The admittance process will speed up compared to manually entering each information.



To automatically enter the patient information from the magnetic card or bar code, it is necessary to perform the setup in advance.  
 → “8. Installation Magnetic Card Reader Setup”  
 → “8. Installation Bar Code Reader Setup”

### 1 Read the data from the magnetic card or bar code.

The read data will be displayed on the monitor.

The screenshot shows a software interface titled "Patient Data Confirmation". It displays "Current Information" with fields for "Pat. ID" and "Name". Below this, a "New Information" section is shown with a highlighted box containing "Pat. ID 1234567890", "Name FUKUDA DENSHI", "Sex Male", and "Birth Date 1950Yr 12Mo 15Dy 61 Yrs". At the bottom are three buttons: "Input of the patient information", "Patient information Search Patient", and "Cancel".

### 2 Select whether or not to automatically enter the read data as the patient information.

Select from **[Enter Patient Data]** / **[Cancel]**.

**[Enter Patient Data]** will replace the current patient information with the read data.  
**[Cancel]** will not enter the read data as the patient information.

The item not read from the magnetic card or bar code will be left blank.  
 For the blank item, manually input the information.

## To Enter the Patient Information from the Patient Data Server (DS-LANIII)

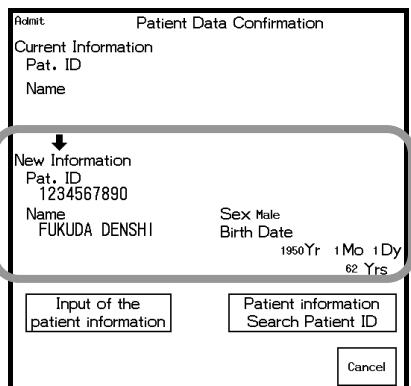
On the DS-LANIII system, patient information can be automatically entered by searching on the patient data server via central monitor.

### CAUTION

Refer to our service representative for the monitor model type and software version which supports the patient data server search function.

### ●When Using the Patient Data Server and Magnetic Card (or Bar Code)

- 1 Read the data from the magnetic card or bar code.
- 2 Press the **Search Patient ID** key on the "Patient Data Confirmation" screen to search the patient information.
- 3 The acquired patient information from the patient data server will be displayed in the "New Information" area.



If there is no applicable patient information, current patient information will be displayed in the "New Information" area.

- 4 Select whether or not to enter the searched patient information.

Select from **Enter Patient Data** / **Cancel**.

**Enter Patient Data** will replace the current patient information with the acquired data.

**Cancel** will not enter the acquired data as the patient information.

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

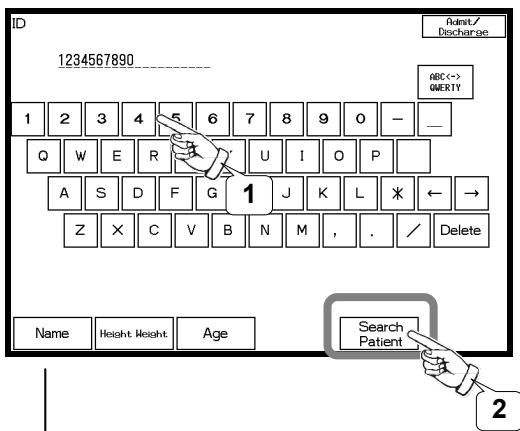
### ●When Not Using the Magnetic Card (or Bar Code)

- 1 Press the **Menu** → **Settings** → **Admit/Discharge** → **ID** keys.

The patient ID screen will be displayed.

- 2 Enter the patient ID.

- 3 Press the **Search Patient ID** key and start searching on the patient data server.



- 1) Use the touch keys to enter the ID.
  - 2) Based on the entered patient ID, patient information will be searched on the patient data server through the DS-LANIII network.
- The searched patient information will be displayed under "New Information".

**Patient Data Confirmation**

Current Information  
Pat. ID  
Name

New Information  
Pat. ID  
1234567890  
Name FUKUDA DENSHI      Sex Male  
Birth Date 1950Yr 1Mo 1Dy  
62 Yrs

#### 4 Select whether or not to enter the searched patient information.

Select from **Enter Patient Data** / **Cancel**.

**Enter Patient Data** will replace the current patient information with the acquired data.

**Cancel** will not enter the acquired data as the patient information.

The item not acquired from the patient data server will be left blank.

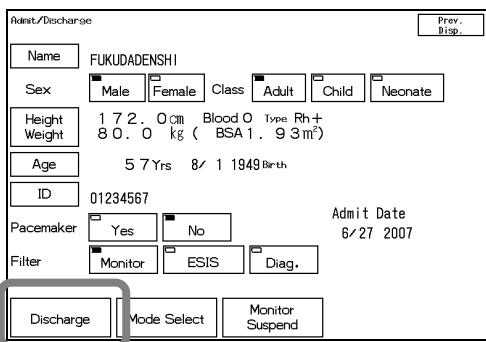
For the blank item, manually input the information.

# Discharging a Patient

# Erasing Name, Data, etc.

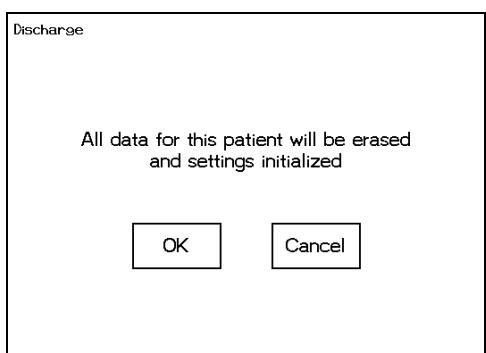
This menu allows clearing the patient name, ID, age, and past measurement data such as tabular trend, graphic trend, and recall data.

## Discharging Procedure



### 1 Press the **Discharge** key.

The confirmation display will appear. If the **Discharge** key is pressed by mistake, 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 following data; trend, table, recall, ST Display, OCRG, cardiac output, short trend, hemodynamics, P-V / F-V control data, vigilance table, NICO table, BIS table, ST table, ST trend, respiration table. The setup condition of recall, table, trend, vigilance table, NICO table, BIS table will remain.
Patient Information	Erases the following data; patient name, ID, sex, age, height, weight, BSA, blood type. 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. The NIBP measurement interval will be set to 2.5 minutes. The NIBP cuff inflation value will be initialized to default value for each patient classification.

NOTE	<ul style="list-style-type: none"><li>Depending on the ON/OFF setting for "Backup at Discharge" on the Discharge Mode setup under the Initial Settings, some data may not be initialized.</li><li>If discharge procedure is performed during stopwatch operation, the counting will stop and the stopwatch time will be reset to "00:00:00".</li></ul>
------	--

## Monitoring Mode Selection

## Alarm/Display Mode

This section explains about the alarm mode and display mode selection.

There are 5 types of mode for each alarm setting and Home Display configuration setting which can be selected according to the monitoring purpose. Select an appropriate mode at admittance of patient.

### CAUTION

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

## Mode Selection

A screenshot of a medical device's main menu. It shows patient information: Name (FUKUDADENSHI), Sex (Male), Height (172 cm), Weight (80.0 kg), Age (57 years), ID (01234567). It also shows medical history: Pacemaker (No), Filter (Monitor), and Discharge, Mode Select, Monitor Suspend buttons. The 'Mode Select' button is highlighted with a red box.

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

A screenshot of the 'Mode Select' menu. It has two columns: 'Alarm Mode' and 'Display Mode'. Each column contains five buttons labeled 'CONFIG. 1' through 'CONFIG. 5'. The first button in each column is highlighted with a red box.

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

- 2 Select an alarm mode from the selection.

A screenshot of the 'Alarm Mode' selection menu. It contains five buttons labeled 'CONFIG. 1' through 'CONFIG. 5'. The first button is highlighted with a red box.

Select from the **CONFIG. 1** to **CONFIG. 5** keys to set the alarm setup mode which meets the monitoring purpose.

The setup for the alarm mode remains stored even when the power is turned off or when discharging procedure is performed. The previously selected alarm mode will be effective if the selection is not made.

- 3 Select a display mode from the selection.

A screenshot of the 'Display Mode' selection menu. It contains five buttons labeled 'CONFIG. 1' through 'CONFIG. 5'. The first button is highlighted with a red box.

Select from the **CONFIG. 1** to **CONFIG. 5** keys to set the display configuration mode which meets the monitoring purpose.

The setup for the display mode remains stored even when the power is turned off or when discharging procedure is performed. The previously selected display configuration mode will be effective if the selection is not made.

## ●Display Modes

<b>Item</b>	<b>Default Setting</b>	<b>Backup</b>
Mode 1	Display Mode	Auto
	Auto	(none)
	Standard	Numeric: HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1,2,3, RR, NIBP Wave : ECG1, BP overlap, SpO <sub>2</sub> , RESP
	Zoom Display	Numeric: HR/PR, SpO <sub>2</sub> +TEMP1, NIBP, RR Wave : ECG1, SpO <sub>2</sub> , RESP
	Extended	Numeric: HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1,2,3, RR, NIBP, VPC+PACE, ST-A, NIBP LIST Wave : ECG1 cascade, ECG2 cascade, BP overlap, SpO <sub>2</sub> , RESP
	BP Overlap	Depends on the used Option Unit.
	Comment	CONFIG. 1
	Short Trend	OFF
	Grid	ON
	Block Cascade	Wave Quantity: 2, Waveforms: ECG1, ECG2
	Wave Line Thickness	Middle
	GAS CO <sub>2</sub> Waveform	Fill
	BP Label	BP1:BP1, BP2:BP2, BP3:BP3 BP4:BP4, BP5:BP5, BP6:BP6
	TEMP Label	TEMP1:T1, TEMP2:T2, TEMP3:T3
Mode 2	Display Mode	Extended
	Auto	(none)
	Standard	Numeric: HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1,2,3, RR, NIBP Wave : ECG1, BP overlap, SpO <sub>2</sub> , RESP
	Zoom Display	Numeric: HR/PR, SpO <sub>2</sub> +TEMP1, NIBP, RR Wave : ECG1, SpO <sub>2</sub> , RESP
	Extended	Numeric: HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1,2,3, RR, NIBP, VPC+PACE, ST-A, NIBP LIST Wave : ECG1 cascade, ECG2 cascade, BP overlap, SpO <sub>2</sub> , RESP
	BP Overlap	Depends on the used Option Unit.
	Comment	CONFIG. 2
	Short Trend	OFF
	Grid	ON
	Block Cascade	Wave Quantity: 2, Waveforms: ECG1, ECG2
	Wave Line Thickness	Middle
	GAS CO <sub>2</sub> Waveform	Fill
	BP Label	BP1:BP1, BP2:BP2, BP3:BP3 BP4:BP4, BP5:BP5, BP6:BP6
	TEMP Label	TEMP1:T1, TEMP2:T2, TEMP3:T3

<b>Item</b>	<b>Default Setting</b>	<b>Backup</b>
Mode 3	Display Mode	Standard
	Auto	(none)
	Standard	Numeric: HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1,2,3, RR, NIBP Wave : ECG1, BP overlap, SpO <sub>2</sub> , RESP
	Zoom Display	Numeric: HR/PR, SpO <sub>2</sub> +TEMP1, NIBP, RR Wave : ECG1, SpO <sub>2</sub> , RESP
	Extended	Numeric: HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1,2,3, RR, NIBP, VPC+PACE, ST-A, NIBP LIST Wave : ECG1 cascade, ECG2 cascade, BP overlap, SpO <sub>2</sub> , RESP
	BP Overlap	Depends on the used Option Unit.
	Comment	CONFIG. 3
	Short Trend	OFF
	Grid	ON
	Block Cascade	Wave Quantity: 2, Waveforms: ECG1, ECG2
	Wave Line Thickness	Middle
	GAS CO <sub>2</sub> Waveform	Fill
	BP Label	BP1:BP1, BP2:BP2, BP3:BP3 BP4:BP4, BP5:BP5, BP6:BP6
	TEMP Label	TEMP1:T1, TEMP2:T2, TEMP3:T3
Mode 4	Display Mode	Extended
	Auto	(none)
	Standard	Numeric: HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1,2,3, RR, NIBP Wave : ECG1, BP overlap, SpO <sub>2</sub> , RESP
	Zoom Display	Numeric: HR/PR, SpO <sub>2</sub> +TEMP1, NIBP, RR Wave : ECG1, SpO <sub>2</sub> , RESP
	Extended	Numeric: HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1,2,3, RR, NIBP, VPC+PACE, ST-A, NIBP LIST Wave : ECG1 cascade, ECG2 cascade, BP overlap, SpO <sub>2</sub> , RESP
	BP Overlap	Depends on the used Option Unit.
	Comment	CONFIG. 4
	Short Trend	OFF
	Grid	ON
	Block Cascade	Wave Quantity: 2, Waveforms: ECG1, ECG2
	Wave Line Thickness	Middle
	GAS CO <sub>2</sub> Waveform	Fill
	BP Label	BP1:BP1, BP2:BP2, BP3:BP3 BP4:BP4, BP5:BP5, BP6:BP6
	TEMP Label	TEMP1:T1, TEMP2:T2, TEMP3:T3

<b>Item</b>	<b>Default Setting</b>	<b>Backup</b>
Mode 5	Display Mode	Standard
	Auto	(none)
	Standard	Numeric: HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1,2,3, RR, NIBP Wave : ECG1, BP overlap, SpO <sub>2</sub> , Trend (6 rows)
	Zoom Display	Numeric: HR/PR, SpO <sub>2</sub> +TEMP1, NIBP, RR Wave : ECG1, SpO <sub>2</sub> , RESP
	Extended	Numeric: HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1,2,3, RR, NIBP, VPC+PACE, ST-A, NIBP LIST Wave : ECG1 cascade, ECG2 cascade, BP overlap, SpO <sub>2</sub> , RESP
	BP Overlap	Depends on the used Option Unit.
	Comment	CONFIG. 5
	Short Trend	OFF
	Grid	ON
	Block Cascade	Wave Quantity: 2, Waveforms: ECG1, ECG2
	Wave Line Thickness	Middle
	GAS CO <sub>2</sub> Waveform	Fill
Common for All Modes	BP Label	BP1:BP1, BP2:BP2, BP3:BP3 BP4:BP4, BP5:BP5, BP6:BP6
	TEMP Label	TEMP1:T1, TEMP2:T2, TEMP3:T3
	Color of BP Label	ART: Red, CVP: Light Blue, PAP: Yellow Other Labels: White

## ● Alarm Modes

	<b>Item</b>	<b>Default Setting</b>		
Mode1 to Mode5 (Adult)	HR	ON, 50 to OFF		
	ASYSTOLE	ON, 5sec.		
	VF	ON		
	VT	ON, HR Low Limit for VT: 120bpm		
	SLOW VT	OFF		
	RUN	OFF, 3 beats, HR Low Limit for RUN: 40 beats/min.		
	COUPLET	OFF		
	PAUSE	OFF, 3.0sec.		
	BIGEMINY	OFF		
	TRIGEMINY	OFF		
	FREQUENT	OFF, 10 beats/min.		
	TACHY	OFF		
	BRADY	OFF		
	STI, II, III, aVR, aVL, aVF, V	All Alarm: OFF Indiv. Alarm: OFF OFF-OFF		
	BP1	ON S 80 to 200 D OFF to OFF M OFF to OFF		
	BP2 to 6	OFF S OFF to OFF D OFF to OFF M OFF to OFF		
	RR	ON, 5 to 30		
	APNEA	ON, 60sec.		
	SpO <sub>2</sub>	ON, 90 to OFF		
	SEC Alarm	OFF		
	NIBP	ON S 70 to 200 D OFF to OFF M OFF to OFF		
	TEMP1 to 3, Tb	OFF OFF to OFF		
	EtCO <sub>2</sub>	OFF OFF to OFF		
	In-CO <sub>2</sub>	OFF OFF		
	Ex-O <sub>2</sub>	OFF OFF to OFF		
	FiO <sub>2</sub>	OFF 18 to OFF		
	Ex-N <sub>2</sub> O	OFF OFF to OFF		
	In-N <sub>2</sub> O	OFF OFF to OFF		
	Ex-AGT	OFF OFF to OFF		
	In-AGT	OFF OFF to OFF		
	MAC	OFF OFF		

	<i>Item</i>	<i>Default Setting</i>		
Mode1 to Mode5 (Child)	HR	ON, 60 to OFF		
	ASYSTOLE	ON, 5sec.		
	VF	ON		
	VT	ON, HR Low Limit for VT: 120bpm		
	SLOW VT	OFF		
	RUN	OFF, 3 beats, HR Low Limit for RUN: 40 beats/min.		
	COUPLET	OFF		
	PAUSE	OFF, 3.0 sec.		
	BIGEMINY	OFF		
	TRIGEMINY	OFF		
	FREQUENT	OFF, 10 beats/min.		
	TACHY	OFF		
	BRADY	OFF		
	STI, II, III, aVR, aVL, aVF, V	All Alarm: OFF Indiv. Alarm: OFF OFF-OFF		
	BP1	ON S 80 to 200 D OFF to OFF M OFF to OFF		
	BP2 to 6	OFF S OFF to OFF D OFF to OFF M OFF to OFF		
	RR	ON 6 to 30		
	APNEA	ON, 60sec.		
	SpO <sub>2</sub>	ON, 90 to OFF		
	SEC Alarm	OFF		
	NIBP	ON S 70 to OFF D OFF to OFF M OFF to OFF		
	TEMP1 to 3, Tb	OFF OFF to OFF		
	EtCO <sub>2</sub>	OFF OFF to OFF		
	In-CO <sub>2</sub>	OFF OFF		
	Ex-O <sub>2</sub>	OFF OFF to OFF		
	FiO <sub>2</sub>	OFF OFF to OFF		
	Ex-N <sub>2</sub> O	OFF OFF to OFF		
	In-N <sub>2</sub> O	OFF OFF to OFF		
	Ex-AGT	OFF OFF to OFF		
	In-AGT	OFF OFF to OFF		

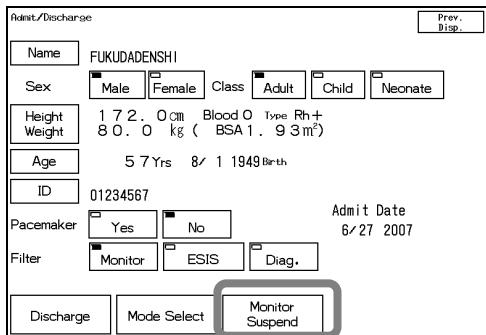
	<i>Item</i>	<i>Default Setting</i>		
Mode1 to Mode5 (Neonate)	HR	ON, 70 to OFF		
	ASYSTOLE	ON, 5 sec.		
	VF	ON		
	VT	ON, HR Low Limit for VT: 120bpm		
	SLOW VT	OFF		
	RUN	OFF, 3 beats, HR Low Limit for RUN: 40 beats/min.		
	COUPLET	OFF		
	PAUSE	OFF, 3.0 sec.		
	BIGEMINY	OFF		
	TRIGEMINY	OFF		
	FREQUENT	OFF, 10 beats/min.		
	TACHY	OFF		
	BRADY	OFF		
	STI, II, III, aVR, aVL, aVF, V	All Alarm: OFF Indiv. Alarm: OFF OFF-OFF		
	BP1	ON S 80 to 200 D OFF to OFF M OFF to OFF		
	BP2 to 6	OFF S OFF to OFF D OFF to OFF M OFF to OFF		
	RR	ON 6 to 30		
	APNEA	ON, 60sec.		
	SpO <sub>2</sub>	ON, 85 to OFF		
	SEC Alarm	OFF		
	NIBP	ON S 50 to OFF D OFF to OFF M OFF to OFF		
	TEMP1 to 3, Tb	OFF OFF to OFF		
	EtCO <sub>2</sub>	OFF OFF to OFF		
	In-CO <sub>2</sub>	OFF OFF		
	Ex-O <sub>2</sub>	OFF OFF to OFF		
	FiO <sub>2</sub>	OFF OFF to OFF		
	Ex-N <sub>2</sub> O	OFF OFF to OFF		
	In-N <sub>2</sub> O	OFF OFF to OFF		
	Ex-AGT	OFF OFF to OFF		
	In-AGT	OFF OFF to OFF		

## Suspend Monitoring

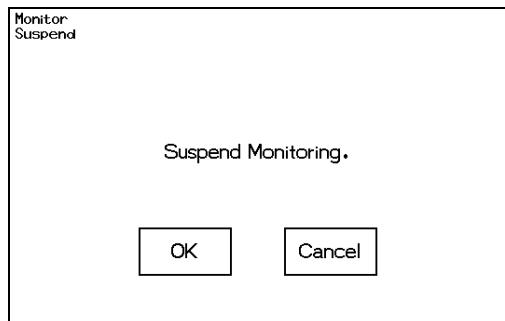
## Suspend / Resume Monitoring

This menu allows suspending and resuming 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 you do not want to suspend monitoring, press the **Cancel** key to return to the previous display.

- 2 Monitoring will be suspended.

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.



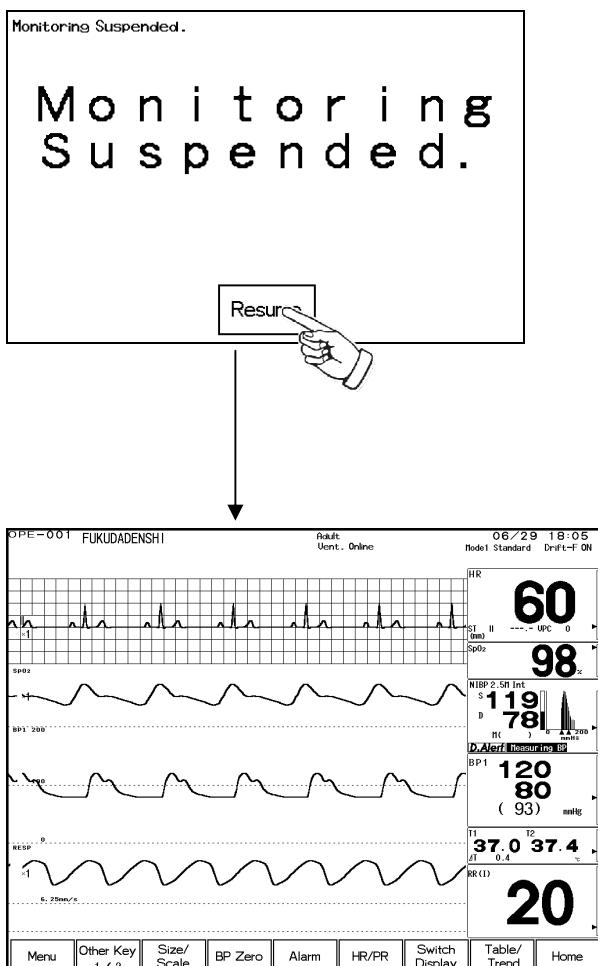
#### NOTE

- The telemetry transmission will cease when monitoring is suspended.  
Note that 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

- 1 Press the **Resume** key.

The “Monitoring suspended.” message will be cleared and monitoring will resume.



5

Suspend Monitoring

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# Chapter 6

## Parameter Setup

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## Parameter Setup

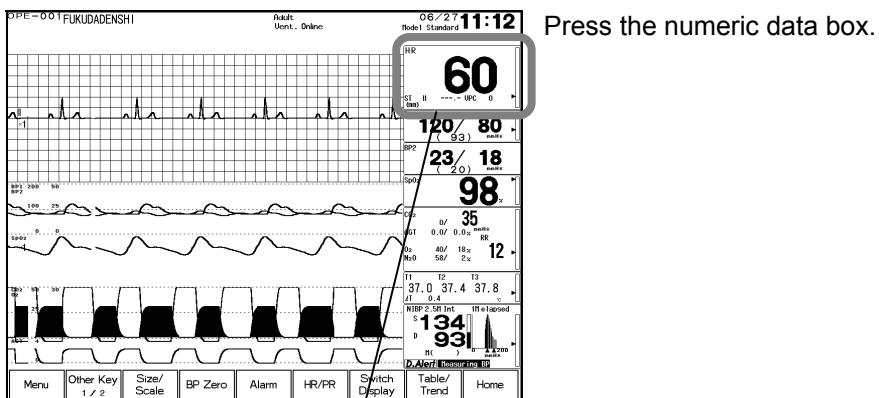
## Setting the Monitoring Condition

This menu allows setting the measurement condition, waveform size, scale, etc. of ECG, BP, NIBP, SpO<sub>2</sub>, RESP, TEMP, vigilance data, and multigas data.

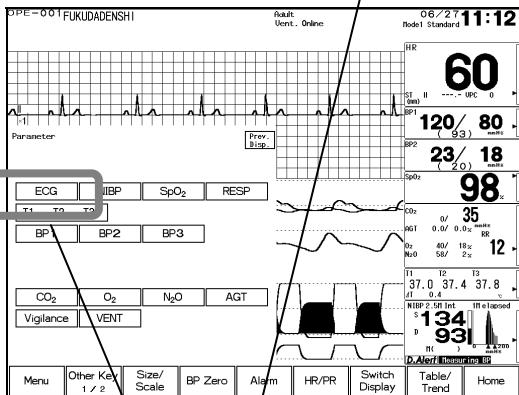
### To Display the Parameter Setup Menu

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

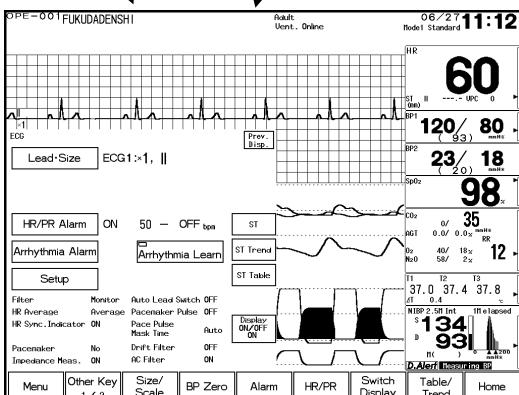
The parameter setup menu for each parameter can be also accessed by pressing the numeric data box where the numeric data is displayed.



Press the numeric data box.



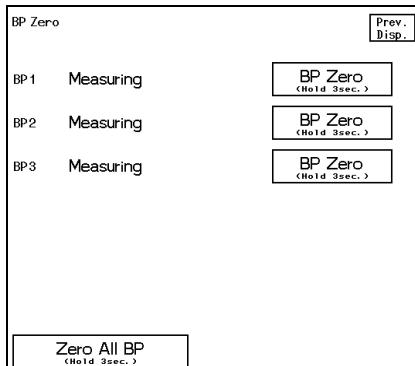
Press the **Menu** → **Settings** → **Parameter** keys to display the parameter setup menu, and select the parameter.



<ECG Parameter Setup Menu>

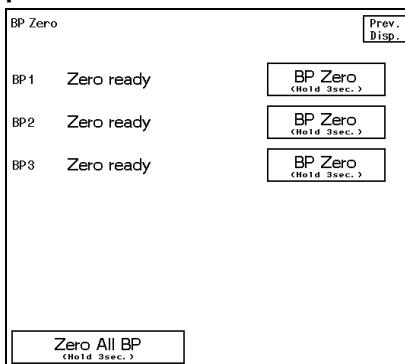
# Zero Balance of Blood Pressure

- 1 Press the **Menu** → **Function** → **BP Zero** keys to display the zero balance screen.



- 2 Open the three-way valve of the pressure transducers to air.

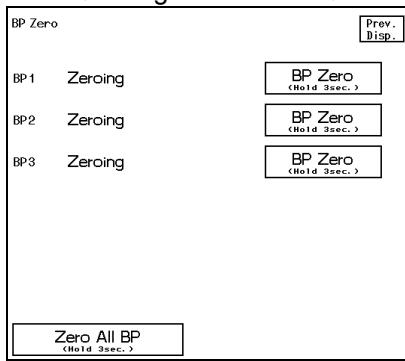
When performing zero balance of all the pressure lines, open the three-way valve of all the pressure transducers.



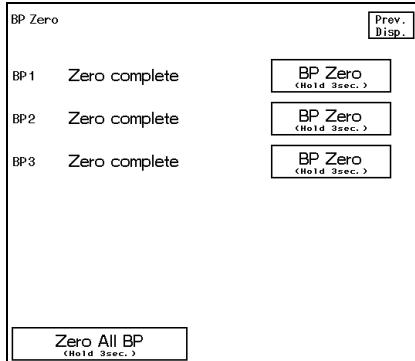
- 3 To perform zero balance for each pressure line, press the **BP Zero** key for the respective BP for more than 3 seconds.

To perform zero balance for all pressure lines, press the **Zero All BP** key for more than 3 seconds.

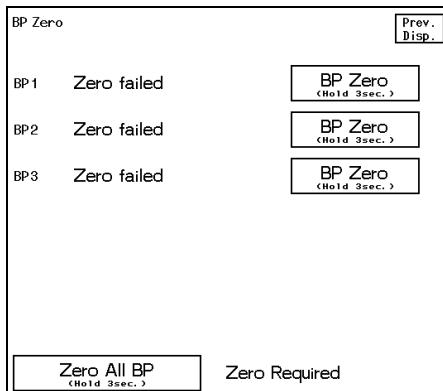
<During zero balance>



<When zero balance is complete>



Verify that the BP waveform is positioned at zero, and "0" is displayed for the BP value. A message, "Zero complete" will be displayed when the procedure is complete.



A message, "Zero failed" will be displayed if the process fails. The three-way valve may not be opened to air, noise interference may be present, or the transducer may be defective.

Check the cause and try the zero balance process again. A message, "Disconnect" will be displayed when the interface cable is not connected. Check if the cable is connected correctly.

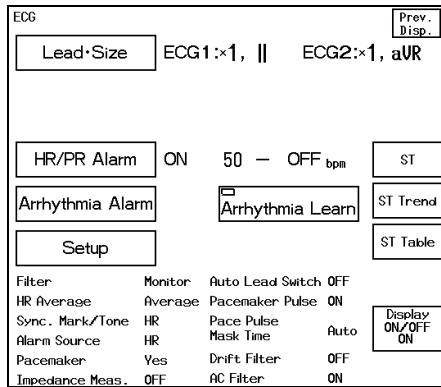
#### 4 When the zero balance process is complete, close the three-way valve.



CAUTION Each time the blood pressure transducer or tubing is replaced, the zero balance procedure is required to ensure accurate measurements.

# ECG

The ECG measurement condition can be set on this menu.

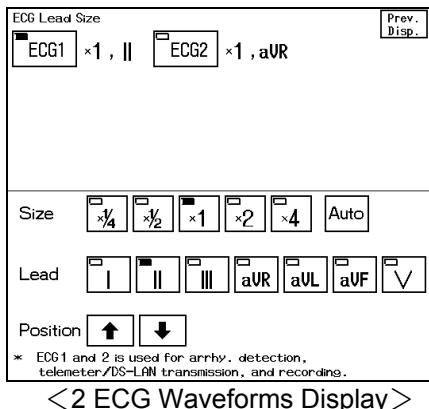


- Lead, Size : Sets the waveform size and lead for ECG display and recording.  
HR/PR Alarm : Sets ON/OFF of the HR and PR alarm, and sets the upper and lower alarm limit.  
Arrhythmia Alarm : Sets ON/OFF and the detection threshold for each arrhythmia alarm.  
Setup : Sets the condition for measuring ECG and HR.  
Arrhythmia Learn : The monitor learns the normal QRS at ECG electrode replacement or at misdetection of the arrhythmia analysis.

## Waveform Size, Lead, and Baseline Position

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

**ECG1 x1, II    ECG2 x1, aVR**

Select the ECG channel by pressing the **ECG\*** key.  
The key LED for the selected channel will light.

### 3 Select the waveform size.

Size Auto

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



- 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  $\times 1/4$ ,  $\times 1/2$ , or  $\times 1$ , the detection threshold is 250  $\mu$ V. When the ECG waveform size is  $\times 2$  or  $\times 4$ , the detection threshold is 150  $\mu$ V.
- 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 to display.

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

ECG Relay Cable	Lead
3-electrode	
4-electrode	
5-electrode	 



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.

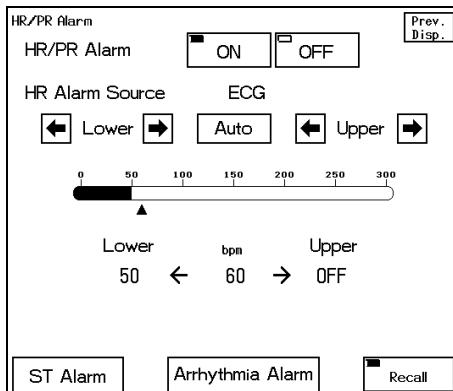
Position

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 Alarm

- 1 Press the **[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<sub>2</sub>, PR measured from BP can be set.

The upper and lower limit can be set in 5 bpm increments.

Key	Item	Description
<b>[ON]</b> <b>[OFF]</b>	Individual Alarm	Selecting <b>ON</b> will generate the HR/PR alarm. Selecting <b>OFF</b> will not generate the HR/PR alarm.
▲	Current Value	Indicates the current value.
<b>[Lower]</b> <b>[Upper]</b>	Lower Alarm Limit	Sets the lower alarm limit (20 to 295bpm). Setting a value 20bpm or below will turn OFF the alarm.
<b>[Lower]</b> <b>[Upper]</b>	Upper Alarm Limit	Sets the upper alarm limit (25 to 300bpm). Setting a value 300bpm or above will turn OFF the alarm.
<b>[Auto]</b>	Automatic Setup	Automatically sets the upper limit to +40bpm, and the lower limit to -40bpm to 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 **ON** for "Backup at Discharge" on the Discharge Mode setup menu under the Initial Settings.

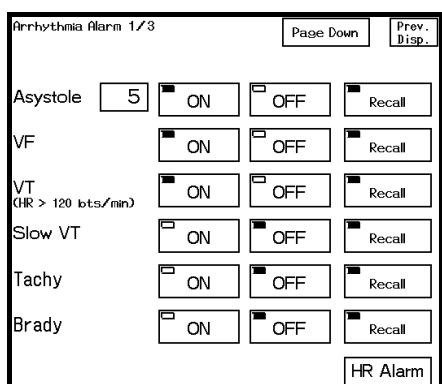


For the alarm mode setup procedure, refer to "9. Initial Settings –Alarm Mode Setup–".

## Arrhythmia Alarm

- 1 Press the **[Arrhythmia Alarm]** key to display the arrhythmia alarm setup menu.

ON/OFF of each arrhythmia alarm and analysis threshold level can be set.



Refer to "7. Function –Arrhythmia Analysis–" for details.

## ECG Monitoring Condition Setup

Pressing the **Setup** key on the ECG configuration menu will allow to set the ECG measurement condition.

ECG Setup 1/3			
Filter	<input checked="" type="checkbox"/> Monitor	<input type="checkbox"/> ESIS	
Impedance Meas.	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	
Pacemaker	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Pacemaker Pulse	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	
Pace Pulse Mask Time	<input checked="" type="checkbox"/> Auto	<input type="checkbox"/> 10ms	<input type="checkbox"/> 20ms
AC Filter	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	
Drift Filter	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	

ECG Setup 2/3			
Auto Lead Switch	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF	
Sync. Mark/Tone	<input checked="" type="checkbox"/> HR	<input type="checkbox"/> PR	<input type="checkbox"/> OFF
HR Average	<input type="checkbox"/> Sync.	<input checked="" type="checkbox"/> Instant	<input type="checkbox"/> Average
Noise Detection	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	
HR/PR Alarm Source	<input checked="" type="checkbox"/> HR	<input type="checkbox"/> PR	<input type="checkbox"/> Auto
ST/VPC/Arrhy. Alarm Display	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	

ECG Setup 3/3		
ECG Waveform Display during Lead-OFF	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF
HR Display during Lead-OFF	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF

### ●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 printed when recording.

#### 1 Select the filter mode from **Monitor**, **ESIS**, or **Diag.**.

ECG Setup 1/3			
Filter	<input checked="" type="checkbox"/> Monitor	<input type="checkbox"/> ESIS	
Impedance Meas.	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	
Pacemaker	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Pacemaker Pulse	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	
Pace Pulse Mask Time	<input checked="" type="checkbox"/> Auto	<input type="checkbox"/> 10ms	<input type="checkbox"/> 20ms
AC Filter	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	
Drift Filter	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	

#### 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: Adult/Child 0.05 to 100Hz, Neonate 1.6 to 100Hz)

Select this mode if ST measurement or high frequency ECG monitoring is performed.

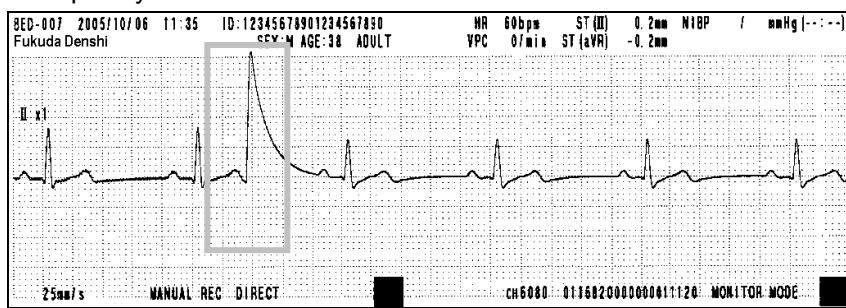
As the lower frequency is set to 0.05Hz, ST level can be accurately measured.



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.

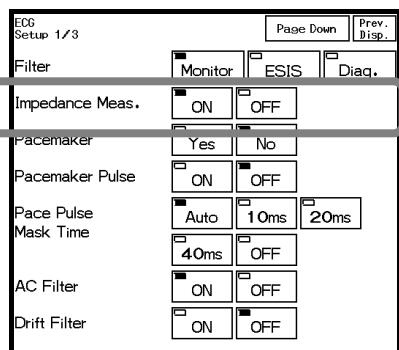


## ●Impedance Respiration Measurement

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 to OFF.

### 1 Select **ON** or **OFF** for impedance respiration measurement.



**ON** will perform impedance respiration measurement.

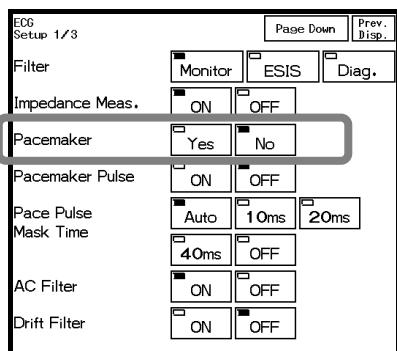
**OFF** will stop the impedance respiration measurement.

## ●Pacemaker Usage

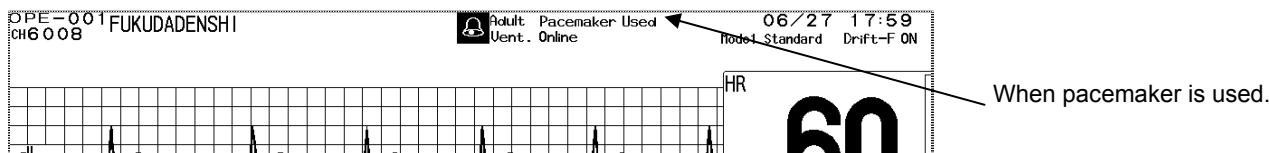
If the patient is wearing a pacemaker, the monitor will identify the pacemaker pulse and insert an artificial pulse onto the ECG waveform for easy identification. By detecting the pacemaker pulse, it prevents to erroneously detect QRS as a pacemaker pulse when pacing waveform does not appear (pacing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

 <b>WARNING</b>	<ul style="list-style-type: none"> <li>The pacemaker usage selection influences the precision of the QRS detection and arrhythmia analysis. Make sure the correct selection is made.</li> <li>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 the pacemaker patients under close surveillance. See this manual for disclosure of the pacemaker pulse rejection capability of this equipment.</li> </ul>
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### 1 Select **Yes** or **No** for pacemaker use.



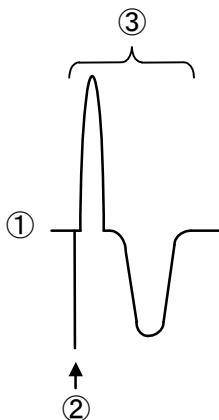
### 2 When **Yes** is selected, “Pacemaker Used” will be displayed on the home display.



## ●Pacemaker Pulse

The artificial pace pulse can be displayed by superimposing it on the ECG waveform. The artificial pace pulse will be displayed in yellow.

### Pacemaker Pulse Detection Algorithm



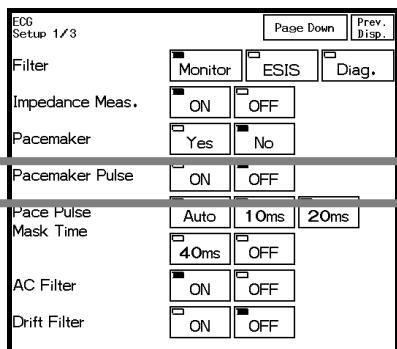
①ECG Signal Input  
Inputs ECG signal.

②Suspension 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 erroneously detected as QRS.

③Canceling Arrhythmia Detection  
Arrhythmia detection will be cancelled to avoid detecting the waveform succeeding the pacemaker pulse as an abnormal beat.

 <b>CAUTION</b>	<p><b>Precautions about Pacemaker Pulse Detection</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>When a spontaneous QRS and pacemaker pulse overlaps (as in a fusion beat), QRS detection will be suspended and the heart rate will be reduced.</li> <li>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.</li> </ul>
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### 1 Select **ON** or **OFF** for "Pacemaker Pulse".



**ON** will display the pacemaker pulse in a different color from the ECG waveform. This will automatically be set to

**ON** when "Used" is selected for pacemaker use.

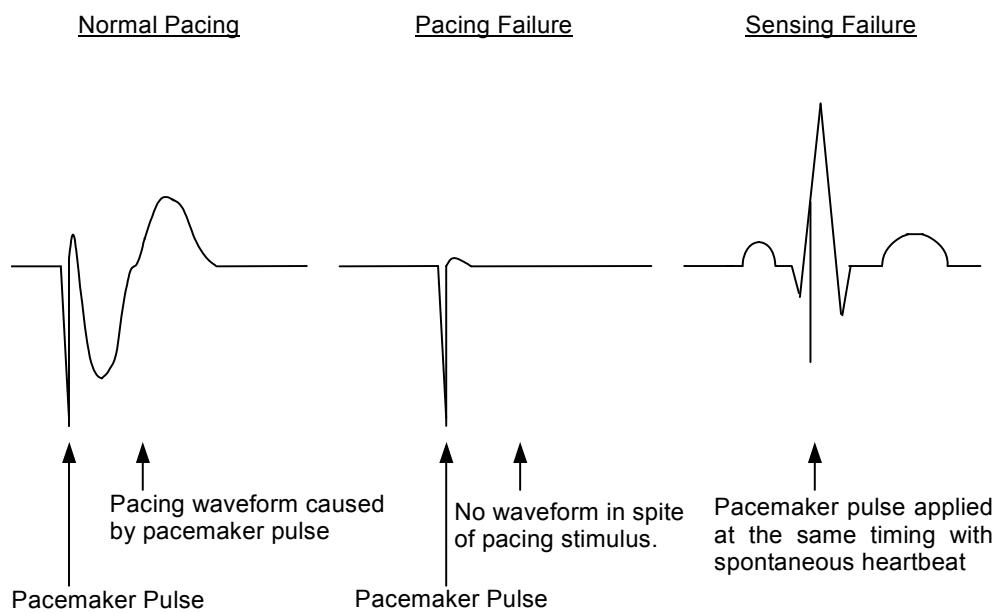
**OFF** will not display the pacemaker artificial pulse.

### ●QRS Pace Pulse Mask

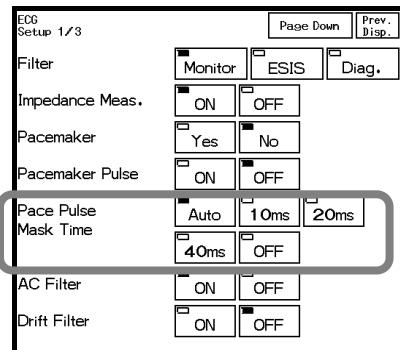
For patients using pacemakers, there are cases when the paced QRS may not occur in spite of the pacing stimulus. This condition is called "pacing failure", or "failure to capture". To avoid detecting pacemaker pulses as a QRS complex, the monitor has a function to suspend QRS detection for a fixed amount of time starting from the detection of the pacing stimulus. This function is called "pace pulse mask".

Signal with amplitude of  $\pm 2$  to  $\pm 700\text{mV}$ , pulse width of 0.1 to 2.0ms will be masked as a pace pulse. 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 : **ON**)

 <b>WARNING</b>	<p>If the QRS pace mask function is set to <b>OFF</b>, <b>10ms</b>, or <b>20ms</b>, 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 <b>OFF</b>, <b>10ms</b>, or <b>20ms</b> only if you are sure that pacing failure will not occur, or when the patient can be constantly monitored.</p>
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### 1 Select the pace pulse mask time.



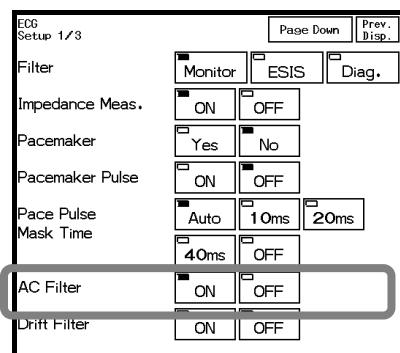
Select from **10ms**, **20ms**, **40ms** depending on the pace pulse amplitude or presence of fusion beat.

Selecting **Auto** will automatically mask the pace pulse depending on the amplitude.

Selecting **OFF** will set the mask time to 0ms.

### ●AC Filter

### 1 Select **ON** or **OFF** for the AC filter.



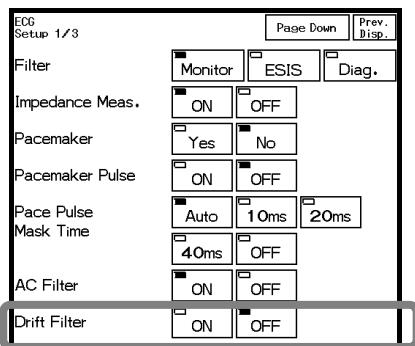
Selecting **ON** will set the AC filter which attenuates the AC noise of 50 to 60Hz.

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 Select **ON** or **OFF** for the ECG drift filter.

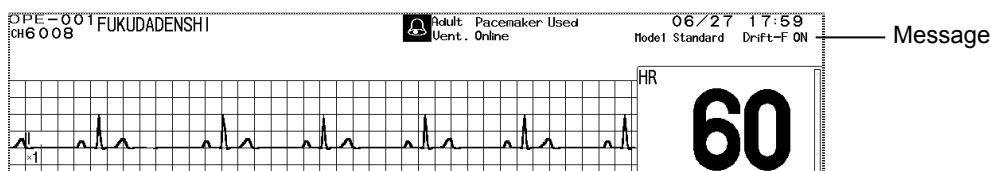


Selecting **ON** will set the ECG drift filter and controls the baseline drift.

When the ECG drift filter is set, the patient signal display 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.



Instead of "Drift-F ON" message, the enlarged time can be displayed depending on the setup.  
For procedures, refer to "4. Monitoring Setup –Display Setup–".

## ●Automatic Lead Switching

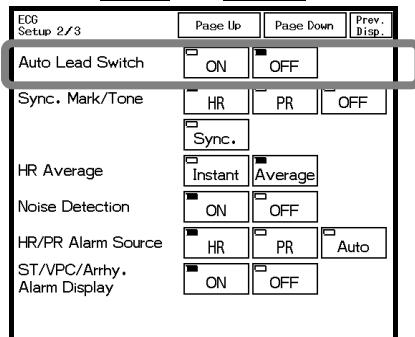
When the Lead-Off condition occurs, the "Check Electrodes" message will be displayed and a new ECG lead will be automatically set if the "Automatic Lead Switching" is set to ON.  
The automatic lead switching will be performed for ECG 1 and ECG 2.

### Lead Switching when Electrode is Detached

Lead Type	Detached Electrode	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

- 1 Press the **Page Down** key to display the 2nd page of the ECG setup menu.

Select **ON** or **OFF** for "Auto Lead Switch".



**ON** will automatically switch to another lead when an electrode is detached.

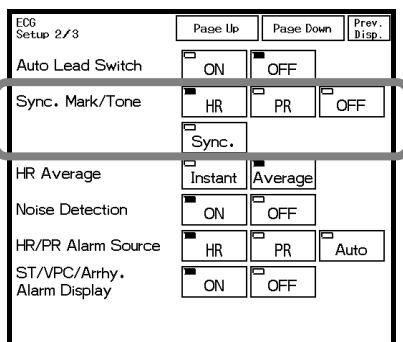
**OFF** will not switch the lead when an electrode is detached.

## ●Synchronization Mark/Tone

A mark synchronized to HR or PR can be displayed inside the numeric data box.  
A synchronization tone will be also generated.



- 1 Select [HR], [PR] or [OFF] for “Sync. Mark/Tone” on the 2nd page of the ECG setup menu.**



[HR] will display a mark synchronized to HR and will generate HR synchronized tone.

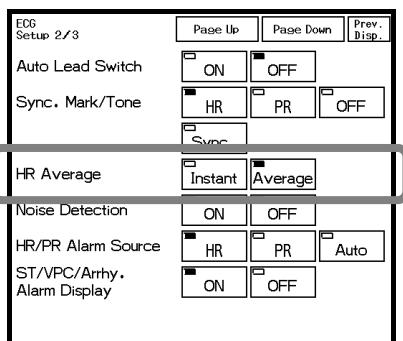
[PR] will display a mark synchronized to BP or SpO<sub>2</sub> according to the priority set for the PR source on the BP setup menu or SpO<sub>2</sub> setup menu. A PR synchronized tone will be also generated.

[OFF] will not display a synchronized mark and will not generate a synchronized tone.

## ●HR Average Method

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

- 1 Select [Instant] or [Average] for “HR Average” on the 2nd page of the ECG setup menu.**

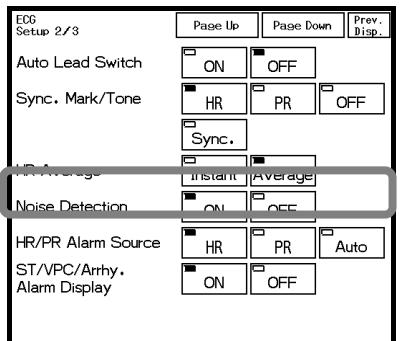


[Instant] will display the HR measured from RR interval for each heartbeat.

[Average] will display the average HR measured for 6 seconds for adult and child, and 3 seconds for neonate.

## ●Noise Detection

- 1 Set the “Noise Detection” on the 2nd page of the ECG setup menu.**



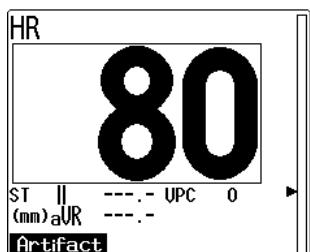
[ON] will automatically switch the HR numeric data and HR synchronized tone to PR when electrical surgery noise or motion artifact is detected.

If PR is not measured, HR data before the noise was detected will remain displayed.

During this condition, HR synchronized tone will not be generated.

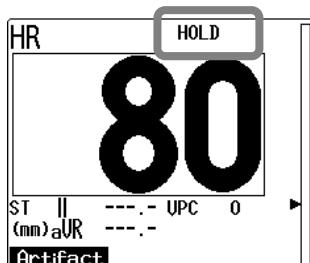
[OFF] will not switch HR to PR even when noise is detected.

**When ON is selected for “Noise Detection”**



If some noises are detected and PR is also measured, HR data will switch to PR.

The measurement data will be surrounded by a red box to indicate that an artifact is present.



If PR is not measured, then the HR data before the noise detection remains displayed (with HOLD showing inside the parameter box).

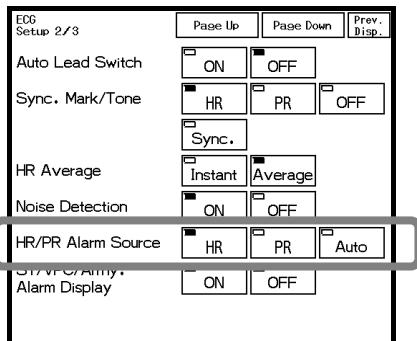
The measurement data will be surrounded by a red box to indicate that an artifact is present.



**CAUTION** Arrhythmia may be erroneously detected as noise.

## ●HR/PR Alarm Source

### 1 Set the “HR/PR Alarm Source” on the 2nd page of the ECG setup menu.



HR will generate the alarm based on HR.

PR will generate the alarm based on BP or SpO<sub>2</sub> according to the priority set for the PR source on the BP setup menu or SpO<sub>2</sub> setup menu.

Auto will automatically select the alarm source according to the priority set on the “Source Setup” (Initial Settings).

#### WARNING

The HR/PR alarm will not be generated unless the numeric data box corresponded to the selected HR/PR alarm source is displayed. When the HR/PR alarm source selection is changed, be sure to display the numeric data box corresponded to the selected HR/PR source.

#### CAUTION

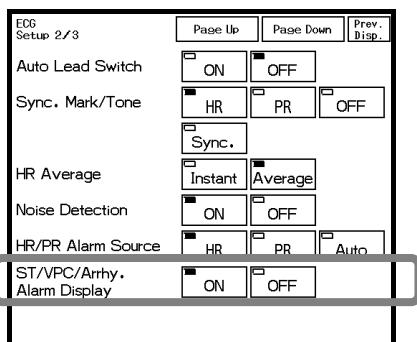
If “HR/PR Alarm Source” is PR, and “PR Source” is BP, the ECG waveform will not be transmitted on a wired network. On the central monitor, PR-IBP value will be displayed for HR. However, the HR value from ECG will be displayed on the NIBP list and ST measurement table.

#### NOTE

- The synchronized mark will be displayed inside the numeric data box for the selected “Sync. Mark/Tone” source regardless of the “HR/PR Alarm Source” setting.
- The “Sync. Mark/Tone” and “HR/PR Alarm Source” settings will be synchronized with the  HR/PR user key function.

## ●ST/VPC/Arrhy. Alarm Display

### 1 Set the “ST/VPC/Arrhy. Alarm Display” on the 2nd page of the ECG setup menu.



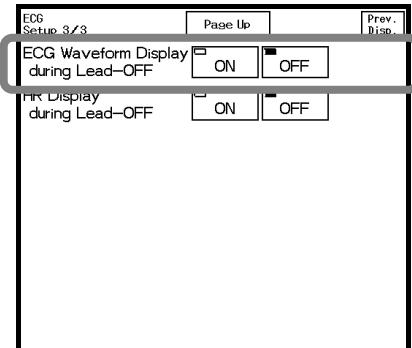
ON will display the ST, VPC, arrhythmia alarm factor on the ECG numeric data box.

OFF will not display the ST, VPC, arrhythmia alarm factor on the ECG numeric data box.

## ●ECG Waveform Display during Lead-OFF

When a lead-off condition is detected, whether or not to display the waveform for detached lead can be selected.

### 1 Set the “ECG Waveform Display during Lead-OFF” on the 3rd page of the ECG setup menu.



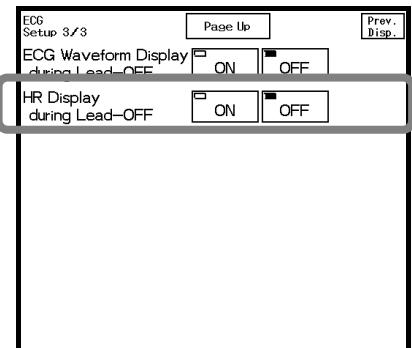
[ON] will display the ECG waveform even during lead-off condition.

[OFF] will display the ECG waveform in baseline during lead-off condition.

## ●HR Display during Lead-OFF

When a lead-off condition is detected for the lead used for HR measurement or arrhythmia analysis, whether or not to display the HR data can be selected.

### 1 Set the “HR Display during Lead-OFF” on the 3rd page of the ECG setup menu.

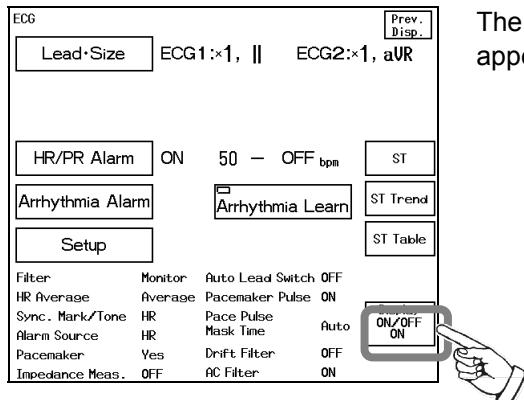


[ON] will display the HR data even during lead-off condition.

[OFF] will not display the HR data during lead-off condition.

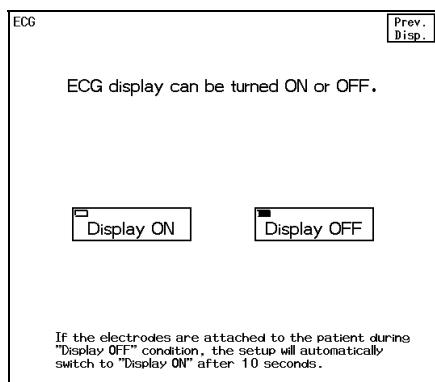
## ON/OFF of Parameter Display

- 1 Press the **Display ON/OFF** key.



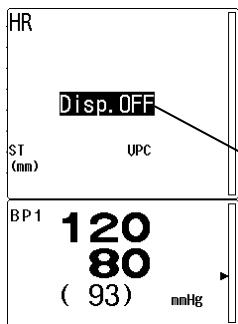
The confirmation display for the ON/OFF of ECG display will appear.

- 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 numeric data box.

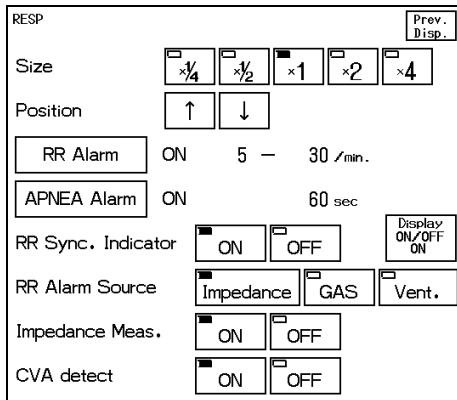
When ECG electrodes are attached to the patient with the ECG display set to OFF, the ECG waveform and numeric data will be automatically displayed after 10 seconds.



**CAUTION** When the waveform and numeric data display is set to OFF, the alarm generation and table/ trend data input will also be suspended..

## Respiration

This menu allows setting the impedance respiration measurement, gas respiration measurement, and ventilator respiration measurement.

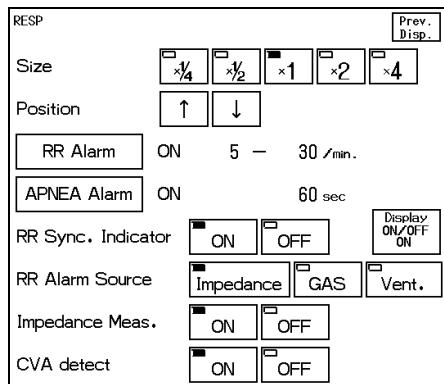


- Size** : Selects the waveform size to display the impedance respiration.  
**RR Alarm** : Selects ON/OFF for respiration rate alarm, and sets the upper and lower alarm limits.  
**Apnea Alarm** : Selects ON/OFF for apnea alarm and sets the upper alarm limit.

<b>CAUTION</b>	<ul style="list-style-type: none"><li>When the following relay cables are used, respiration cannot be measured.<ul style="list-style-type: none"><li>Relay Cable CI-700E-3 (FA) (defibrillation and electrosurgery-proof, 3-electrode)</li><li>Relay Cable CI-700E-4 (FA) (defibrillation and electrosurgery-proof, 4-electrode)</li><li>Relay Cable CI-700E-5 (FA) (defibrillation and electrosurgery-proof, 5-electrode)</li></ul></li><li>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.</li></ul>
----------------	---

## Waveform Size and Baseline Position

- 1 Press the respiration numeric data box to display the respiration setup menu.**



Set the waveform size and baseline position for the impedance respiration display and recording.

- 2 Select the waveform size.**

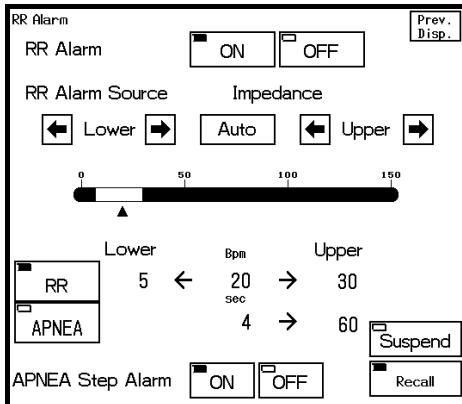
Select from  $\times 1/4$ ,  $\times 1/2$ ,  $\times 1$ ,  $\times 2$ ,  $\times 4$ .

- 3 Adjust the baseline position using the  $\uparrow$ ,  $\downarrow$  keys.**

Adjust the baseline position if the waveform is hard to see due to the waveform amplitude. The baseline position for recording will not change with this adjustment.

## RR Alarm/Apnea Alarm

- Press the **RR Alarm** key to display the alarm setup menu.



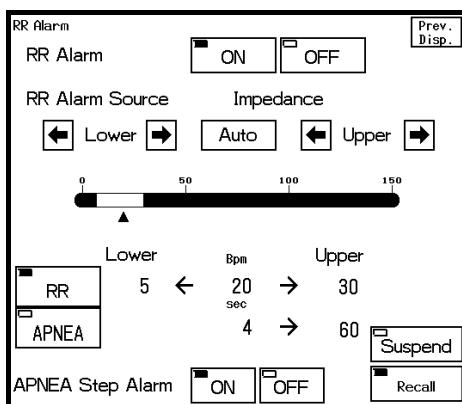
- Set ON/OFF of the RR alarm.

RR Alarm       ON       OFF

ON will generate a RR alarm.

OFF will not generate a RR alarm.

- Press the **RR** key, and set the upper and lower limit for the RR alarm.



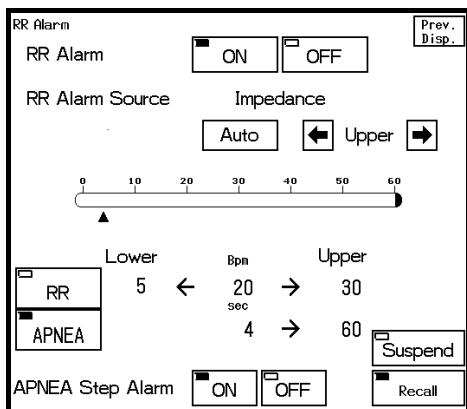
The set alarm limit will be applied to RR measured from the impedance respiration waveform, ventilator, or multigas unit.

The adjustable increment for upper and lower limit depends on the patient classification.

Adult : 5Bpm increment  
Child/Neonate : 2Bpm increment

Key	Item	Description
▲	Current Value	Indicates the current value.
◀ Lower ▶	Lower Alarm Limit	Range: 5 to 145Bpm (Adult) 2 to 148Bpm (Child/Neonate) Setting the value to 5Bpm or below (2Bpm or below for child/neonate) will turn OFF the alarm.
◀ Upper ▶	Upper Alarm Limit	Range: 10 to 150Bpm (Adult) 4 to 150Bpm (Child/Neonate) 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.

**4 Press the **APNEA** key to light the key indicator, and set the upper limit of the apnea alarm.**



The set alarm limit will be applied to the apnea time measured from the impedance respiration waveform, ventilator, or multigas unit.

The upper limit can be set in 5-second increment. There is no lower limit.

Key	Item	Description
<b>[ ON ] [ OFF ]</b>	Individual Setup	Selecting <b>[ ON ]</b> will generate the apnea alarm. Selecting <b>[ OFF ]</b> will not generate the apnea alarm.
<b>▲</b>	Current Value	Indicates the current value. (-6 sec. for neonate.)
<b>[ ← ] Upper [ → ]</b>	Upper Alarm Limit	Sets the upper alarm limit (10 to 60sec.). Setting the value equal to or above 60sec. will turn OFF the alarm.
<b>Auto</b>	Automatic Setup	Sets the alarm limit to 60sec. Also, "APNEA Step Alarm" will be set to ON.
<b>[ Suspend ]</b>	Suspend Alarm	Suspends the RR and apnea alarm even if the thresholds are exceeded.

**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.)

**5 Select ON/OFF for "APNEA Step Alarm".**

The "Apnea Step Alarm" selection will be displayed when the upper limit of apnea alarm is set to 30 seconds or above.

APNEA Step Alarm    **[ ON ] [ OFF ]**

Selecting **[ ON ]** will generate level 3 alarm sound (single beep tone) at 1/3 and 2/3 of the apnea upper alarm limit along with an "Apnea Alarm" message.

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 **[ ON ]** for "Backup at Discharge" on the Discharge Mode setup menu under the Initial Settings.



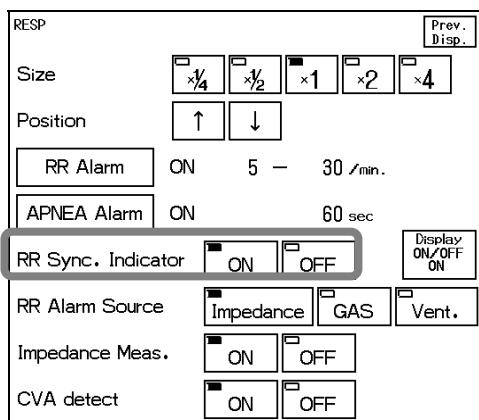
Refer to "9. Initial Settings –Alarm Mode Setup–" for procedure to program the alarm mode.

## Respiration Monitoring Condition Setup

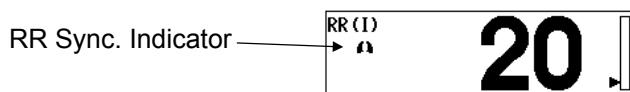
### ●RR Synchronization Mark

The RR mark synchronized to impedance respiration, multigas unit, or ventilator will be displayed inside the numeric data box.

- Select **ON** or **OFF** for "RR Sync. Indicator".



**ON** will display the synchronized mark.  
**OFF** will not display the synchronized mark.



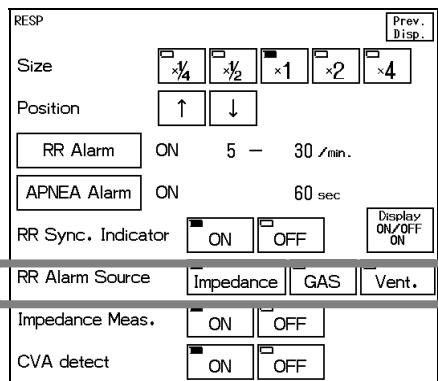
### ●RR Alarm Source

The parameter to display the RR synchronized mark and to generate the RR/Apnea alarm can be selected from the Impedance RR, Gas RR, and Ventilator RR.

The RR Alarm Source will be displayed inside the respiration numeric data box.



- Select the RR Alarm Source.



**Impedance** will generate RR alarm and display the RR synchronization mark based on the impedance respiration curve.

**GAS** will generate RR alarm and display the RR synchronization mark based on the RR measured by the multigas unit.

**Vent.** will generate RR alarm and display the RR synchronization mark based on the RR measured by the ventilator.



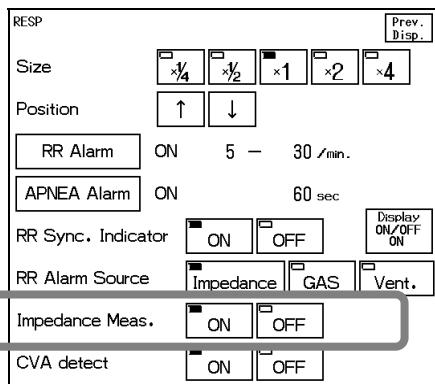
If the RR alarm source is other than the impedance respiration, the respiration waveform will not be transmitted on the wired network.

## ●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 an 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 Select **ON** or **OFF** for “Impedance Measurement”.



**ON** will perform impedance respiration measurement.  
**OFF** will stop the impedance respiration measurement.

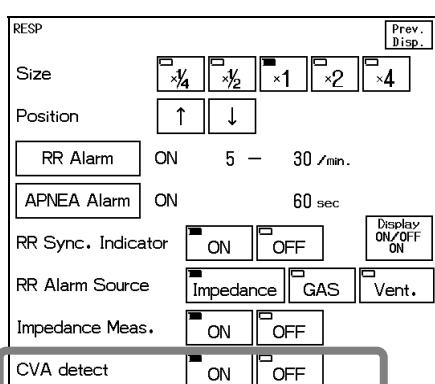
## ●CVA Detection

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.

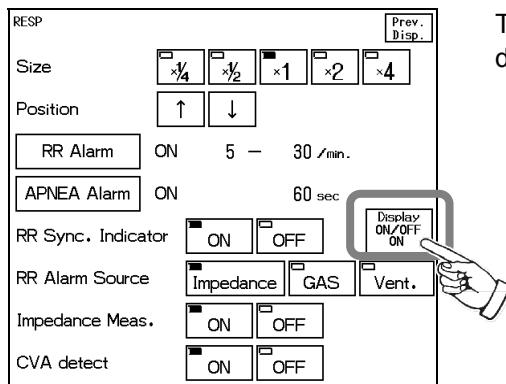
### 1 Select **ON** or **OFF** for “CVA Detection”.



**ON** will generate an alarm and display a message when CVA is detected.  
**OFF** will not perform CVA detection.

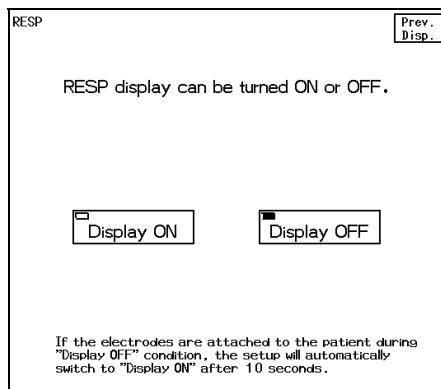
## ON/OFF of Parameter Display

- 1 Press the **Display ON/OFF** key.



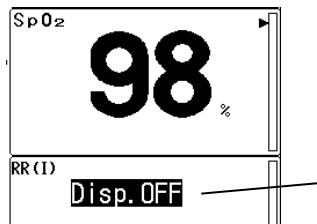
The confirmation display for the ON/OFF of respiration display will appear.

- 2 Select **Display ON** or **Display OFF**.



**Display ON** key will display the waveform and numeric data.

**Display OFF** key will not display the waveform and numeric data.



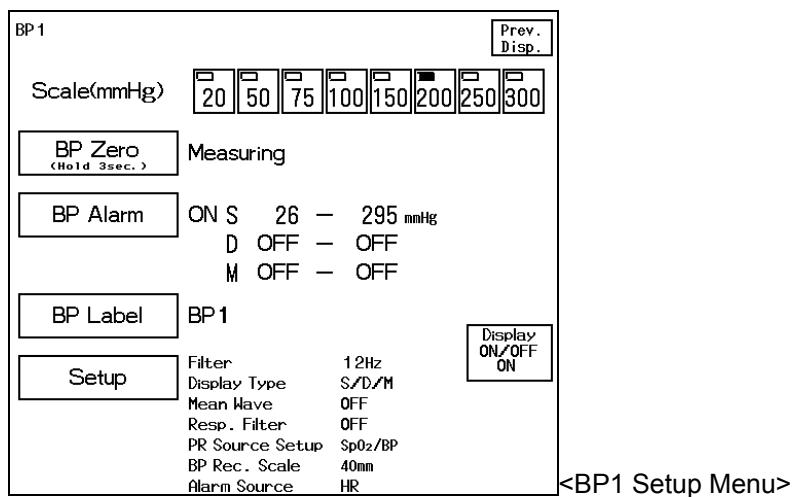
When ECG electrodes are attached to the patient with the respiration display set to OFF, the respiration waveform and numeric data will be automatically displayed after 10 seconds.



CAUTION When the waveform and numeric data display is set to OFF, the alarm generation and table/ trend data input will also be suspended.

## Invasive Blood Pressure (BP1 to BP6)

This menu allows setting the measurement condition for BP1 to BP6.



<BP1 Setup Menu>

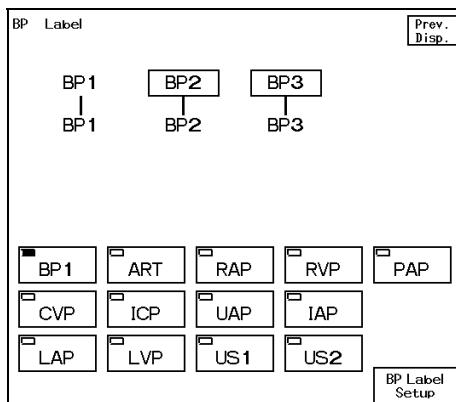
- Scale : Selects the scale for BP waveform display.  
BP Zero : Performs zero balance.  
BP Alarm : Sets the upper and lower alarm limit of systolic, diastolic, mean blood pressure and ON/OFF for the alarm.  
Label : Select the label for the measurement site.  
Setup : Sets the BP monitoring condition.

### ⚠ CAUTION

When the main power is turned ON, the BP value will not be displayed until the zero balance is performed. Make sure to perform the zero balance. However, if the power is turned ON within 30 seconds 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 **BP 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, 3 characters
US2	BP User Label 2, 3 characters



Refer to "9. Initial Settings –BP User Label–" for procedure to set the BP user label.

### NOTE

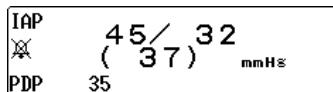
#### Default BP Label

The BP1 to BP6 label will be set in the order from the top of the option units at the time of power ON.  
The BP label cannot be set individually for each option unit.

## ●When the BP Label is IAP

When the BP label is IAP, PDP (Peak Diastolic Pressure) will be displayed in addition to systolic (S), diastolic (D), and mean (M) pressure.

Please be aware that the Systolic Pressure (SYS) = Peak Systolic Pressure (PSP).



- Note that the Systolic Pressure (SYS) = Peak Systolic Pressure (PSP) for 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” or “cmH<sub>2</sub>O”.

The measurement unit can be selected on the preset menu. The selected unit will be displayed on the BP numeric data box.



Refer to “9. Initial Settings –Measurement Unit–” 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.

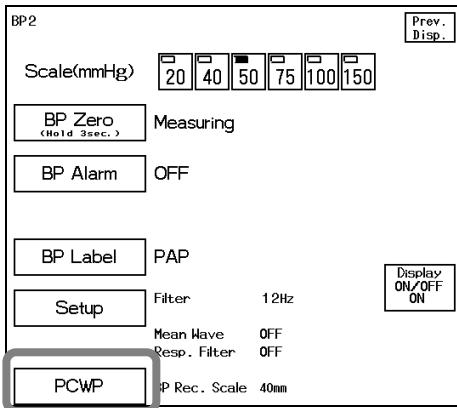
If CPP is a negative value, the value will not be displayed. Also, the alarm cannot be set for CPP.



## PCWP Measurement

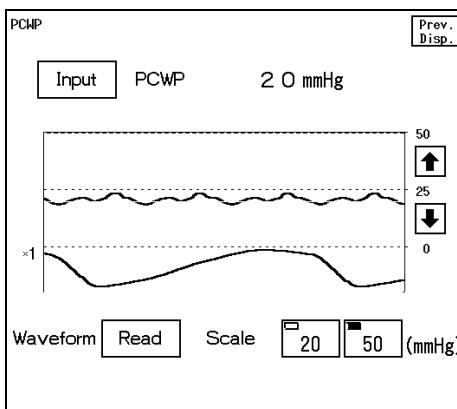
When PAP is set as BP label, the mean value can be displayed as PCWP (Pulmonary Capillary Wedge Pressure).

### 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.

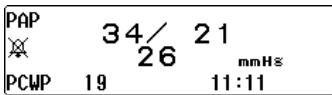
PCWP waveform and respiration waveform will be displayed.  
The cursor point indicates the current mean pressure.

### 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 for optimum view.

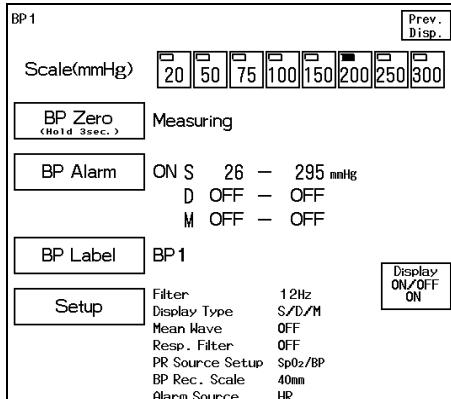
### 5 Press the **Input** key.

Press the **Input** key when the PCWP value is correctly set.  
The PCWP value will be displayed inside the PAP (BP label) numeric data box with the measurement time.  
Also, this value will be input to the trend data.



## BP Scale

### 1 Select the scale on the BP setup menu.



Select the full scale for displaying and recording.  
The scale selection will differ depending on the label.

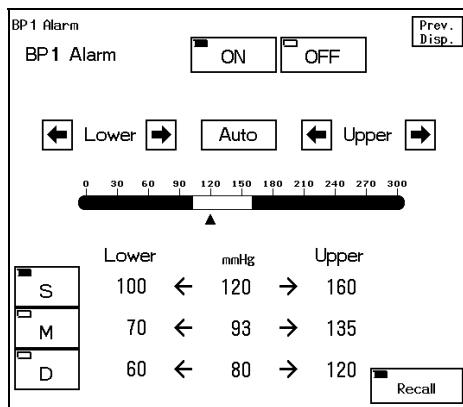
<b>BP Label</b>	<b>Scale</b>
BP1 to BP6, UAP, User Label	20, 50, 75, 100, 150, 200, 250, 300 (mmHg) 4, 8, 12, 16, 20, 24, 32, 40 (kPa)
ART, LVP, IAP	50, 75, 100, 150, 200, 250, 300 (mmHg) 8, 12, 16, 20, 24, 32, 40 (kPa)
PAP, RVP	20, 40, 50, 75, 100, 150 (mmHg) 4, 6, 8, 12, 16, 20 (kPa)
CVP, RAP, LAP	10, 20, 30, 40, 50, 100 (mmHg) 2, 4, 5, 6, 8, 16 (kPa) 20, 40 (cmH <sub>2</sub> O) * only for CVP
ICP	5, 10, 15, 20, 50, 100 (mmHg) 1, 2, 3, 4, 8, 16 (kPa)



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 is to be set for each measurement unit. (mmHg / kPa)  
The adjustable increment for upper and lower limit changes from 50mmHg / 7kPa.

mmHg : 0 to 50mmHg / 2mmHg increment  
55 to 300mmHg / 5mmHg increment  
kPa : 0 to 7kPa / 0.2kPa increment  
7.5 to 40.0kPa / 0.5kPa increment

Key	Item	Description
<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF	Individual Alarm	Selecting <input checked="" type="checkbox"/> ON will generate BP alarm. Selecting <input type="checkbox"/> OFF will not generate BP alarm.
▲	Current Value	Indicates the current value.
<input checked="" type="checkbox"/> S <input type="checkbox"/> M <input type="checkbox"/> D		Select from S (systolic BP), D (diastolic BP), M (mean BP).
<input type="button"/> Lower <input type="button"/>	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.
<input type="button"/> Upper <input type="button"/>	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.
<input type="checkbox"/> 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  ON for "Backup at Discharge" on the Discharge Mode setup menu under the Initial Settings.

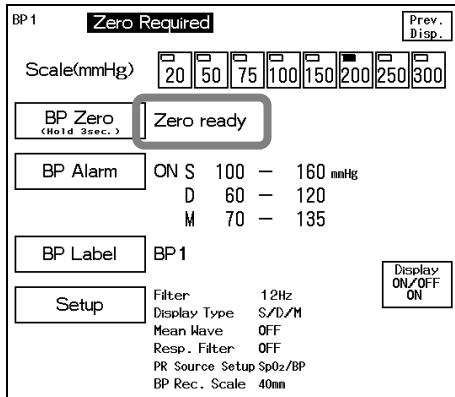


For the alarm mode setup procedure, refer to "9. Initial Settings –Alarm Mode Setup–".

## Zero Balance

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

**2 Press the **BP Zero** key.**

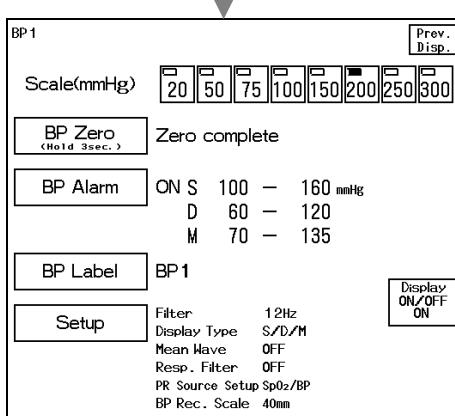
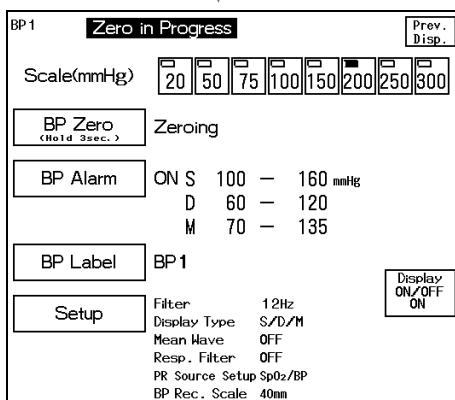


Verify that the BP waveform is positioned at zero, and "0" is displayed for the BP value.

A message, "Zero complete" will be displayed when the procedure is complete.

A message, "Zero failed" will be displayed when the process fails. The three-way valve may not be opened to air, noise has interfered, or the transducer may be defective. Check the cause and try the zero balance procedure again.

A message, "Disconnect" 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.**

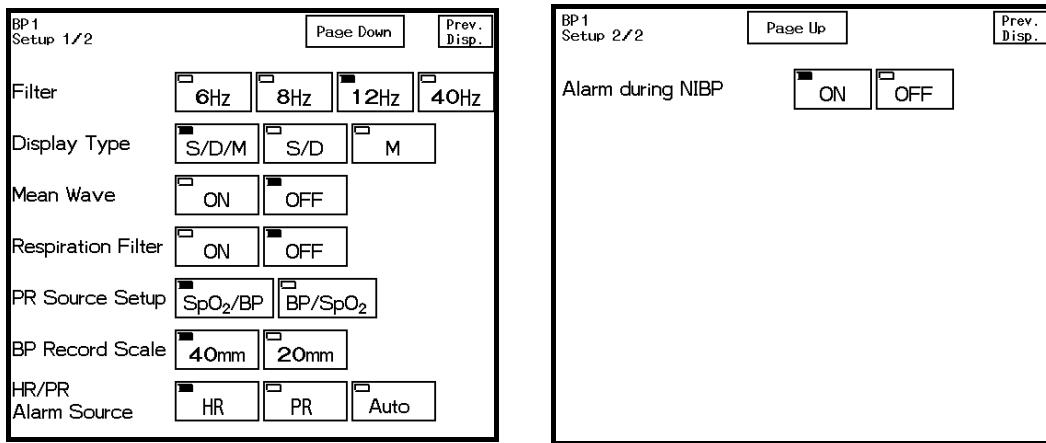


**CAUTION**

Each time the blood pressure transducer or tubing is replaced, the zero balance procedure is required to ensure accurate measurements.

## BP Monitoring Condition Setup

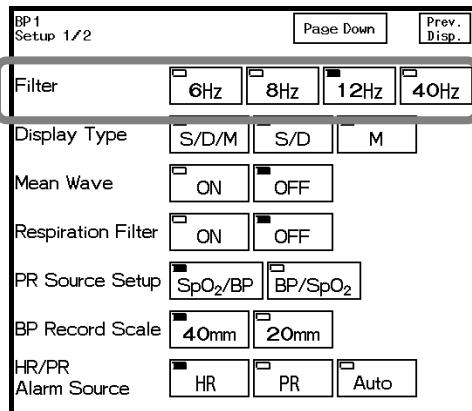
Pressing the **Setup** key on the BP menu will display the BP setup menu and allows to set the BP monitoring condition.



### ●Filter Selection

A noise may interfere on the BP waveform depending on the combination of BP measurement circuit. Select an appropriate filter from the low-pass filter of 6Hz, 8Hz, 12Hz, or 40Hz.

#### 1 Select the filter.

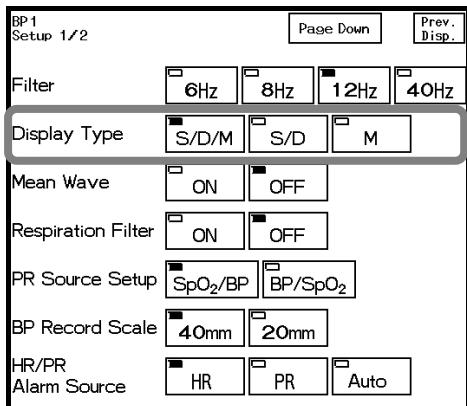


Select the appropriate filter from **6Hz**, **8Hz**, **12Hz**, **40Hz**.

## ●Display Format of BP Numeric Data

The display format of BP numeric data can be selected from systolic / diastolic / mean, systolic / diastolic, or mean BP. If the BP label is CVP, PAP, ICP, or IAP, this selection is not possible.

### 1 Select the display format.



BP1  
116/  
( 92 )  
mmHg

S/D/M will display the systolic / diastolic / mean pressure.

BP2  
23/  
10  
mmHg

S/D will display the systolic / diastolic pressure.

BP3  
26  
mmHg

M will display only the mean pressure.

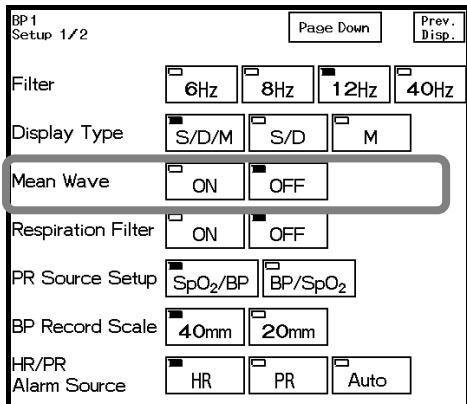


**CAUTION** The underplayed BP data (S/D/M) will not generate a BP alarm or be displayed in the table data. Select the appropriate display format according to the monitoring purpose.

## ●Mean BP Waveform Display

The mean BP waveform can be set to be continuously displayed on the home display.

### 1 Select ON or OFF for mean BP waveform display.



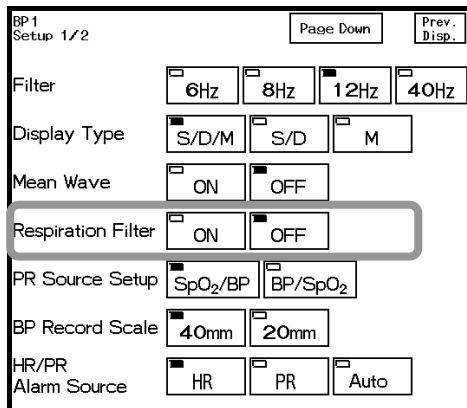
Selecting  ON will display the mean BP waveform and "Mean Wave" will be displayed inside the numeric data box.

BP2  
23/  
( 20 )  
Mean Wave  
18  
mmHg

## ●Respiration Filter

The BP waveform baseline drift caused by the respiration influence can be prevented by setting the respiration filter ON.

### 1 Select **ON** or **OFF** for “Respiration Filter”.



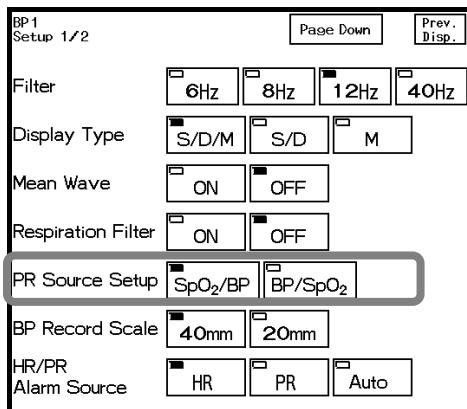
**ON** will set the respiration filter.

**OFF** will not set the respiration filter.

## ●PR Source (BP or SpO<sub>2</sub>)

The HR synchronized mark will be also displayed with the selected PR source. This selection will be displayed only for the BP setup menu of BP1 and ART label.

### 1 Select the PR source.



**SpO<sub>2</sub>/BP** will prioritize SpO<sub>2</sub> as measurement source for PR. When PR cannot be measured with SpO<sub>2</sub>, the measurement source will switch to BP.

**BP/SpO<sub>2</sub>** will prioritize BP as measurement source for PR. When PR cannot be measured with BP, the measurement source will switch to SpO<sub>2</sub>.

### CAUTION

If “HR/PR Alarm Source” is PR, and “PR Source” is BP, ECG waveform will not be transmitted on a wired network. On the central monitor, PR-IBP value will be displayed for HR. However, HR value from the ECG will be displayed for the NIBP list and ST measurement table.

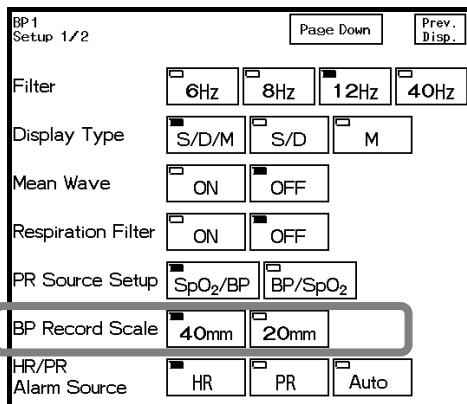
### NOTE

- If PR source is BP, make sure to measure the corresponded BP (BP1 or ART). Otherwise PR will be displayed as “---”.
- The “Sync. Mark/Tone” (ECG setup) and “HR/PR Alarm Source” settings will be synchronized with the **HR/PR** user key function.

## ●BP Recording Scale

The scale for BP1 to BP6 waveform when recording on the built-in recorder can be selected.

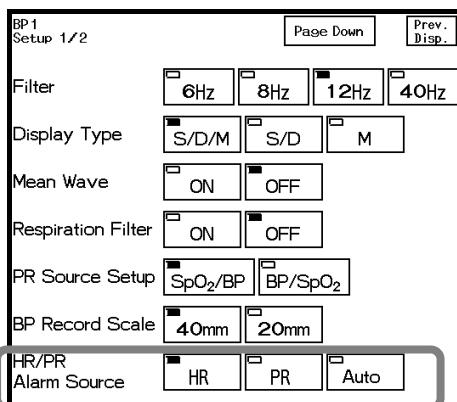
### 1 Set the BP recording scale.



Select [40mm] or [20mm].

## ●HR/PR Alarm Source

### 1 Set the "HR/PR Alarm Source".



[HR] will generate an alarm based on HR.

[PR] will generate an alarm based on BP or SpO<sub>2</sub> according to the priority set for the PR source on the BP setup menu or SpO<sub>2</sub> setup menu.

[Auto] will automatically select the alarm source according to the priority set on the "Source Setup" (Initial Settings).

**WARNING** The HR/PR alarm will not be generated unless the numeric data box corresponded to the selected HR/PR alarm source is displayed. When the HR/PR alarm source selection is changed, be sure to display the numeric data box corresponded to the selected HR/PR source.

**CAUTION** If "HR/PR Alarm Source" is PR, and "PR Source" is BP, the ECG waveform will not be transmitted on a wired network. On the central monitor, the PR-IBP value will be displayed for HR. However, the HR value from ECG will be displayed for the NIBP list and ST measurement table.

**NOTE**

- If PR source is BP, make sure to measure the corresponded BP (BP1 or ART). Otherwise PR will be displayed as "—".
- The "Sync. Mark/Tone" (ECG setup) and "HR/PR Alarm Source" settings will be synchronized with the [HR/PR] user key function.

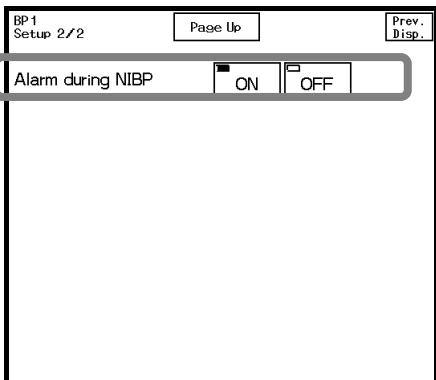
## ●Alarm During NIBP

This setup can be used when the SpO<sub>2</sub> 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 the SpO<sub>2</sub> and PR, and may generate an improper alarm.

Selecting [OFF] will not generate the alarm until the NIBP measurement is complete. Similarly, when the PR source is set as [BP], the PR alarm will not be generated during NIBP measurement.

## 1 Set the “Alarm During NIBP”.

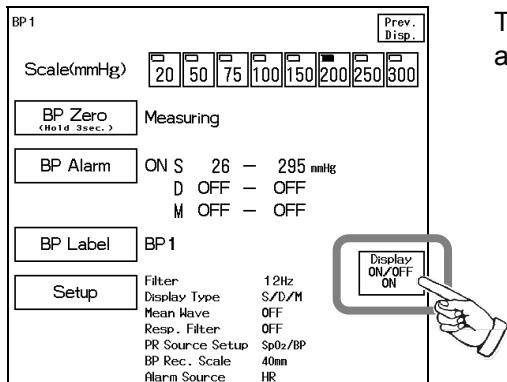


**ON** will generate the alarm even during NIBP measurement.

**OFF** will not generate the BP alarm, PR alarm during NIBP measurement.

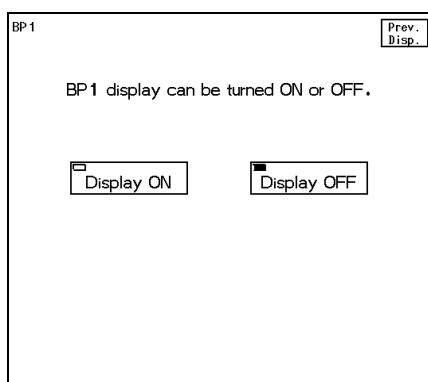
## ON/OFF of Parameter Display

### 1 Press the **Display ON/OFF** key.



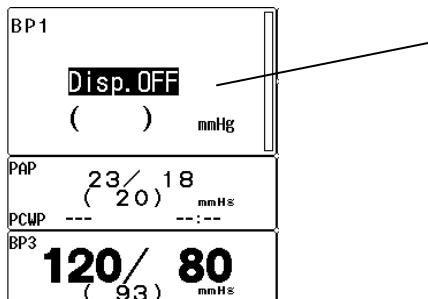
The confirmation display for the ON/OFF of BP display will appear.

### 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.

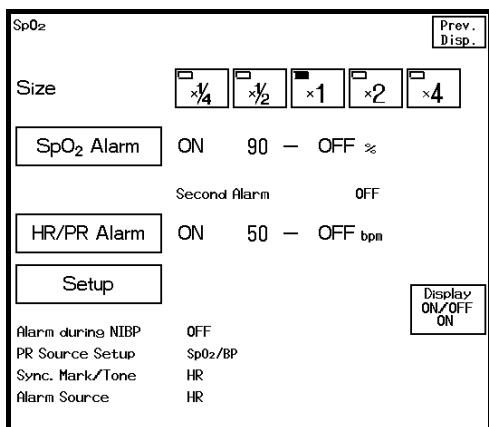


The Display OFF message will be displayed inside the numeric data box.



- When the waveform and numeric data display is set to OFF, the alarm generation and table/trend input will also be suspended.
- If the display of the waveform / numeric data labeled as BP1 or ART is set to OFF, the BP pulse rate will not be displayed.

This menu allows setting the SpO<sub>2</sub> monitoring condition for DS-7000 (Nellcor® Model).



**Size** : Sets the pulse wave size

**SpO<sub>2</sub> Alarm** : Sets ON/OFF of the SpO<sub>2</sub> alarm, upper and lower alarm limit, and SEC alarm.

**HR/PR Alarm** : Sets ON/OFF of the HR/PR alarm, upper and lower alarm limit.

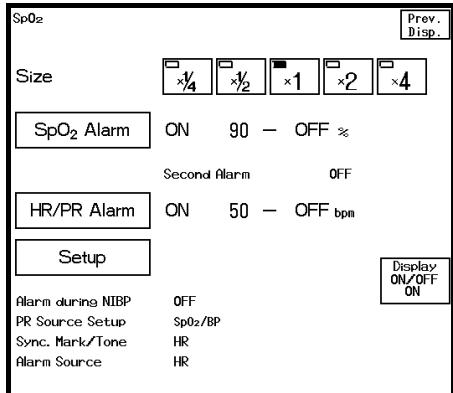
<b>⚠ CAUTION</b>	Take the following precautions when monitoring over a long periods of time. <ul style="list-style-type: none"> <li>To avoid skin rash or low-temperature burn, it is recommended to change the measurement position several times a day. Be especially careful when continuously using on neonates, infants, or patients with peripheral circulatory disturbance.</li> <li>Direct sunlight to the sensor area can cause measurement error. Place a black or dark cloth over the sensor in these environments. When not measuring, unplug the relay cable and sensor from the SpO<sub>2</sub> connector. Otherwise, the outside light may affect the displayed measurements.</li> </ul>
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<b>⚠ CAUTION</b>	<ul style="list-style-type: none"> <li>The DS-100A is intended for use on finger for adults weighing over 40 kg (approximate). Do not use them on children or neonates. Also do not apply them on the thumb or foot.</li> <li>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.</li> <li>The DS-100A is not designed for long-term use. Move the sensor to another finger every 4 hours or if any inhibition is detected in tissue blood flow.</li> <li>Measuring on a limb with NIBP cuff, arterial catheter, or intracatheter may result in incorrect measurement.</li> </ul>
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<b>⚠ CAUTION</b>	<ul style="list-style-type: none"> <li>Do not secure the adhesive tape too tight as it may obstruct the blood flow.</li> <li>The pulse wave is normalized for SpO<sub>2</sub> measurement. It does not indicate perfused blood volume. Check proper probe attachment by observing the pulse wave.</li> </ul>
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## Pulse Wave Size

### 1 Select the waveform size.



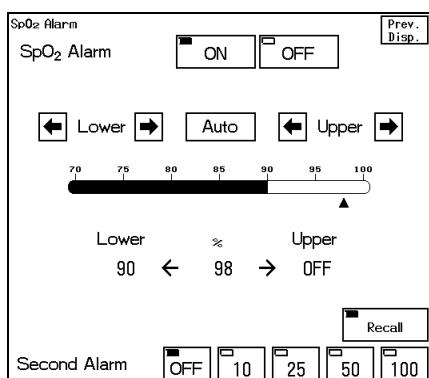
Select the waveform size for displaying and recording from  $\times 1/4$ ,  $\times 1/2$ ,  $\times 1$ ,  $\times 2$ ,  $\times 4$ .

## SpO<sub>2</sub> Alarm

### 1 Press the **SpO<sub>2</sub> Alarm** key to display the alarm setup menu.

Select ON/OFF of SpO<sub>2</sub> alarm, and set the upper and lower alarm limit.

Also, when the SpO<sub>2</sub> value is unstable around the lower alarm limit, the frequently generated alarm can be corrected by setting the SEC (second) alarm function.



The upper and lower limits can be set in 1% increment.

6

SpO<sub>2</sub>

Key	Item	Description
<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF	Individual Alarm	Selecting <input checked="" type="checkbox"/> ON will generate the SpO <sub>2</sub> alarm. Selecting <input type="checkbox"/> OFF will not generate the SpO <sub>2</sub> alarm.
▲	Current Value	Indicates the current value.
<input checked="" type="checkbox"/> Lower <input type="checkbox"/>	Lower Alarm Limit	Sets the lower alarm limit (70 to 99%). Setting the value to 70% or below will turn OFF the alarm.
<input checked="" type="checkbox"/> Upper <input type="checkbox"/>	Upper Alarm Limit	Sets the upper alarm limit (71 to 100%). Setting the value to 100% or above will turn OFF the alarm.
<input type="checkbox"/> Auto	Automatic Setup	Automatically sets the upper limit to OFF, and the lower limit to 90%.

NOTE	Whether to use the SEC (second) alarm function and its threshold selection should be based on the patient's clinical indication portent and medical evaluation.
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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 **ON** for "Backup at Discharge" on the Discharge Mode setup menu under the Initial Settings.



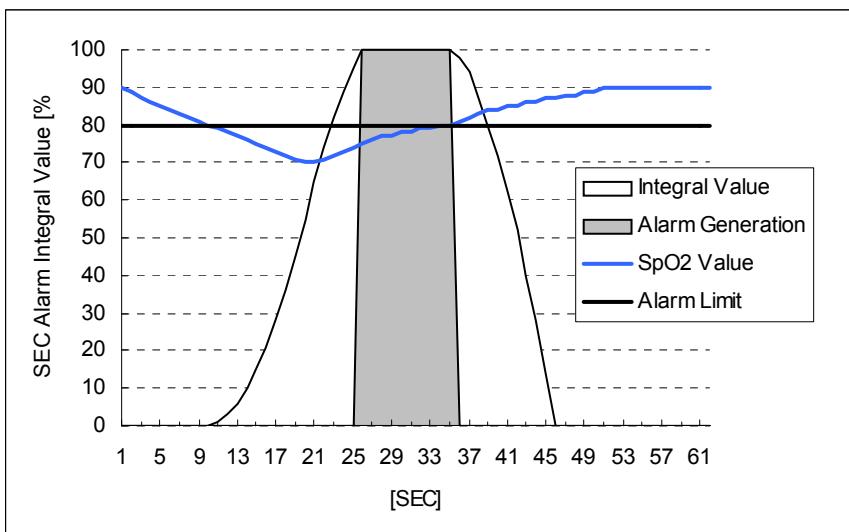
For the alarm mode setup procedure, refer to "9. Initial Settings –Alarm Mode Setup–".

## SpO<sub>2</sub> SEC Alarm Setup

When the SpO<sub>2</sub> value is unstable around the lower alarm limit, the frequently generated alarm may be bothersome. 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<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> value) is accumulated each second.

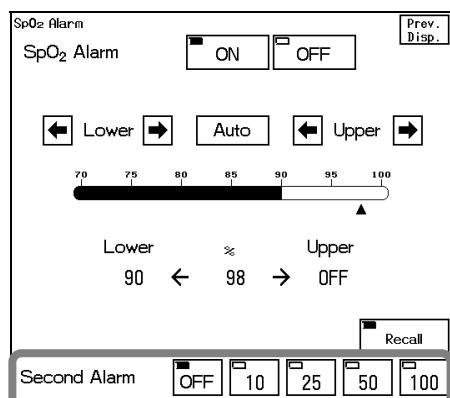
At around 25 seconds, the integral value reaches 100 and the alarm is generated.

At approximately 36 seconds, the SpO<sub>2</sub> value returns to the level within the alarm limit, and at the same time, the integral value begins to decrease. {(Alarm limit) – (SpO<sub>2</sub> value)} x 2 is subtracted each second.

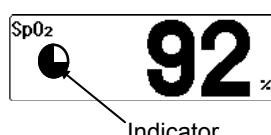
Also, there is a safety net when setting the SEC alarm function. This safety net is for the case when the SpO<sub>2</sub> value frequently falls below the alarm limit but does not last long enough to reach the SEC alarm threshold.

If the SpO<sub>2</sub> 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 Select the SEC alarm value according to the alarm frequency.



If **10** / **25** / **50** / **100** is selected, a circular SEC alarm indicator will be displayed inside the numeric data box. As the integral value increases, the indicator will begin to fill, and when it is completely filled, an alarm will be generated. If **OFF** is selected, this SEC alarm indicator will not be displayed.



#### CAUTION

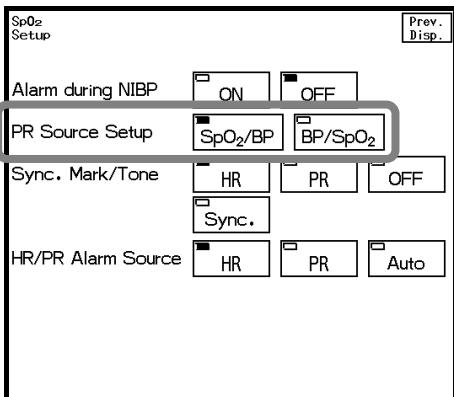
- Whether to use the SEC alarm function and its threshold selection should be based on the patient's clinical indication portent and medical evaluation.
- If the SpO<sub>2</sub> alarm and SEC alarm setup is set to OFF, the SEC alarm integral value will be set to 0.

# SpO<sub>2</sub> Monitoring Condition Setup

## ● PR Source (BP or SpO<sub>2</sub>)

The measurement source for PR can be selected. The HR synchronized mark will be also displayed with the selected PR source.

### 1 Select the PR source.



**SpO<sub>2</sub>/BP** will prioritize SpO<sub>2</sub> as measurement source for PR. When PR cannot be measured with SpO<sub>2</sub>, the measurement source will switch to BP.

**BP/SpO<sub>2</sub>** will prioritize BP as measurement source for PR. When PR cannot be measured with BP, the measurement source will switch to SpO<sub>2</sub>.

### ⚠ CAUTION

If "HR/PR Alarm Source" is PR, and "PR Source" is BP, the ECG waveform will not be transmitted on a wired network. On the central monitor, the PR-IBP value will be displayed for HR. However, the HR value from ECG will be displayed for the NIBP list and ST measurement table.

### NOTE

- If PR source is BP, make sure to measure the corresponded BP (BP1 or ART). Otherwise PR will be displayed as “---”.
- The “Sync. Mark/Tone” (ECG setup) and “HR/PR Alarm Source” settings will be synchronized with the **HR/PR** user key function.

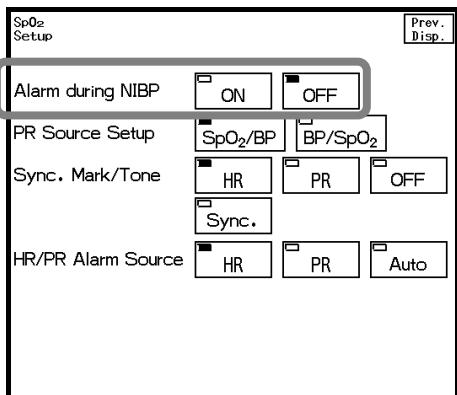
## ● SpO<sub>2</sub> Alarm during NIBP Measurement

This setup can be used when the SpO<sub>2</sub> 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<sub>2</sub> and may generate an improper alarm.

Selecting **OFF** for “Alarm during NIBP” will not generate the SpO<sub>2</sub> alarm until the NIBP measurement is complete. Similarly, when the PR source is SpO<sub>2</sub>, the PR alarm will not be generated during NIBP measurement.

### 1 Select **ON** or **OFF** for “Alarm during NIBP”.



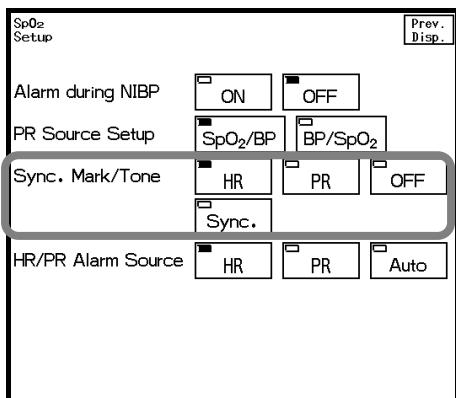
**ON** will generate a SpO<sub>2</sub>/PR alarm during NIBP measurement.

**OFF** will not generate a SpO<sub>2</sub>/PR alarm during NIBP measurement.

## ●Synchronization Mark/Tone

A mark synchronized to HR or PR can be displayed inside the numeric data box.  
A synchronization tone will be also generated.

### 1 Select **HR**, **PR** or **OFF** for “Sync. Mark/Tone”.



**HR** will display a mark synchronized to HR and will generate HR synchronized tone.

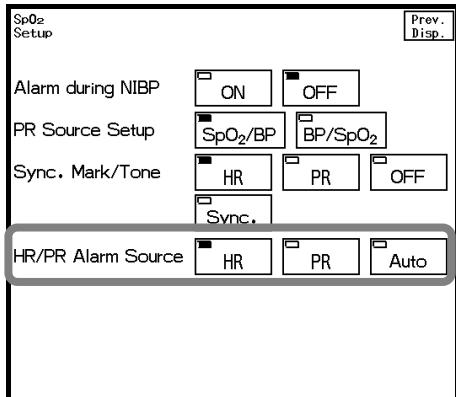
**PR** will display a mark synchronized to BP or SpO<sub>2</sub> according to the priority set for the PR source. PR synchronized tone will be also generated.

**OFF** will not display a synchronized mark and will not generate a synchronized tone.

**Sync.** will display a mark and generate a tone synchronized to HR, BP, or SpO<sub>2</sub> according to the alarm source.

## ●HR/PR Alarm Source

### 1 Set the “HR/PR Alarm Source”.



**HR** will generate an alarm based on HR.

**PR** will generate an alarm based on BP or SpO<sub>2</sub> according to the priority set for the PR source.

**Auto** will automatically select the alarm source according to the priority set on the “Source Setup” (Initial Settings).

#### WARNING

The HR/PR alarm will not be generated unless the numeric data box corresponded to the selected HR/PR alarm source is displayed. When the HR/PR alarm source selection is changed, be sure to display the numeric data box corresponded to the selected HR/PR source.

#### CAUTION

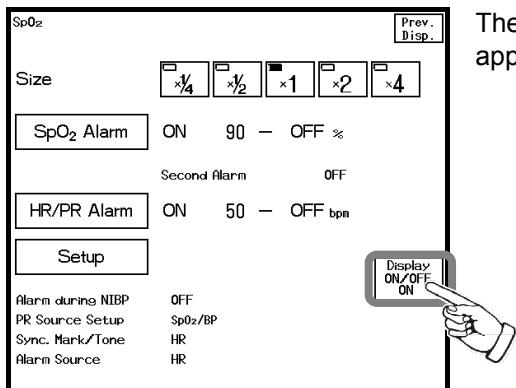
If “HR/PR Alarm Source” is PR, and “PR Source” is BP, the ECG waveform will not be transmitted on a wired network. On the central monitor, the PR-IBP value will be displayed for HR. However, the HR value from ECG will be displayed for the NIBP list and ST measurement table.

#### NOTE

- The synchronized mark will be displayed inside the numeric data box for the selected “Sync. Mark/Tone” source regardless of the “HR/PR Alarm Source” setting.
- The “Sync. Mark/Tone” and “HR/PR Alarm Source” settings will be synchronized with the **HR/PR** user key function.

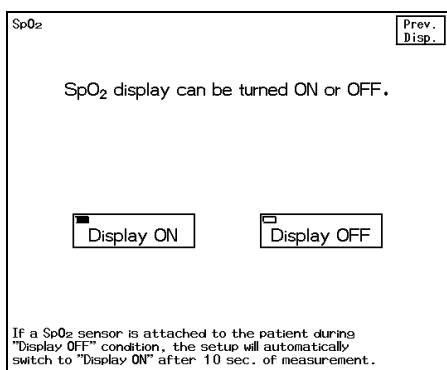
## ON/OFF of Parameter Display

- 1 Press the **Display ON/OFF** key.



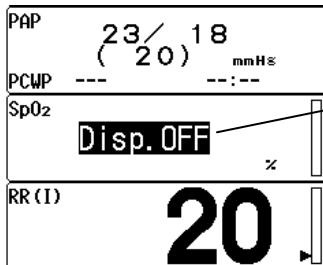
The confirmation display for the ON/OFF of SpO<sub>2</sub> display will appear.

- 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.



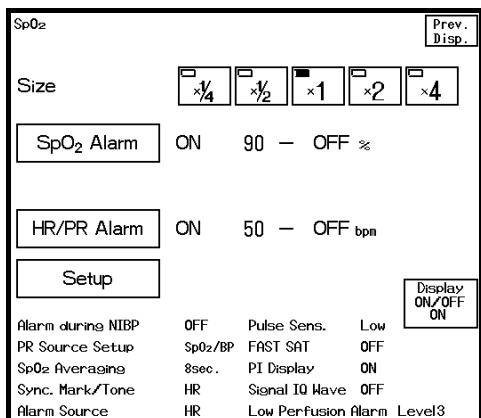
The Disp. OFF message will be displayed inside the numeric data box.

When the SpO<sub>2</sub> sensor is attached to the patient with the SpO<sub>2</sub> display set to OFF, and SpO<sub>2</sub> 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 table/trend input will also be suspended.
- When the waveform and numeric data display is set to OFF, the pulse rate measured by SpO<sub>2</sub> will not be displayed either.

This menu allows setting the SpO<sub>2</sub> monitoring condition for DS-7000M (Masimo® Model).



- Size** : Sets the pulse wave size  
**SpO<sub>2</sub> Alarm** : Sets ON/OFF the SpO<sub>2</sub> alarm, upper and lower alarm limit.  
**HR/PR Alarm** : Sets ON/OFF the HR/PR alarm, upper and lower alarm limit.  
**Setup** : Sets the SpO<sub>2</sub> monitoring condition.

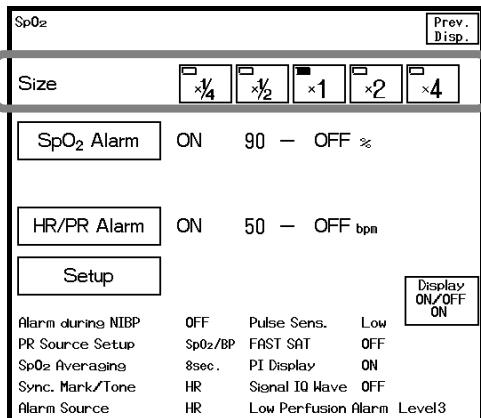
<b>CAUTION</b>	Take the following precautions when monitoring over a long period of time. <ul style="list-style-type: none"> <li>To avoid skin rash or low-temperature burn, it is recommended to change the measurement position several times a day. Be especially careful when continuously using on neonates, infants, or patients with peripheral circulatory disturbance.</li> <li>Direct sunlight to the sensor area can cause measurement error. Place a black or dark cloth over the sensor in these environments. When not measuring, unplug the relay cable and sensor from the SpO<sub>2</sub> connector. Otherwise, the outside light may affect the displayed measurements.</li> </ul>
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<b>CAUTION</b>	<ul style="list-style-type: none"> <li>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.</li> <li>The sensor is not designed for long-term use. Replace the sensor or move to another finger every 4 hours for resalable sensor, every 8 hours for disposable sensor, or if any inhibition is detected in tissue blood flow.</li> <li>Measuring on a limb with the NIBP cuff, arterial catheter, or intracatheter may result in incorrect measurement.</li> </ul>
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<b>CAUTION</b>	Do not secure the adhesive tape too tight as it may obstruct the blood flow.
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## Pulse Wave Size

### 1 Select the waveform size.

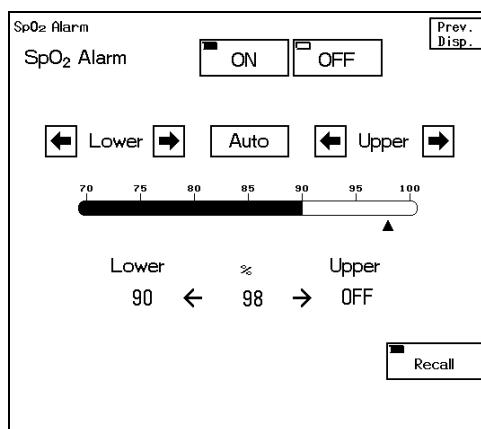


Select the waveform size for displaying and recording from  
x1/4, x1/2, x1, x2, x4.

## SpO<sub>2</sub> Alarm

### 1 Press the **SpO<sub>2</sub> Alarm** key to display the alarm setup menu.

Select ON/OFF for SpO<sub>2</sub> alarm, and set the upper and lower alarm limit.



The upper and lower limits can be set in 1% increment.

Key	Item	Description
<b>ON</b> <b>OFF</b>	Individual Alarm	Selecting <b>ON</b> will generate the SpO <sub>2</sub> alarm. Selecting <b>OFF</b> will not generate the SpO <sub>2</sub> alarm.
▲	Current Value	Indicates the current value.
<b>Lower</b> <b>Upper</b>	Lower Alarm Limit	Sets the lower alarm limit (70 to 99%). Setting the value to 70% or below will turn OFF the alarm.
<b>Lower</b> <b>Upper</b>	Upper Alarm Limit	Sets the upper alarm limit (71 to 100%). Setting the value to 100% or above will turn OFF the alarm.
<b>Auto</b>	Automatic Setup	Automatically sets the upper limit to OFF, and the lower limit to 90%.

## SpO<sub>2</sub> Monitoring Condition Setup

Pressing the **Setup** key on the SpO<sub>2</sub> configuration menu will allow setting the SpO<sub>2</sub> measurement condition.

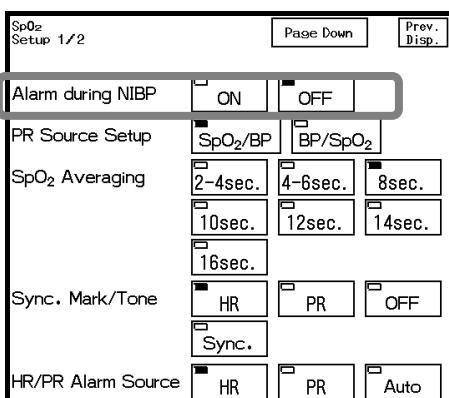
### ● SpO<sub>2</sub> Alarm during NIBP Measurement

This setup can be used when the SpO<sub>2</sub> 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<sub>2</sub> and may generate an improper alarm.

Selecting **OFF** for “Alarm during NIBP” will not generate the SpO<sub>2</sub> alarm until the NIBP measurement is complete. Similarly, when the PR source is SpO<sub>2</sub>, the PR alarm will not be generated during NIBP measurement.

#### 1 Select **ON** or **OFF** for “Alarm during NIBP”.



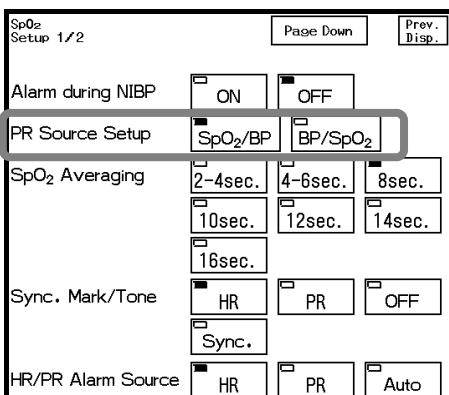
**ON** will generate a SpO<sub>2</sub>/PR alarm during NIBP measurement.

**OFF** will not generate a SpO<sub>2</sub>/PR alarm during NIBP measurement.

### ● PR Source (BP or SpO<sub>2</sub>)

The measurement source for PR can be selected. The PR synchronized mark will be also displayed with the selected source.

#### 1 Select the PR source.



**SpO<sub>2</sub>/BP** will prioritize SpO<sub>2</sub> as measurement source for PR. When PR cannot be measured with SpO<sub>2</sub>, the measurement source will switch to BP.

**BP/SpO<sub>2</sub>** will prioritize BP as measurement source for PR. When PR cannot be measured with BP, the measurement source will switch to SpO<sub>2</sub>.

#### CAUTION

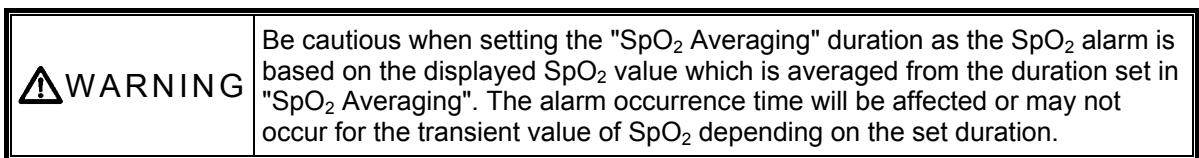
If “HR/PR Alarm Source” is PR, and “PR Source” is BP, the ECG waveform will not be transmitted on a wired network. On the central monitor, the PR-IBP value will be displayed for HR. However, the HR value from ECG will be displayed for the NIBP list and ST measurement table.

#### NOTE

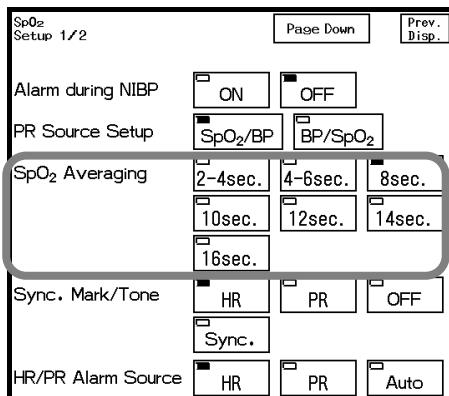
- If PR source is set to BP, make sure to measure the corresponded BP (BP1 or ART). Otherwise PR will be displayed as “---”.
- The “Sync. Mark/Tone” (ECG setup) and “HR/PR Alarm Source” settings will be synchronized with the **HR/PR** user key function.

## ● SpO<sub>2</sub> Averaging

The averaging time for SpO<sub>2</sub> value can be selected.



- 1** Press the **Setup** key.

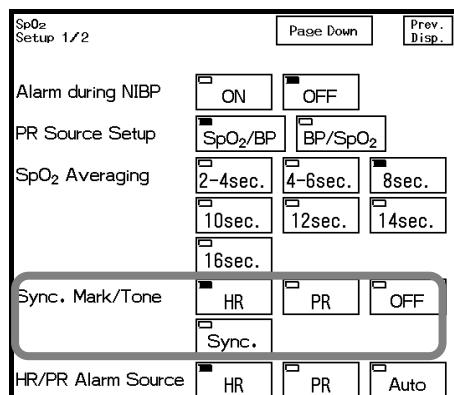


- 2** Select the averaging time from **2-4sec.** / **4-6sec.** / **8sec.** / **10sec.** / **12sec.** / **14sec.** / **16 sec.**

## ● Synchronization Mark/Tone

A mark synchronized to HR or PR can be displayed inside the numeric data box. A synchronization tone will be also generated.

- 1** Select **HR**, **PR** or **OFF** for "Sync. Mark/Tone".



**HR** will display a mark synchronized to HR and will generate HR synchronized tone.

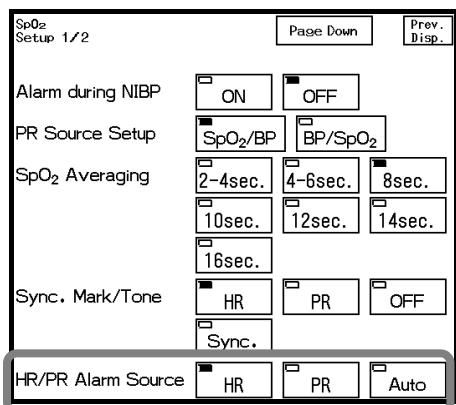
**PR** will display a mark synchronized to BP or SpO<sub>2</sub> according to the priority set for the PR source. PR synchronized tone will be also generated.

**OFF** will not display a synchronized mark and will not generate a synchronized tone.

**Sync.** will display a mark and generate a tone synchronized to HR, BP, or SpO<sub>2</sub> according to the alarm source.

## ●HR/PR Alarm Source

### 1 Set the “HR/PR Alarm Source”.



[HR] will generate an alarm based on HR.

[PR] will generate an alarm based on BP or SpO<sub>2</sub> according to the priority set for the PR source.

[Auto] will automatically select the alarm source according to the priority set on the “Source Setup” (Initial Settings).



**WARNING** The HR/PR alarm will not be generated unless the numeric data box corresponded to the selected HR/PR alarm source is displayed. When HR/PR alarm source selection is changed, be sure to display the numeric data box corresponded to the selected HR/PR source.



**CAUTION** If “HR/PR Alarm Source” is PR, and “PR Source” is BP, the ECG waveform will not be transmitted on a wired network. On the central monitor, the PR-IBP value will be displayed for HR. However, the HR value from ECG will be displayed for the NIBP list and ST measurement table.

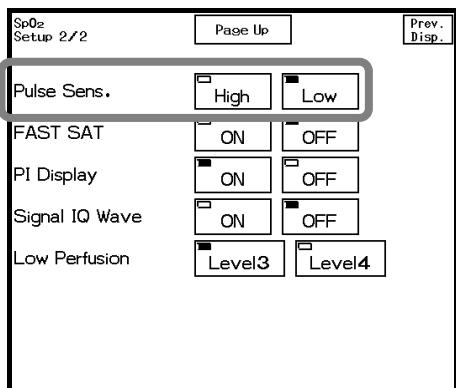
### NOTE

- The synchronized mark will be displayed inside the numeric data box for the selected “Sync. Mark/Tone” source regardless of the “HR/PR Alarm Source” setting.
- The “Sync. Mark/Tone” and “HR/PR Alarm Source” settings will be synchronized with the [HR/PR] user key function.

## ●Pulse Wave Detection Sensitivity

The sensitivity to detect the pulse wave can be selected from high or low.

### 1 Press the [Setup] → [Page Down] key.



The setup menu to select the pulse wave sensitivity will be displayed.

### 2 Select from [High] or [Low].

For standard use, select [Low].

To improve the low perfusion condition, or to perform fast tracking when the SpO<sub>2</sub> value changes abruptly, select [High].



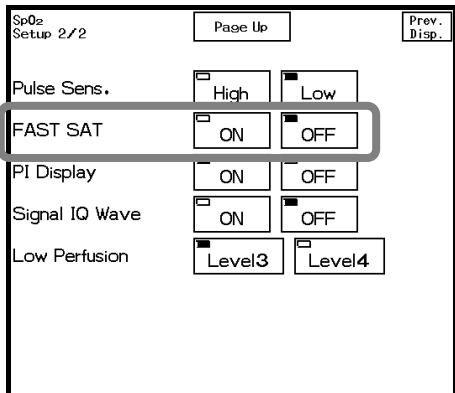
**CAUTION** If [High] is selected for pulse wave sensitivity, sensor-detached detection will become somewhat inaccurate.

## ●FAST SAT Setup

By selecting ON for “FAST SAT”, abrupt change of the SpO<sub>2</sub> 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 <b>2-4sec</b> for SpO <sub>2</sub> averaging time when FAST SAT is set to ON.
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- 1 Press the **Setup** → **Page Down** key.



The setup menu to set the FAST SAT will be displayed.

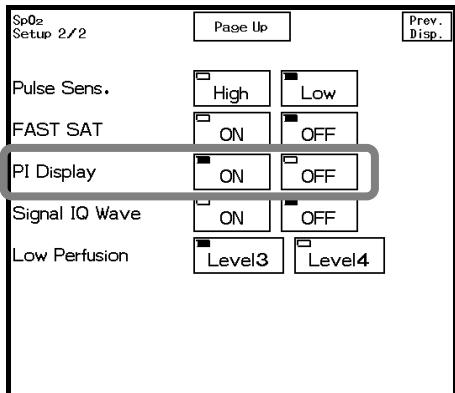
- 2 Select from **ON** or **OFF**.

## ●PI Display

Whether or not to display the PI (Perfusion Index) data can be selected.

The perfusion index is calculated by the following formula; pulsatile signal ÷ apulsatile signal ×100, and indicates the 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 Press the **Setup** → **Page Down** key.



The setup menu to set the PI display will be displayed.

**2 Select from  ON or  OFF.**

SpO<sub>2</sub>  
PI 7.00 **92%**

ON will display the perfusion index.

SpO<sub>2</sub>  
**92%**

OFF will not display the perfusion index.

**●Signal IQ Wave Display**

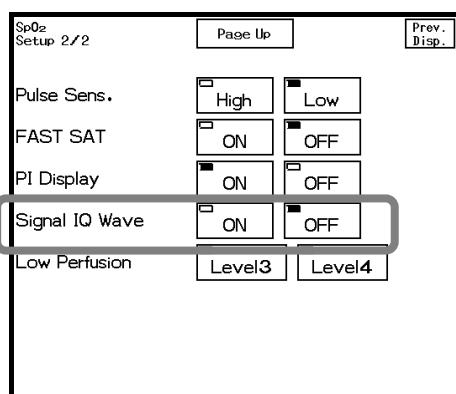
Whether or not to display the signal IQ wave can be selected.



The signal IQ wave indicates the signal force and pulse wave timing.  
The vertical bar indicates the signal quality. A low vertical line indicates a bad signal quality.

**NOTE** The signal IQ wave cannot be recorded.

**1 Press the  Setup →  Page Down key.**



The setup menu to set the signal IQ wave will be displayed.

**2 Select  ON (display) or  OFF (not display).**

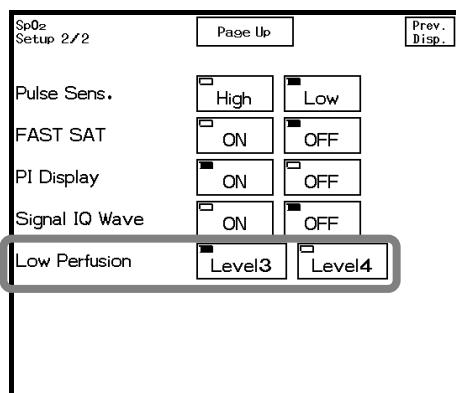
**●SpO<sub>2</sub> Low Perfusion Alarm**

The low perfusion alarm level can be selected from level 3 or level 4.



Be cautious not to miss the low perfusion condition when selecting level 4 for the low perfusion alarm level as the alarm sound will not be generated.

**1 Set the alarm level for the low perfusion alarm.**

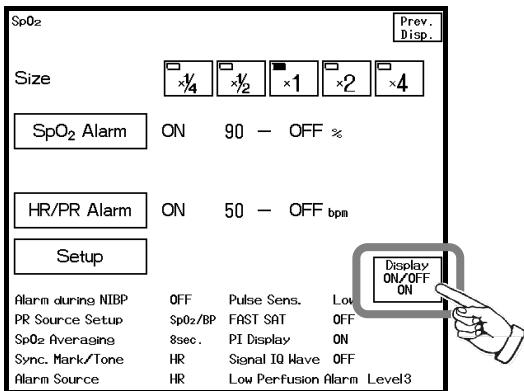


Level3 will generate a single tone alarm sound and display an alarm message at low perfusion condition.

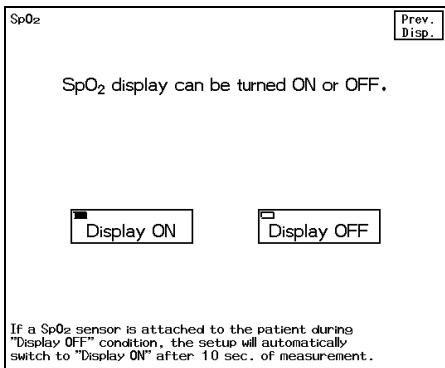
Level4 will only display an alarm message and will not generate an alarm sound.

## 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 numeric data box.

When SpO<sub>2</sub> sensor is attached to the patient with the SpO<sub>2</sub> display set to OFF, and SpO<sub>2</sub> is measured for 10 seconds, the pulse wave and numeric data will be automatically displayed.

### ⚠ CAUTION

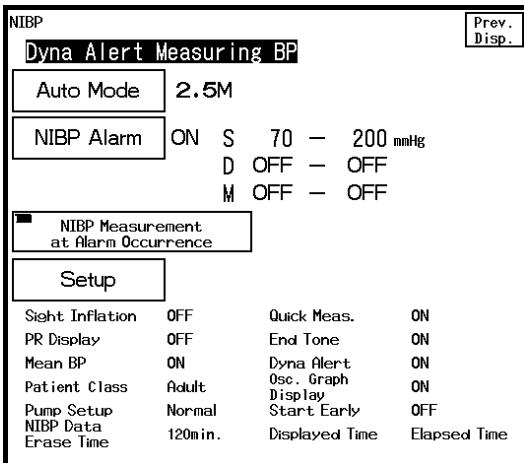
- When the waveform and numeric data display is set to OFF, the alarm generation and table/trend input will also be suspended.
- When the waveform and numeric data display is set to OFF, the pulse rate measured by SpO<sub>2</sub> will not be displayed either.

## Non-Invasive Blood Pressure

This menu allows setting the NIBP monitoring condition.

### NOTE

The NIBP measurement function for neonate is not supported on this equipment. If **Neonate** is set for patient classification on the "admit/discharge menu", all NIBP related keys will become ineffective and "NIBP is disabled for neonate." will be displayed on the NIBP main screen and NIBP numeric data box.



#### Auto Mode

: Sets the automatic interval measurement and starts the 1-minute interval measurement and continuous measurement.

#### NIBP Alarm

: Sets the ON/OFF of NIBP alarm and upper / lower limit of systolic, diastolic, and mean BP.

#### NIBP Measurement at

#### Alarm Occurrence

: Sets the condition to perform NIBP measurement at alarm generation.

#### Setup

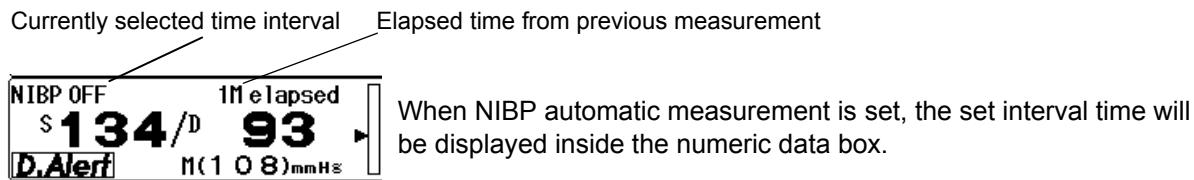
: Sets the NIBP monitoring condition.

### ⚠ CAUTION

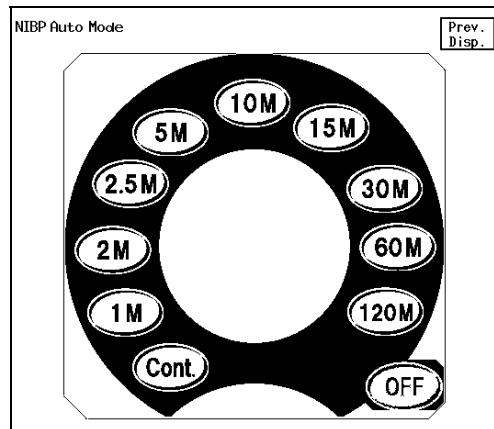
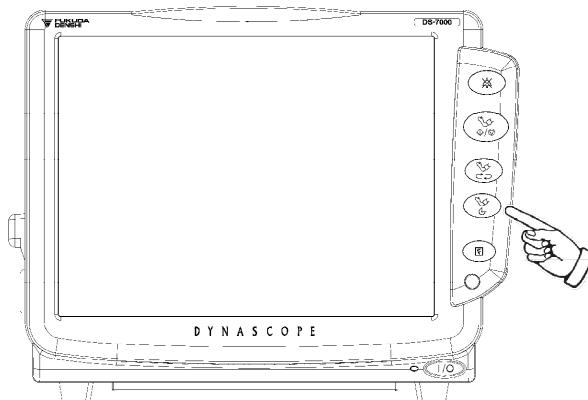
- Pay attention when measuring the NIBP of patient with bleeding disorders or hypercoagulation. The cuff inflation constricting the arm may cause petechia or circulatory failure with blood clot.
- Check the patient's condition constantly while measuring over a long period of time with interval of 2.5 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 classification, 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 1-minute interval measurement was performed during the automatic measurement, the automatic measurement will resume after 12 minutes of 1-minute interval measurement.



- 1 Press the (NIBP Auto Mode) key.



The measurement interval selection for the automatic measurement will be displayed.

- 2 Select the interval time.

Select from  Cont.  1M  2M  2.5M  5M  10M  15M  30M  60M  120M.  
Select  OFF if not performing automatic measurement.

The measurement 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 time will be as follows for each interval time.

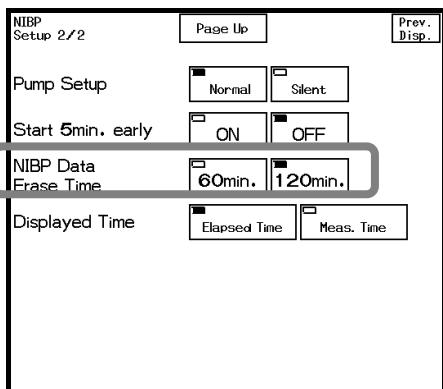
2M : 13:16, 13:18, 13:20, . . .

2.5M : 13:15, 13:17:30, 13:20, . . .

5M : 13:15, 13:20, 13:25, . . .

120M : 14:00, 16:00, 18:00, . . . (The measurement will start at every even hours.)

- 3** If **60min** or **120min** is selected, ON/OFF of “Start 5min. early” can be selected.  
Press the **Setup** → **Page Down** keys to display the second page of the NIBP setup menu.

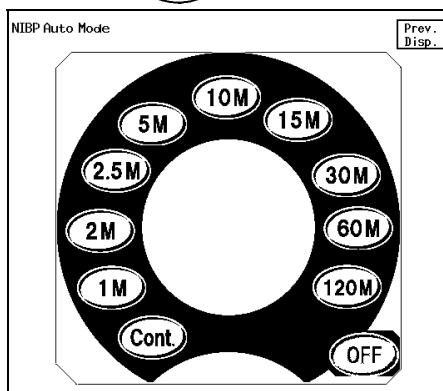


If **60M** or **120M** is selected for interval, the measurement can be started 5 minutes early. If outputting the data to PC or other external equipment using the PC communication function of this device, an error may be generated to the NIBP measurement time depending on the input interval of the external 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 earlier, this time lag between the external equipment can be minimized.

## NIBP 1-Minute Interval Measurement

The 1-minute interval measurement will automatically stop after 12 minutes and returns to the automatic measurement mode of 2.5 minutes interval.

- 1** Press the (NIBP Auto Mode) key.



The measurement interval selection for the automatic measurement will be displayed.

- 2** Selecting **1M** will immediately start the 1-minute interval measurement.

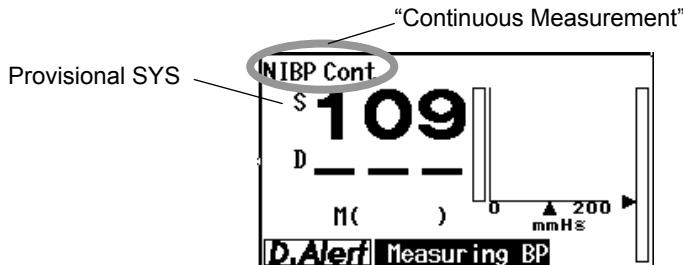
To suspend the measurement, press the (NIBP Start/Stop) key.

**NOTE**

Pressing the (NIBP Start/Stop) key will only suspend the 1-minute interval measurement. To cancel the 1-minute interval measurement operation, change the measurement interval.

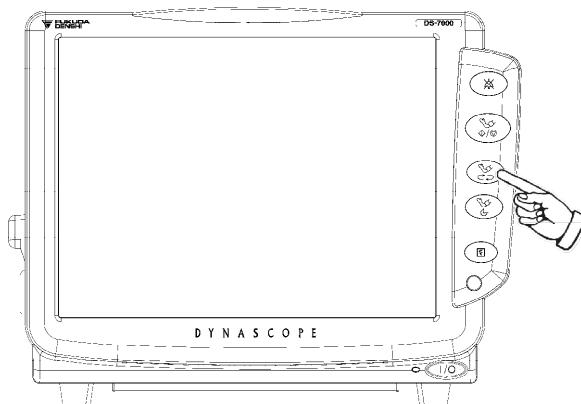
## Continuous Measurement

The NIBP measurement can be continuously performed for 12 minutes. When the continuous measurement is completed, the measurement interval will be set to 2.5 minutes. If any abnormality on the cuff hose, etc. is found during the continuous measurement, the measurement will cease.



During continuous measurement, a provisional SYS (systolic pressure) will be displayed during the measurement. It will not be displayed during the Quick Measurement (measurement duration of 20 to 25 seconds).

- 1 Press the (NIBP Continuous Measurement) key.



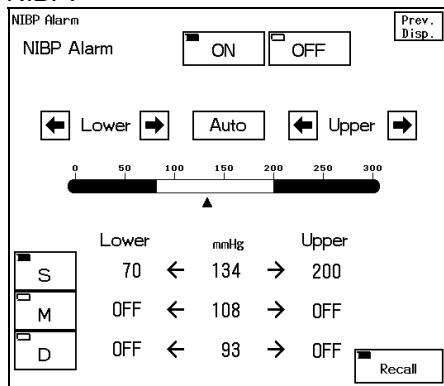
- 2 Start the NIBP continuous measurement.

To cease the measurement, press the (NIBP Start/Stop) key, or press again the (NIBP Continuous Measurement) key.

## NIBP Alarm

### 1 Press the **NIBP Alarm** key.

Set ON/OFF of the NIBP alarm, upper and lower alarm limits of systolic (S), diastolic (D), mean (M) NIBP.



The upper and lower limit can be set in 5mmHg / 0.5kPa increment.

Key	Item	Description
<b>[ON] [OFF]</b>	Individual Alarm	Selecting <b>ON</b> will generate a NIBP alarm. Selecting <b>OFF</b> will not generate a NIBP alarm.
<b>▲</b>	Current Value	Indicates the current value.
<b>S M D</b>		Select from S (systolic BP), D (diastolic BP), or M (mean BP).
<b>[Lower] [Upper]</b>	Lower Alarm Limit	Sets the lower alarm limit. Setting the value below the range will turn OFF the alarm. (See below for NIBP alarm range.)
<b>[Lower] [Upper]</b>	Upper Alarm Limit	Sets the upper limit. Setting the value above the range will turn OFF the alarm. (See below for NIBP alarm range.)
<b>Auto</b>	Automatic Setup	Automatically sets the upper limit to +40mmHg/+5.0kPa from the current value, and the lower limit to -20mmHg/-2.5kPa from the current value.

### [NIBP Alarm Range]

Systolic Lower Limit	Mean Lower Limit	Diastolic Lower Limit
60 to 245mmHg (Adult) 40 to 175mmHg (Child) 30 to 115mmHg (Neonate) 8.0 to 32.5kPa (Adult) 5.0 to 23.5kPa (Child) 4.0 to 15.5kPa (Neonate)	45 to 230mmHg (Adult) 30 to 155mmHg (Child) 15 to 95mmHg (Neonate) 6.0 to 30.5kPa (Adult) 4.0 to 20.5kPa (Child) 2.0 to 12.5kPa (Neonate)	40 to 195mmHg (Adult) 20 to 145mmHg (Child) 10 to 85mmHg (Neonate) 5.0 to 25.5kPa (Adult) 2.5 to 19.5kPa (Child) 1.0 to 11.5kPa (Neonate)
Upper Limit	Upper Limit	Upper Limit
65 to 250mmHg (Adult) 45 to 180mmHg (Child) 35 to 120mmHg (Neonate) 8.5 to 33.0kPa (Adult) 5.5 to 24.0kPa (Child) 4.5 to 16.0kPa (Neonate)	50 to 235mmHg (Adult) 35 to 160mmHg (Child) 20 to 100mmHg (Neonate) 6.5 to 31.0kPa (Adult) 4.5 to 21.0kPa (Child) 2.5 to 13.0kPa (Neonate)	45 to 200mmHg (Adult) 25 to 150mmHg (Child) 15 to 90mmHg (Neonate) 5.5 to 26.0kPa (Adult) 3.0 to 20.0kPa (Child) 1.5 to 12.0kPa (Neonate)

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 **ON** for "Backup at Discharge" on the Discharge Mode setup menu under the Initial Settings.



For the alarm mode setup procedure, refer to "9. Initial Settings –Alarm Mode Setup–".

## NIBP Measurement at Alarm Occurrence

The NIBP measurement can be started at alarm generation of specified parameter.

- 1 Press the **NIBP Measurement at Alarm Occurrence** on the NIBP display.

NIBP Measurement at Alarm Occurrence					Prev. Disp.
NIBP Measurement at Alarm Occurrence					<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF
Numeric					
<input checked="" type="checkbox"/> HR/PR	<input type="checkbox"/> ST	<input type="checkbox"/> RR	<input type="checkbox"/> APNEA	<input checked="" type="checkbox"/> SpO <sub>2</sub>	
<input checked="" type="checkbox"/> BP1	<input type="checkbox"/> BP2	<input type="checkbox"/> BP3			
		<input checked="" type="checkbox"/> T1	<input type="checkbox"/> T2	<input type="checkbox"/> T3	<input type="checkbox"/> Tb
<input checked="" type="checkbox"/> CO <sub>2</sub>	<input type="checkbox"/> O <sub>2</sub>	<input type="checkbox"/> N <sub>2</sub> O	<input type="checkbox"/> AGT	<input type="checkbox"/> MAC	
Arrhythmia					
<input type="checkbox"/> Asystole	<input type="checkbox"/> VF	<input type="checkbox"/> VT	<input type="checkbox"/> Slow VT		
<input type="checkbox"/> Run	<input type="checkbox"/> Couplet	<input type="checkbox"/> Pause	<input type="checkbox"/> Bigeminy		
<input type="checkbox"/> Trigeminy	<input type="checkbox"/> Frequent	<input type="checkbox"/> Tachy	<input type="checkbox"/> Brady		

**ON** will start NIBP measurement at alarm generation of the specified parameter.

When **ON** is set, select the parameters to start the NIBP measurement. More than one parameter can be selected.

The NIBP measurement at alarm occurrence will be performed on the condition that at least one NIBP measurement is performed since the power is turned ON, and 10 seconds or more has elapsed since the last NIBP measurement.

## NIBP Monitoring Condition Setup

Pressing the **Setup** key on the NIBP configuration menu allows setting the NIBP monitoring condition.

NIBP Setup 1/2			Page Down	Prev. Disp.
Patient Classification		<input checked="" type="checkbox"/> Adult <input type="checkbox"/> Child <input type="checkbox"/> Neonate		
Quick Measurement		<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		
Dyna Alert		<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		
Sight Inflation		<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		
Osc. Graph Display		<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		
Mean BP Display		<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		
PR Display		<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		
End Tone		<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		

NIBP Setup 2/2			Page Up	Prev. Disp.
Pump Setup		<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Silent		
Start 5min. early		<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		
NIBP Data Erase Time		<input type="checkbox"/> 60min. <input checked="" type="checkbox"/> 120min.		
Displayed Time		<input type="checkbox"/> Elapsed Time <input checked="" type="checkbox"/> Meas. Time		

### ●Patient Classification Selection

The patient classification affects the NIBP measurement accuracy.

It also affects the accuracy of HR and RR measurement and the delay time to generate the alarm.

		Adult	Child	Neonate
NIBP Measurement Range		10 to 280mmHg	10 to 180mmHg	10 to 130mmHg
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		0.05 to 100Hz	1.6 to 100Hz
Impedance Respiration		1.5Hz		2.5Hz
Alarm Delay		5sec.		0sec.

The alarm delay duration is provided to prevent the alarm to generate frequently. The alarm will not generate during the alarm delay duration even if the alarm threshold is exceeded.

The parameters which alarm generation will be delayed are HR/PR, BP, RR, SpO<sub>2</sub>, TEMP, TACHY, and BRADY.

## WARNING

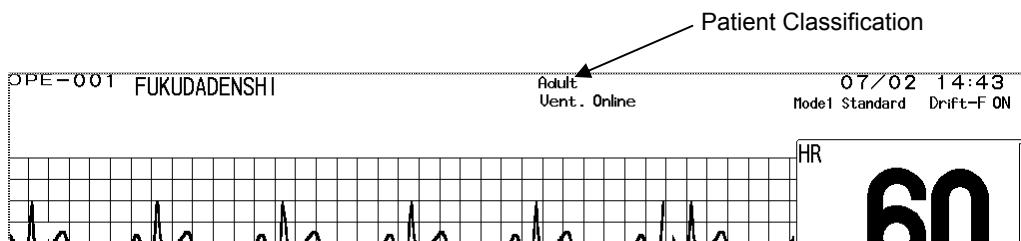
The patient classification affects the measurement accuracy of QRS detection, NIBP measurement, etc. Make sure to select the correct classification for the monitoring patient.

### 1 Select the patient classification from **Adult** / **Child** / **Neonate**.

NIBP Setup 1/2			
	Page Down	Prev. Disp.	
Patient Classification	<input checked="" type="checkbox"/> Adult	<input type="checkbox"/> Child	<input type="checkbox"/> Neonate
Quick Measurement	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	
Dyna Alert	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	
Sight Inflation	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF	
Osc. Graph Display	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	
Mean BP Display	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	
PR Display	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF	
End Tone	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	

This selection is synchronized with the patient classification selection on the patient admit/discharge menu. If the patient classification is changed here, the selection on the admit/discharge menu will be automatically changed to the same selection.

### 2 The selected patient classification will be displayed on the Home Display.



## ●Quick Measurement

### 1 Select ON/OFF for “Quick Measurement”.

NIBP Setup 1/2			
	Page Down	Prev. Disp.	
Patient Classification	<input checked="" type="checkbox"/> Adult	<input type="checkbox"/> Child	<input type="checkbox"/> Neonate
Quick Measurement	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	
Dyna Alert	<input type="checkbox"/> ON	<input type="checkbox"/> OFF	
Sight Inflation	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF	
Osc. Graph Display	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	
Mean BP Display	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	
PR Display	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF	
End Tone	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	

**ON** will perform the measurement for duration of about 20 to 25 seconds in case an adult patient.

### NOTE

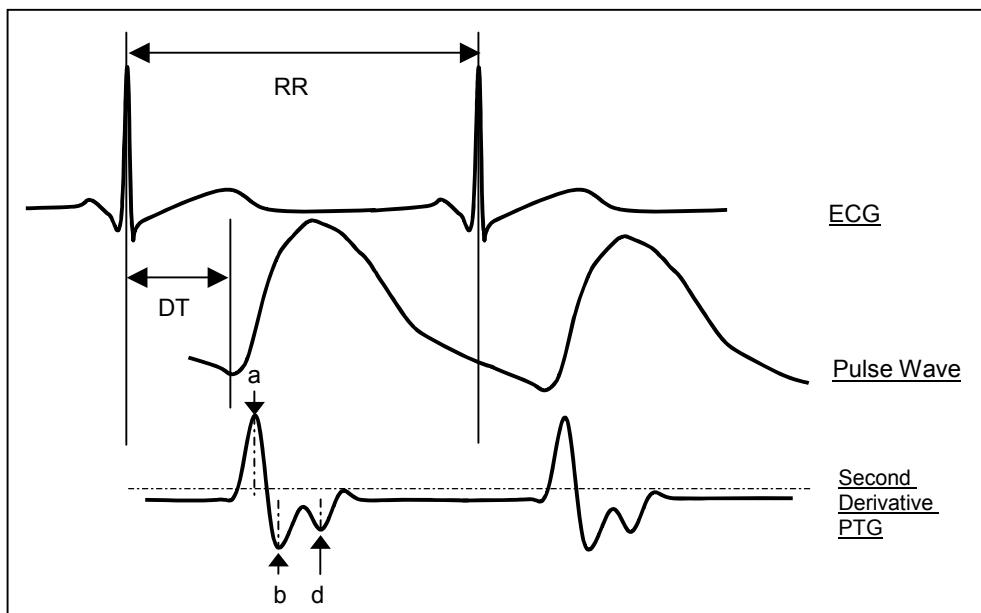
The quick measurement setting will be effective when the patient classification is adult or child. If the patient classification is neonate, normal NIBP measurement will be performed regardless of the quick measurement setting.

## ●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 photoplethysmogram ( $\text{SpO}_2$ ), 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
$\text{SpO}_2$ Sensor Applied Site	: Fingertip
NIBP Measurement Interval	: 5 to 60 minutes



When a PTG ( $\text{SpO}_2$ ) sensor is applied to the toe or forehead, the Dyna Alert may not function depending on the patient's condition.

### 1 Select ON/OFF for Dyna Alert function.

NIBP Setup 1/2		Page Down	Prev. Disp.
Patient Classification	<input checked="" type="checkbox"/> Adult <input type="checkbox"/> Child <input type="checkbox"/> Neonate		
Quick Measurement	<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		
Dyna Alert	<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		
Sight Inflation	<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		
Osc. Graph Display	<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		
Mean BP Display	<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		
PR Display	<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		
End Tone	<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF		

**ON** will set the Dyna Alert function ON.  
**OFF** will set the Dyna Alert function OFF.

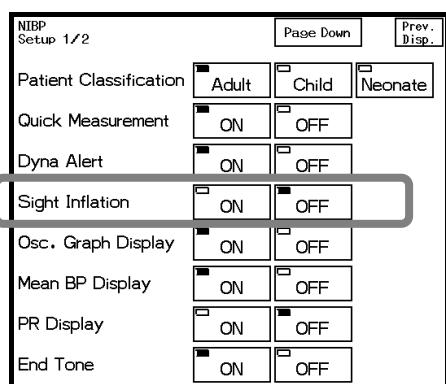
## ●Sight Inflation

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 detecting any sudden increase of blood pressure to prevent re-inflation and discomfort for the patient.

When "Sight Inflation" is set to OFF, normal cuff inflation, which inflates to the target level set according to the previous measurement result, will be performed.

NOTE	<ul style="list-style-type: none"><li>● The Sight Inflation setting is valid only during the NIBP automatic measurement.</li><li>● The "Sight Inflation" will not function if the patient classification is "Neonate".</li><li>● During continuous measurement / 1 minute measurement, normal cuff inflation will be performed regardless of the Sight Inflation setting.</li><li>● When performing manual measurement / measurement at alarm occurrence, it will inflate to the fixed pressure (Adult: 180mmHg, Child: 140mmHg, Neonate: 110mmHg) regardless of the Sight Inflation setting.</li></ul>
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### 1 Select ON/OFF for "Sight Inflation".

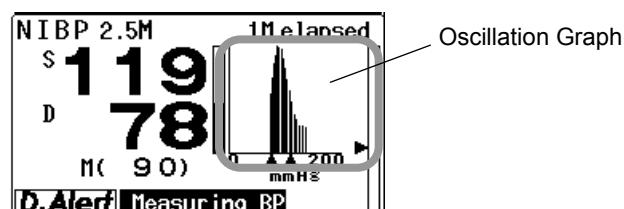


**ON** will set the Sight Inflation ON.

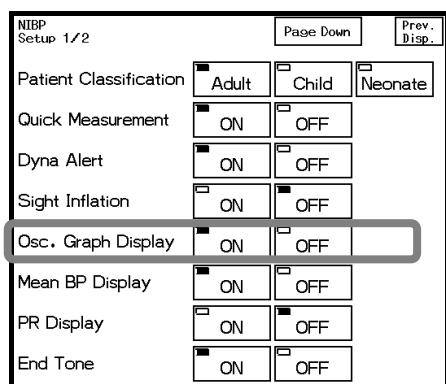
**OFF** will set the Sight Inflation OFF.

## ●Oscillation Graph Display

The oscillation graph can be set to be displayed inside the NIBP numeric data box.



### 1 Select ON/OFF for "Osc. Graph Display".



**ON** will display the oscillation graph inside the NIBP numeric data box.

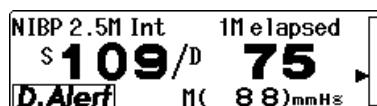
**OFF** will not display the oscillation graph.

## ●Mean BP Value Display

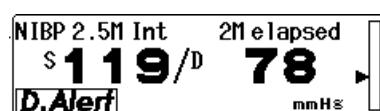
The mean BP value can be set to be displayed inside the NIBP numeric data box.

### 1 Select ON/OFF for “Mean BP Display”.

NIBP Setup 1/2	Page Down	Prev. Disp.
Patient Classification	<input checked="" type="checkbox"/> Adult	<input type="checkbox"/> Child
Quick Measurement	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
Dyna Alert	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
Sight Inflation	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
Osc. Graph Display	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
Mean BP Display	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
PR Display	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF
End Tone	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF



ON will display the mean BP value.



OFF will not display the mean BP value.



**CAUTION** If the mean BP value is not displayed, the alarm for mean BP will not generate. The mean BP value will not be displayed for the table data either.

## ●Pulse Rate Display

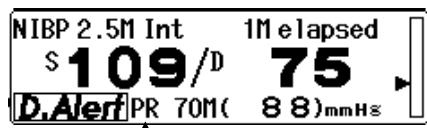
The pulse rate measured during NIBP measurement can be displayed. This pulse rate is only for display. It will not generate an alarm, or be displayed for the table function.

### 1 Select ON or OFF for “PR Display”.

NIBP Setup 1/2	Page Down	Prev. Disp.
Patient Classification	<input checked="" type="checkbox"/> Adult	<input type="checkbox"/> Child
Quick Measurement	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
Dyna Alert	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
Sight Inflation	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
Osc. Graph Display	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
Mean BP Display	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
PR Display	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF
End Tone	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF

ON will display the pulse rate.

OFF will not display the pulse rate.



Pulse Rate

## ●End of Measurement Tone

By selecting ON for the "End Tone", a tone will be generated when the NIBP measurement completes.

There are 3 types of "End Tone" depending on the measurement result comparison with the previous value.

If SYS > Previous SYS,

When previous SYS  $\geq$  101 and (SYS - previous SYS)  $\geq$  15mmHg, or

When previous SYS  $\leq$  100 and (SYS - previous SYS)  $\geq$  10mmHg,

the "End Tone" will generate with an increasing tone (high tone) to notify an increase in the BP.

If SYS < Previous SYS,

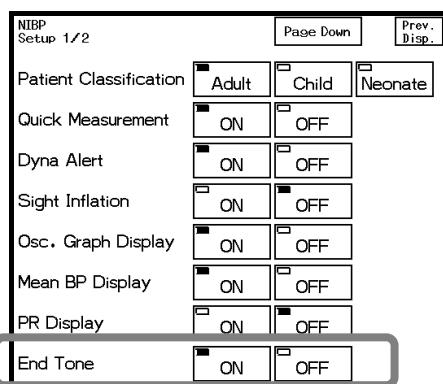
When previous SYS  $\geq$  101 and (previous SYS - SYS)  $\geq$  15mmHg, or

When previous SYS  $\leq$  100 and (previous SYS - SYS)  $\geq$  10mmHg,

the "End Tone" will generate with a decreasing tone (low tone) to notify a decrease in the BP.

For condition other than the above, a medium tone will be generated.

### 1 Select **ON** or **OFF** for "End Tone".



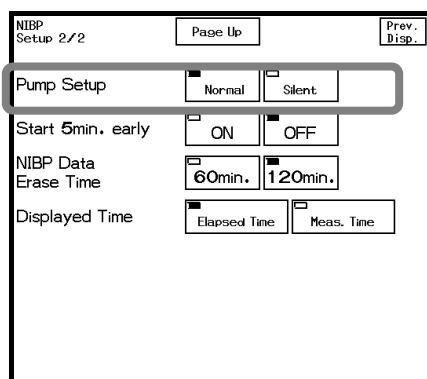
**ON** will generate a tone when the measurement completes.

**OFF** will not generate a tone when the measurement completes.

## ●Pump Setup

The pump inflation operation can be selected from normal or silent operation.

### 1 Display the second page of the NIBP setup menu to set the "Pump Setup".



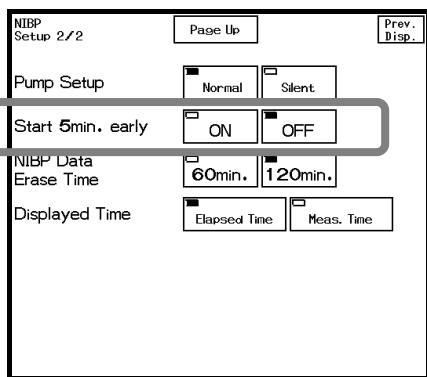
**Silent** will inflate with decreased speed to reduce the pump inflating sound.

## ●Start the Measurement Early

If **[60M]** or **[120M]** is selected for NIBP measurement interval, the measurement can be started 5 minutes before the starting time.

When outputting the measurement data to external equipment (ex. personal computer) using the PC communication function, some error may be generated to NIBP measurement time depending on the input interval of the external equipment. As the DS-7000 outputs the measurement data upon completion of NIBP measurement, if the external equipment inputs the measurement in 60 minutes interval, 60 minutes difference will be generated. By starting the measurement 5 minutes earlier, this difference can be minimized.

### 1 Display the second page of the NIBP setup menu to set the “Start 5min. early”.

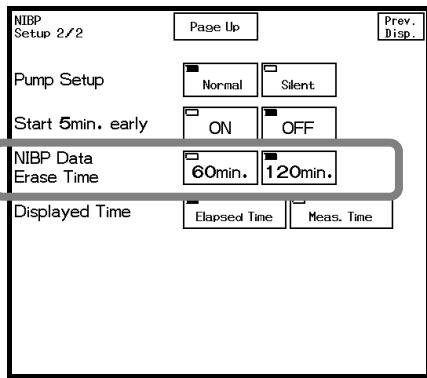


**[ON]** will start the measurement 5 minutes before.

## ●NIBP Data Erase Time

The NIBP data can be erased after preprogrammed duration (60min/120min).

### 1 Display the second page of the NIBP setup menu to set the “NIBP Data Erase Time”.



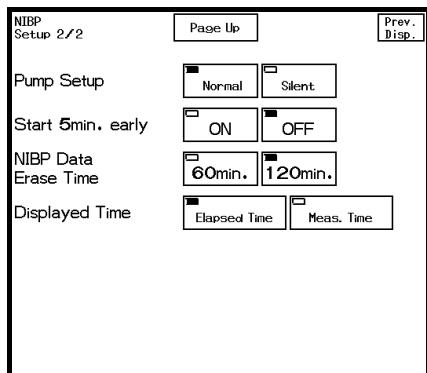
Select the duration from **[60min.]** or **[120min.]**.

When the selected duration elapses, the NIBP data will be erased.

## ●Displayed Time

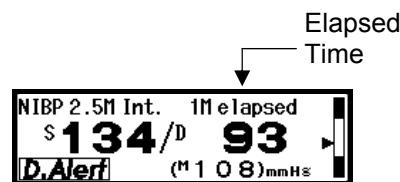
The displayed time in the NIBP numeric data box can be selected from elapsed time or measured time.

### 1 Set the “Displayed Time” for NIBP numeric data box.

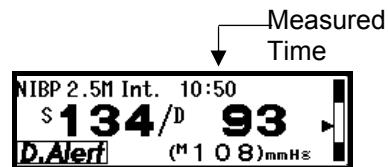


[Elapsed Time] will display the elapsed time from the last NIBP measurement.

[Meas. Time] will display the measured time of the last NIBP measurement.



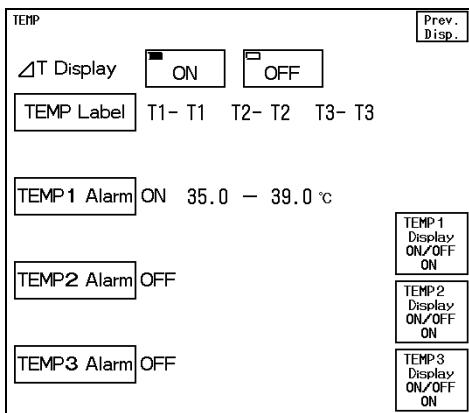
[Elapsed Time] will display the elapsed time from the last NIBP measurement.



[Meas. Time] will display the measured time of the last NIBP measurement.

## Temperature (TEMP1 to TEMP3)

This menu allows setting the monitoring condition for TEMP1 to TEMP3.



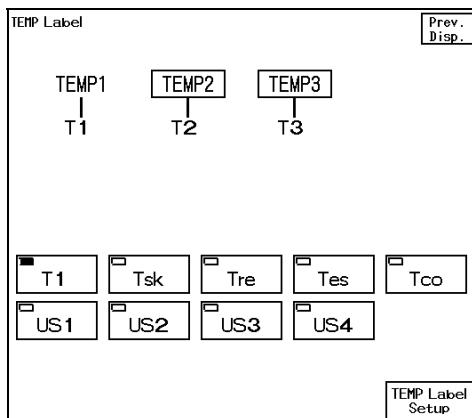
TEMP\* Alarm : Set ON/OFF of the temperature alarm, and upper and lower alarm limits.

TEMP\* Label : Set the temperature measuring site.

(\* indicates 1 to 3)

## Temperature Label

- 1 Press the **TEMP Label** key.



The temperature label setup menu will be displayed.

- 2 Select the label.

Select from **T\***, **Tsk**, **Tre**, **Tes**, **Tco**, **US1**, **US2**, **US3**, **US4**.

### [Description of Each Label]

T1 to T3 (Default)

Tsk (Skin Temperature)

Tre (Rectal Temperature)

Tes (Esophageal Temperature)

Tco (Core Temperature)

US1 (Temperature User Label 1, 3 characters)

US2 (Temperature User Label 2, 3 characters)

US3 (Temperature User Label 3, 3 characters)

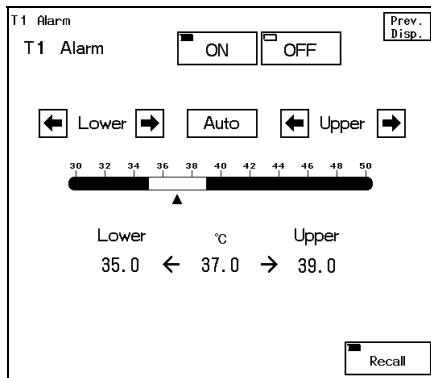
US4 (Temperature User Label 4, 3 characters)



Refer to "9. Initial Settings –TEMP User Label–" for temperature user label setup.

## Temperature Alarm

- 1 Press the **TEMP \* Alarm** key.



The alarm setup menu will be displayed.  
Select ON/OFF for 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.

<b>Key</b>	<b>Item</b>	<b>Description</b>
<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF	Individual Alarm	Selecting <b>ON</b> will generate a TEMP alarm. Selecting <b>OFF</b> will not generate the TEMP alarm.
▲	Current Value	Indicates the current value.
<input type="checkbox"/> Lower <input type="checkbox"/>	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.
<input type="checkbox"/> Upper <input type="checkbox"/>	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.
<input type="checkbox"/> Auto	Automatic Setup	Automatically sets the upper limit to +2.0°C / +4.0°F from the current value, and lower limit to -2.0°C / -4.0°F from the current value.

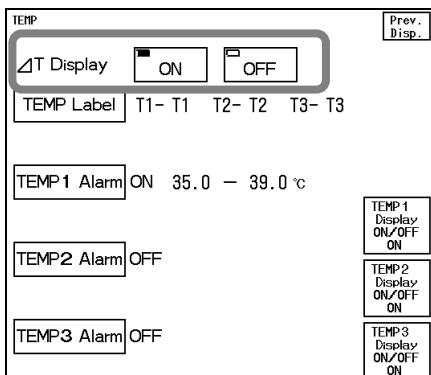
To maintain the alarm setting even after the power is turned OFF or after a discharge procedure, store the setting to one of the alarm modes, or select **ON** for "Backup at Discharge" on the Discharge Mode setup menu under the Initial Settings.



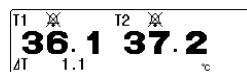
For the alarm mode setup procedure, refer to "9. Initial Settings –Alarm Mode Setup–".

## ΔT Display

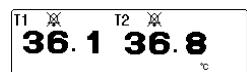
The difference between the TEMP1 and TEMP2 value can be displayed in an absolute value.



- 1 Select **ON** or **OFF**.



**ON** will display the  $\Delta T$  value.

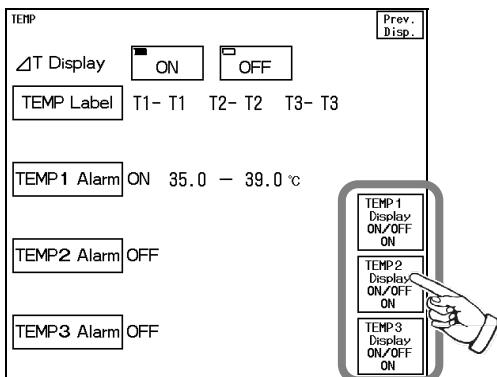


**OFF** will not display the  $\Delta T$  value.

**NOTE** The alarm cannot be set for  $\Delta T$ .

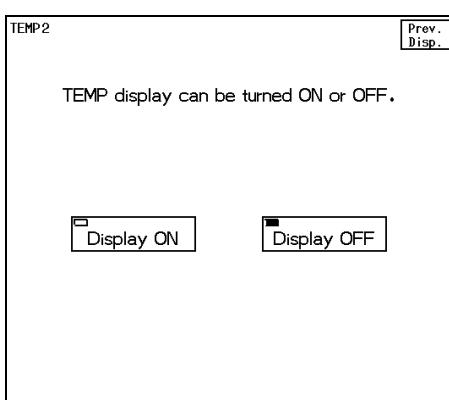
## ON/OFF of Parameter Display

- 1 Press the **Display ON/OFF** key.



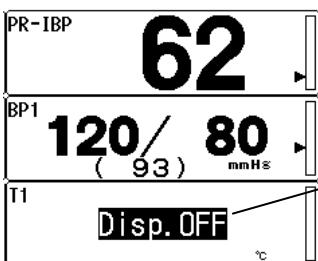
The confirmation display for the ON/OFF of TEMP display will appear.

- 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.



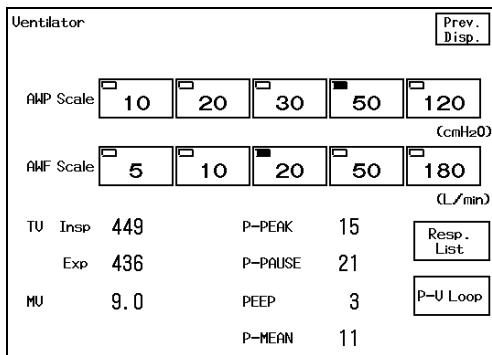
The Display OFF message will be displayed inside the numeric data box.



When the waveform and numeric data display is set to OFF, the alarm generation and table/trend input will also be suspended.

# Ventilator

This menu allows setting the ventilator monitoring condition.

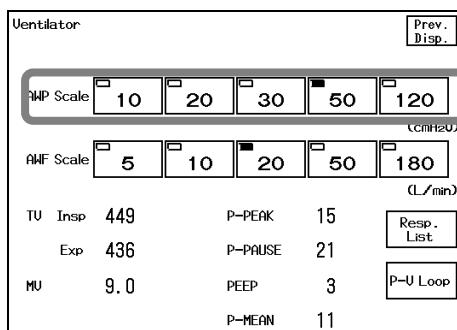


AWP Scale : Sets the scale for AWP (airway pressure) waveform.

AWF Scale : Sets the scale for AWF (airway flow) waveform.

## AWP Scale

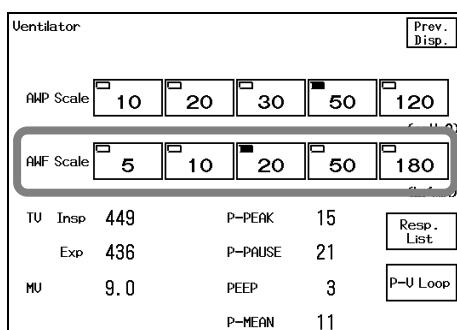
### 1 Select the scale.



Select the appropriate AWP scale from [10], [20], [30], [50], or [120] cmH<sub>2</sub>O.

## AWF Scale

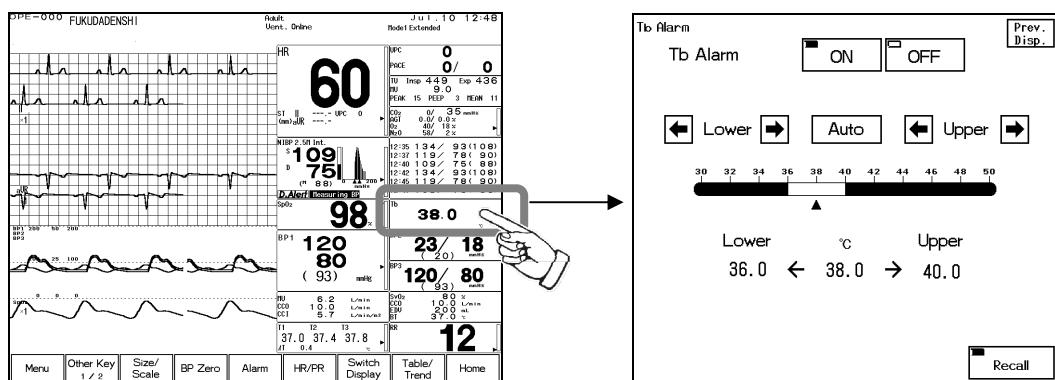
### 1 Select the scale.



Select the appropriate AWF scale from [5], [10], [20], [50], or [180] L/min.

## Tb (Blood Temperature)

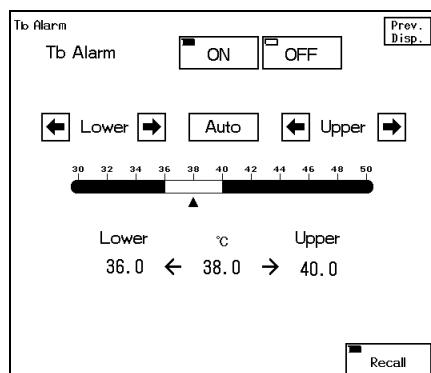
When thermodilution catheter is used to measure the cardiac output, the blood temperature can be monitored.



**Tb Alarm** : Sets ON/OFF of the blood temperature alarm and upper and lower alarm limits.

### Tb Alarm

#### 1 Select ON/OFF for blood temperature alarm and set upper and lower alarm limits.



The upper and lower limit can be set in increments of 0.5°C/1.0°F.

Key	Item	Description
<input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF	Individual Alarm	Selecting <input checked="" type="checkbox"/> ON will generate a TEMP alarm. Selecting <input type="checkbox"/> OFF will not generate a TEMP alarm.
▲	Current Value	Indicates the current value.
◀ Lower ▶	Lower Alarm Limit	Sets the lower alarm limit (30.0 to 44.0°C/86.0 to 111.0°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 45.0°C/88.0 to 113.0°F). Setting the 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 from the current value, and lower limit to -2.0°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  ON for "Backup at Discharge" on the Discharge Mode setup menu under the Initial Settings.



For the alarm mode setup procedure, refer to "9. Initial Settings –Alarm Mode Setup–".

## 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	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF
Index Disp	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF
CO-AVG	10.1	CI-AVG 10.1
ICO[1]	10.0	ICI[1] 10.0
ICO[2]	10.1	ICI[2] 10.1
ICO[3]	10.2	ICI[3] 10.2
ICO[4]	10.3	ICI[4] 10.3
ICO[5]	10.4	ICI[5] 10.4
ICO[6]	10.5	ICI[6] 10.5

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 for STAT Mode and  ON /  OFF for Index display can be selected on the Vigilance display.

### [STAT Mode OFF, Index Display OFF ]

SvO <sub>2</sub>	83	%
CCO	5.0	L/min
EDV	160	mL
BT	38.5	°C

SvO<sub>2</sub>(or ScvO<sub>2</sub>), CCO, EDV, BT data will be displayed inside the SvO<sub>2</sub>+CO numeric data box.

### [STAT Mode OFF, Index Display ON ]

SvO <sub>2</sub>	83	%
CCI	2.5	L/min/m <sup>2</sup>
EDVI	80	mL/m <sup>2</sup>
BT	38.5	°C

By setting the Index display ON, CCI, EDVI data will be displayed instead of CCO and EDV.

### [STAT Mode ON, Index Display OFF ]

SvO <sub>2</sub>	80	%
CCO-STAT	10.0	L/min
EDV-STAT	200	mL
BT	37.0	°C

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 <sub>2</sub>	80	%
CCI-STAT	5.7	L/min/m <sup>2</sup>
EDVI-STAT	114	mL/m <sup>2</sup>
BT	37.0	°C

By setting the STAT mode and Index display ON, CCI-STAT, EDVI-STAT will be displayed instead of CCO and EDV.

## Multigas Data

In this section, the monitoring condition setting of CO<sub>2</sub> concentration, anesthetic gas concentration, O<sub>2</sub> concentration, N<sub>2</sub>O concentration measured by the Multigas Unit (MGU-701/MGU-702/MGU-801P/MGU-802/MGU-803) is explained.

### [When Multigas Unit (MGU-701/MGU-702) is used]

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<CO<sub>2</sub>-GAS Menu><O<sub>2</sub>-GAS Menu><N<sub>2</sub>O-GAS Menu>

--	--	--

&lt;AGT-GAS Menu&gt;

&lt;GAS Setup&gt;

&lt;MAC Value Setup&gt;

### [When Multigas Unit (MGU-801P/MGU-802/MGU-803) is used]

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<CO<sub>2</sub>-GAS Menu><O<sub>2</sub>-GAS Menu><N<sub>2</sub>O-GAS Menu>

--	--	--

&lt;AGT-GAS Menu&gt;

&lt;GAS Setup&gt;

&lt;MAC Value Setup&gt;

### **CO<sub>2</sub> Concentration Setup**

- Scale : Sets the scale for CO<sub>2</sub> waveform display.  
EtCO<sub>2</sub> Alarm : Sets ON/OFF of the EtCO<sub>2</sub> alarm and upper/lower alarm limits.  
In-CO<sub>2</sub> Alarm : Sets ON/OFF of the In-CO<sub>2</sub> alarm and upper alarm limit.

### **O<sub>2</sub> Concentration Setup**

- Scale : Sets the scale for O<sub>2</sub> waveform display.  
FiO<sub>2</sub> Alarm : Sets ON/OFF of the FiO<sub>2</sub> alarm and upper/lower alarm limits.  
Ex-O<sub>2</sub> Alarm : Sets ON/OFF of the Ex-O<sub>2</sub> alarm and upper/lower alarm limits.

### **N<sub>2</sub>O Concentration Setup**

- In-N<sub>2</sub>O Alarm : Sets ON/OFF of the In-N<sub>2</sub>O alarm and upper/lower alarm limits.  
Ex-N<sub>2</sub>O Alarm : Sets ON/OFF of the Ex-N<sub>2</sub>O alarm and upper/lower alarm limits.

### **Anesthetic Gas (AGENT) Concentration Setup**

- Label : Sets anesthetic gas type.  
Scale : Sets the scale for anesthetic gas concentration waveform display.  
In-AGT Alarm : Sets ON/OFF of the In-AGT alarm and upper/lower alarm limits.  
Ex-AGT Alarm : Sets ON/OFF of the Ex-AGT alarm and upper/lower alarm limits.

### **GAS Setup (MGU-701/MGU-702)**

Sets ON/OFF of the gas measurement, flow rate, and ON/OFF for wave clip.

### **GAS Setup (MGU-801P/MGU-802/MGU-803)**

Sets ON/OFF of the gas measurement, flow rate, and ON/OFF for wave clip.  
Performs a zero calibration manually.

### **MAC Value Setup**

- Display : Sets ON/OFF of the MAC display inside the numeric data display area.  
MAC Value Alarm : Sets ON/OFF of the MAC value alarm and upper limit.  
MAC Value Calculation Constant :  
Sets the calculation constant for MAC value.

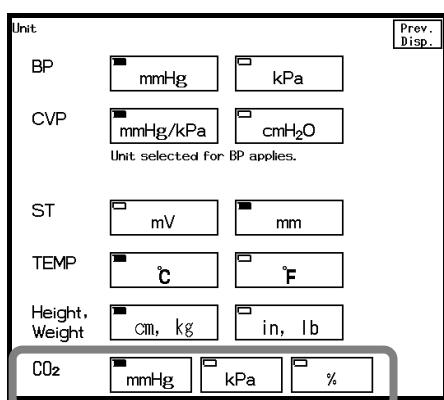
## CO<sub>2</sub> Concentration Measurement Unit

The measurement unit of CO<sub>2</sub> concentration can be selected from mmHg, kPa, %.

**NOTE**

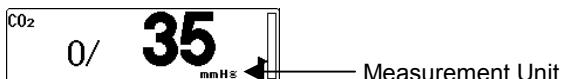
When a measurement unit is changed, make sure to set the alarm condition for that unit. The alarm setup is necessary for each measurement unit.

- 1 Press the **Menu** → **Initial Settings** → **Unit** keys.



- 2 Select the measurement unit from **mmHg**, **kPa**, **%**.

For trend /table data, the gas data will be displayed with the selected measurement unit.



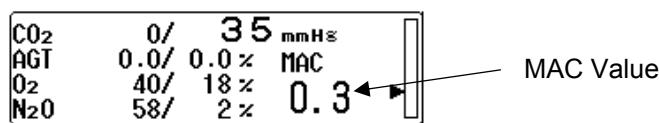
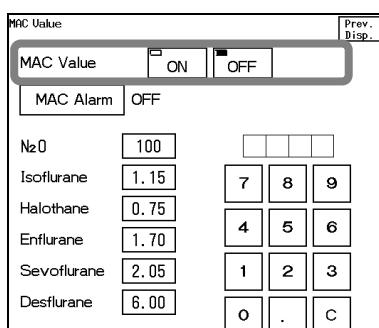
## MAC Value Display

The MAC value can be displayed inside the numeric data display area.

**NOTE**

The MAC value will not be displayed unless ON is selected for “MAC Display”. Perform the setup as necessary.

- 1 Press the **Menu** → **Initial Settings** → **MAC Value** keys.



## MAC Value Calculation Constant

The calculation constant for MAC value can be set.  
The MAC value is calculated from the following formula.

$$MAC = \frac{Ex\ N_2O}{X(N_2O)} + \frac{Ex\ PAGT}{X(PAGT)} + \frac{Ex\ SAGT}{X(SAGT)}$$

Ex N<sub>2</sub>O : Exp N<sub>2</sub>O (%)

Ex PAGT: Exp Primary Agent (%)

Ex SAGT: Exp Secondary Agent (%)

X(N<sub>2</sub>O) : N<sub>2</sub>O Constant

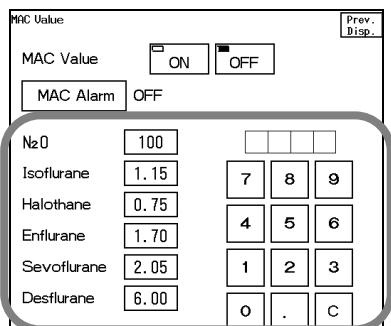
X(PAGT) : Primary Agent Constant

X(AGT) : Secondary Agent Constant

**NOTE**

The MAC value will not be displayed unless ON is selected for “MAC Display”.  
Perform the setup as necessary.

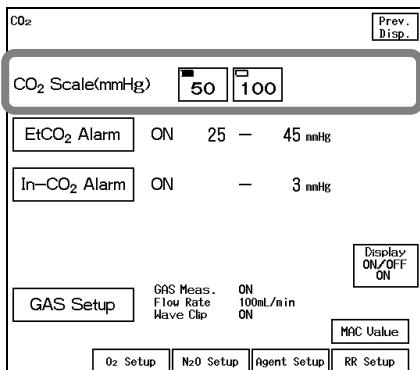
- 1 Press the **Menu** → **Initial Settings** → **MAC Value** keys.



The MAC value setup menu will be displayed.  
If you want to change the displayed default value, input the numbers using the numeric keypad.  
Then, press the key for the corresponding constant.

## Gas Waveform Scale

- 1** The scale for CO<sub>2</sub> waveform can be selected on the CO<sub>2</sub> setup menu.

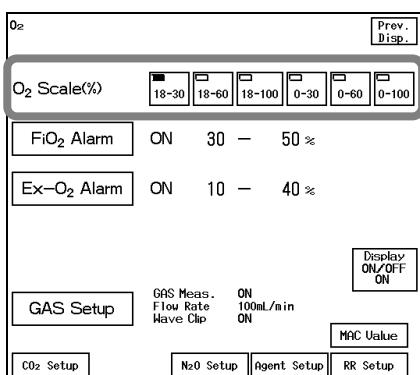


When the unit is mmHg, select the scale from 50, 100.

When the unit is kPa or %, select the scale from 4, 8, 10.

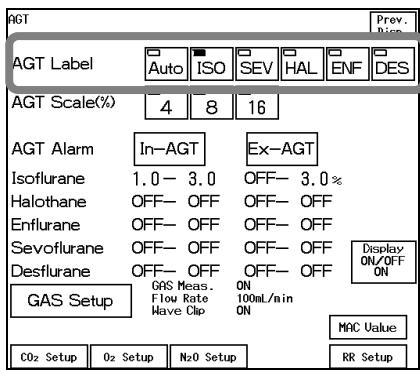
<Scale Setup Menu for "mmHg">

- 2** The scale for O<sub>2</sub> waveform can be selected on the O<sub>2</sub> setup menu.



Select the scale from 18-30, 18-60, 18-100, 0-30, 0-60, 0-100 (%).

- 3** The scale for anesthetic gas waveform can be selected on the AGT setup menu.



Select the scale from 4, 8, 16 %.

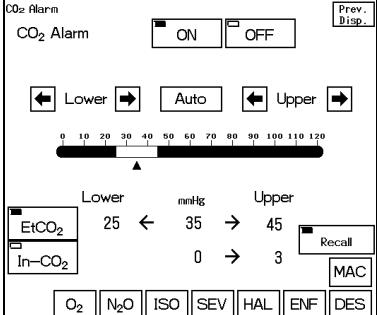
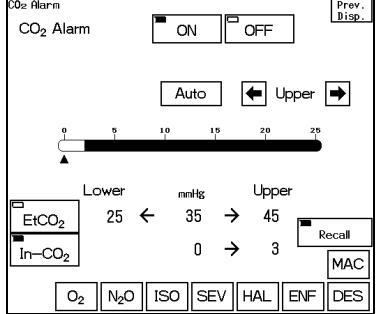
## Alarm Setup

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 **ON** for "Backup at Discharge" on the Discharge Mode setup menu under the Initial Settings.

**Reference**

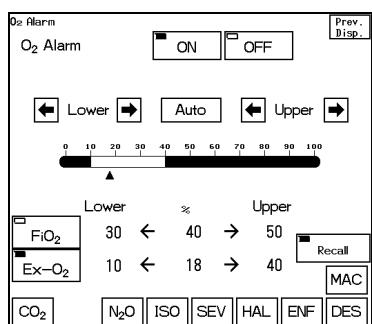
For the alarm mode setup procedure, refer to "9. Initial Settings –Alarm Mode Setup–".

### ●CO<sub>2</sub> Concentration Alarm

EtCO <sub>2</sub> Alarm	
	The alarm setup should be performed for each measurement unit. (mmHg/kPa/%). The upper/lower limit can be set in 1mmHg/0.1kPa/0.1% increments.
Lower Limit	Range: 1 to 98mmHg/0.1 to 13.1kPa/0.1 to 13.1%. Turns OFF if 1mmHg/0.1kPa/0.1% or below is set.
Upper Limit	Range: 3 to 115mmHg/0.3 to 15.0kPa/0.3 to 15.0%. Turns OFF if 115mmHg/15.0kPa/15.0% or above is set.
Auto	Automatically sets the upper limit to +10mmHg/1.3kPa/1.3%, and lower limit to -10mmHg/1.3kPa/1.3% from the current value.
In-CO <sub>2</sub> Alarm	
	The alarm setup should be performed for each measurement unit. (mmHg/kPa/%). The upper limit can be set in 1mmHg/0.1kPa/0.1% increments.
Lower Limit	(No Setting)
Upper Limit	Range: 1 to 24mmHg/0.1 to 3.0kPa/0.1 to 3.0%. Turns OFF if 24mmHg/3.0kPa/3.0% or above is set.
Auto	Automatically sets the upper limit to 3mmHg/0.4kPa/0.4%.

## ●O<sub>2</sub> Concentration Alarm

### Ex-O<sub>2</sub> Alarm



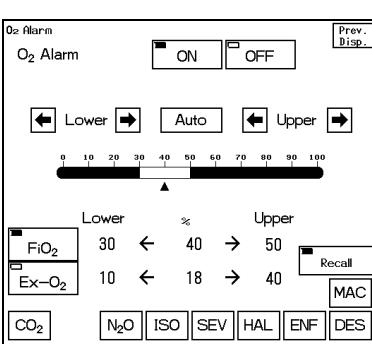
The upper/lower limit can be set in 5% increments.

**Lower Limit** Range: 10 to 60%. Turns OFF if 10% or below is set.

**Upper Limit** Range: 40 to 100%. Turns OFF if 100% or above is set.

**Auto** Automatically sets the upper limit to +10%, and lower limit to -10% from the current value.

### FiO<sub>2</sub> Alarm



The upper/lower limit can be set in 2% increments.

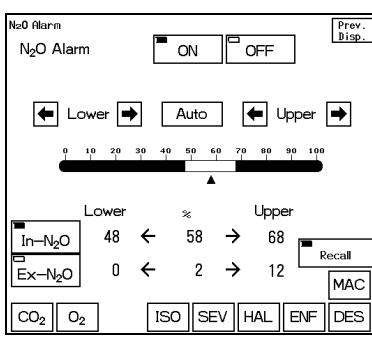
**Lower Limit** Range: 18 to 60%.

**Upper Limit** Range: 40 to 100%. Turns OFF if 100% or above is set.

**Auto** Automatically sets the upper limit to +10%, and lower limit to -10% from the current value.

## ●N<sub>2</sub>O (Nitrous Oxide) Alarm

### In-N<sub>2</sub>O Alarm



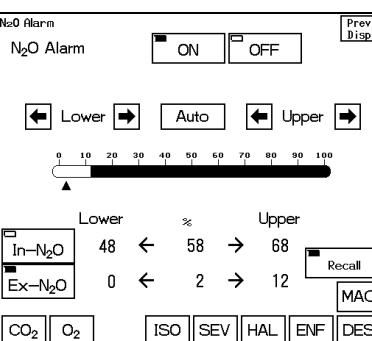
The upper/lower limit can be set in 2% increments.

**Lower Limit** Range: 0 to 98%. Turns OFF if 0% or below is set.

**Upper Limit** Range: 2 to 100%. Turns OFF if 100% or above is set.

**Auto** Automatically sets the upper limit to +10%, and lower limit to -10% from the current value.

### Ex-N<sub>2</sub>O Alarm



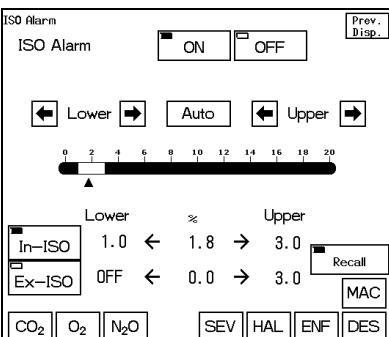
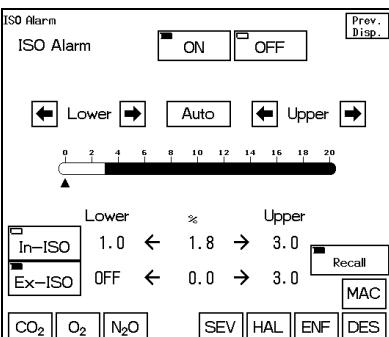
The upper/lower limit can be set in 2% increments.

**Lower Limit** Range: 0 to 98%. Turns OFF if 0% or below is set.

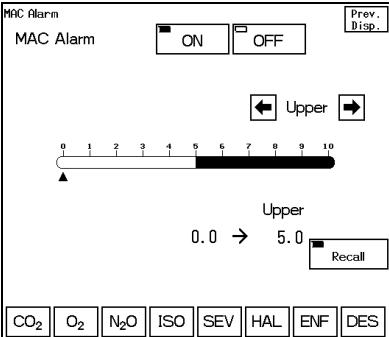
**Upper Limit** Range: 2 to 100%. Turns OFF if 100% or above is set.

**Auto** Automatically sets the upper limit to +10%, and lower limit to -10% from the current value.

## ●Anesthetic Gas Alarm

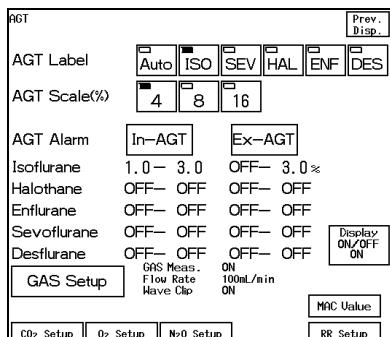
In-AGT Alarm	
	The upper/lower limit can be set in 0.5% increments.
	<p>Lower Limit</p> <p>The adjustable range differs depending on the anesthetic gas label.          ISO, HAL, ENF: 0.5 to 4.0%          DES: 0.5 to 12.0%          SEV: 0.5 to 5.0%          Turns OFF if the value below the adjustable range is set.</p> <p>Upper Limit</p> <p>The adjustable range differs depending on the anesthetic gas label.          ISO, HAL, ENF: 3.0 to 6.0%          DES: 8.0 to 20.0%          SEV: 3.0 to 8.0%          Turns OFF if the value above the adjustable range is set.</p> <p>Auto</p> <p>Automatically sets the upper limit to +0.8%, and lower limit to -0.8% from the current value.</p>
Ex-AGT Alarm	
	The upper/lower limit can be set in 0.5% increments.
	<p>Lower Limit</p> <p>The adjustable range differs depending on the anesthetic gas label.          ISO, HAL, ENF: 0.5 to 4.0%          DES: 0.5 to 12.0%          SEV: 0.5 to 5.0%          Turns OFF if the value below the adjustable range is set.</p> <p>Upper Limit</p> <p>The adjustable range differs depending on the anesthetic gas label.          ISO, HAL, ENF: 3.0 to 6.0%          DES: 8.0 to 20.0%          SEV: 3.0 to 8.0%          Turns OFF if the value above the adjustable range is set.</p> <p>Auto</p> <p>Automatically sets the upper limit to +0.8%, and lower limit to -0.8% from the current value.</p>

## ●MAC Value Alarm

	The upper limit can be set in 0.1 increments.
Lower Limit	(No setting)
Upper Limit	<p>Range: 0.1 to 9.9.          Turns OFF if 9.9 or above is set.</p>

## Anesthetic Gas Label

The anesthetic gas label can be selected on the AGT setup menu.



Select the label from **ISO**, **SEV**, **HAL**, **ENF**, **DES**.

If **Auto** is selected, the label will be automatically set according to the detected anesthetic gas.

If the multigas unit detects a different anesthetic gas type from the set label, the alarm sound will generate, and "Agent \*\*\*?" (\*\*: anesthetics gas label) message will be displayed.

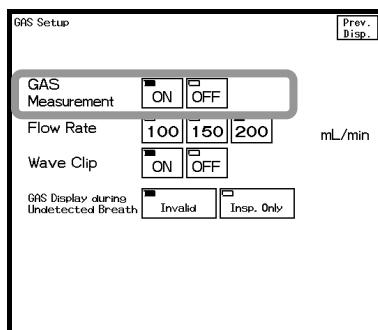
### NOTE

In case of the MGU-801P/MGU-802, the **Auto**, **ISO**, **SEV**, **HAL**, **ENF**, and **DES** keys for AGT Label setup will not appear. The label will be automatically set according to the detected anesthetic gas.

## GAS Setup (MGU-701/MGU-702)

The GAS setup menu can be accessed by pressing the **GAS Setup** key.

### ●ON/OFF of Gas Measurement

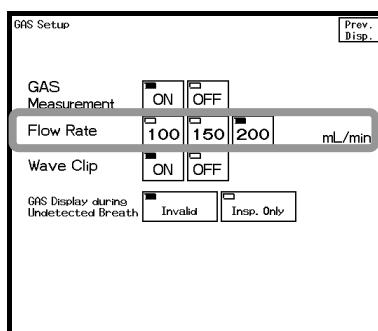


Select **ON** or **OFF** for "Gas Measurement".

**ON** will perform gas measurement.

**OFF** will not perform gas measurement.

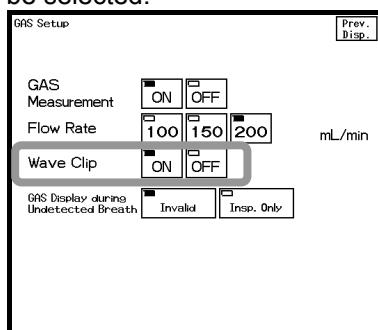
### ●Flow Rate



Select the "Flow Rate" from **100**/**150**/**200** mL/min.

### ●Wave Clip

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

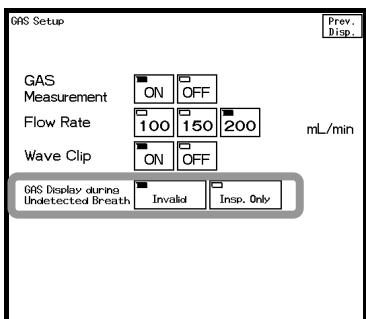


**ON** will display the exceeded part of the waveform in straight line.

**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.

## ●GAS Display during Undetected Breath

Gas data display when a respiration is not detected can be selected from **Invalid** (bar display) or **Insp. Only** (displays only the inspiratory data).



**Invalid** will make the inspiratory and expiratory data invalid when a respiration is not detected and bar marks will be displayed instead.

**Insp. Only** will make only the inspiratory data valid when a respiration is not detected, and bar marks will be displayed for expiratory data.

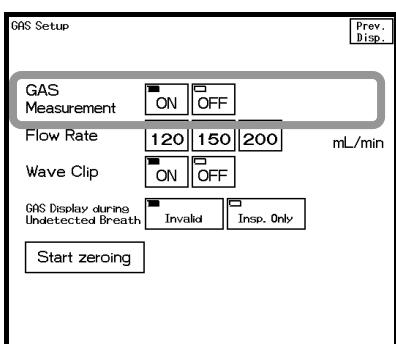
### NOTE

When [Insp. Only] is selected for "GAS Display during Undetected Breath" and if only inspiratory data is displayed, inspiratory and expiratory data display on the central monitor will become invalid.

## GAS Setup (MGU-801P/MGU-802/MGU-803)

The GAS setup menu can be accessed by pressing the **GAS Setup** key.

## ●ON/OFF of Gas Measurement



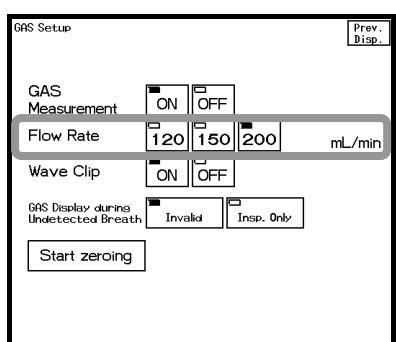
Select **ON** or **OFF** for "Gas Measurement".

**ON** will perform gas measurement.

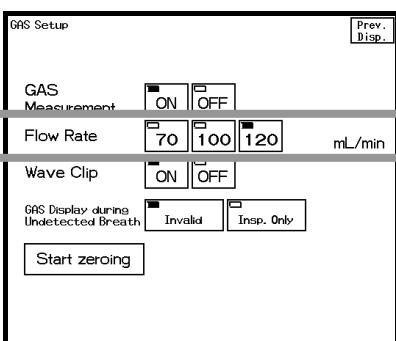
**OFF** will not perform gas measurement.

## ●Flow Rate

Selectable follow rate depends on the type (Adult/Pediatric, Neonate) of DRYLINE™ Water Trap.



When using the DRYLINE™ Water Trap for adult/pediatric, select the "Flow Rate" from **120** / **150** / **200** mL/min.



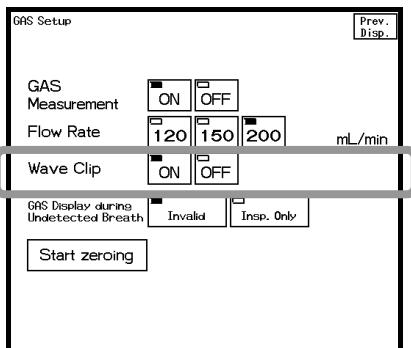
When using the DRYLINE™ Water Trap for neonate, select the "Flow Rate" from **70** / **100** / **120** mL/min.

**CAUTION**

There are 2 types of DRYLINE™ Water Traps for Adult/Pediatric, and Neonate and selectable follow rate depends on the water trap type. Depending on the patient, select appropriate Water Trap.

**●Wave Clip**

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

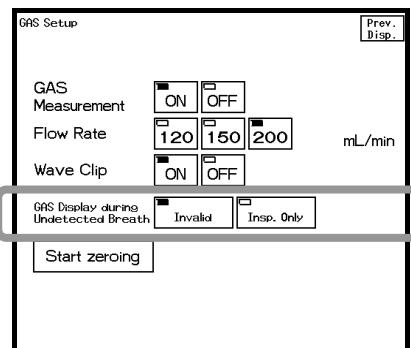


**ON** will display the exceeded part of the waveform in straight line.

**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.

**●GAS Display during Undetected Breath**

Gas data display when a respiration is not detected can be selected from **Invalid** (bar display) or **Insp. Only** (displays only the inspiratory data).



**Invalid** will make the inspiratory and expiratory data invalid when a respiration is not detected and bar marks will be displayed instead.

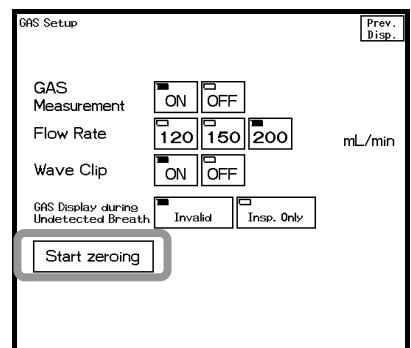
**Insp. Only** will make only the inspiratory data valid when a respiration is not detected, and bar marks will be displayed for expiratory data.

**NOTE**

When **[Insp. Only]** is selected for “GAS Display during Undetected Breath” and if only inspiratory data is displayed, inspiratory and expiratory data display on the central monitor will become invalid.

**●Manual Zero Calibration**

On the patient monitor, a zero calibration for the multigas measurement is periodically performed. However, it is possible to perform a zero calibration when necessary.



Press the **Start zeroing** key to start the zero calibration manually.

In calibration progress, the “Zeroing in Progress” message will be displayed.

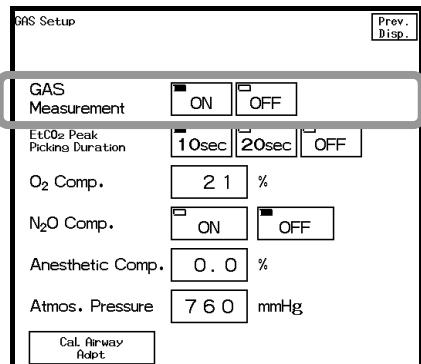
When the calibration is completed, the “Zeroing Complete” message will be displayed.

# CO<sub>2</sub> Concentration

# (HPD-800: Capnostat5)

The GAS setup menu can be accessed by pressing the **GAS Setup** key.

## ●ON/OFF of Gas Measurement



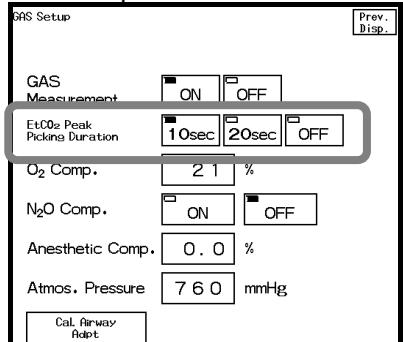
Select **ON** or **OFF** for "Gas Measurement".

**ON** will perform gas measurement.

**OFF** will not perform gas measurement.

## ●EtCO<sub>2</sub> Peak Picking Duration

The duration to pick the EtCO<sub>2</sub> maximum value can be selected from 10 sec., 20 sec., or OFF.

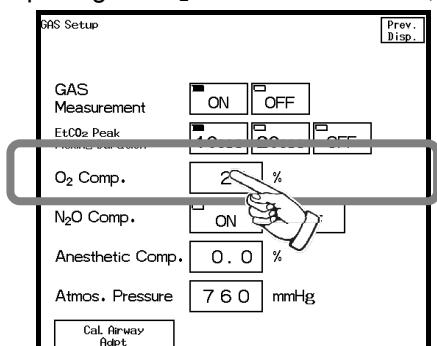


**10sec**, **20sec** will display the maximum EtCO<sub>2</sub> value for the selected duration.

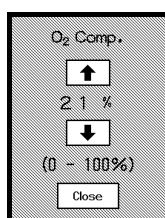
**OFF** will display the EtCO<sub>2</sub> value for each respiration. As the EtCO<sub>2</sub> value display is updated each second, EtCO<sub>2</sub> value for each respiration cannot be displayed if respiration rate is 60Bpm or above.

## ●O<sub>2</sub> Compensation

By inputting the O<sub>2</sub> concentration value, compensation can be made to display more accurate value.



Pressing the key will display the tool box to set the value.



Use the **↑** **↓** keys to adjust the O<sub>2</sub> compensation (O<sub>2</sub> concentration).

The O<sub>2</sub> compensation can be set in 1% increment for the value up to 30%, and 5% increment for the value 30% and above.

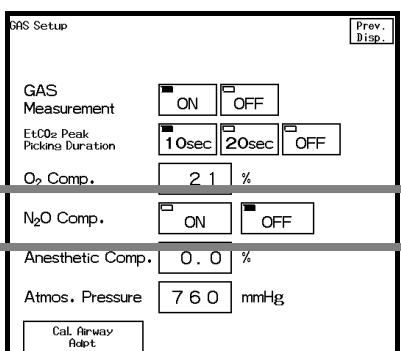
Press the **Close** key after setting the O<sub>2</sub> compensation.

### NOTE

The value cannot be changed if the total value of O<sub>2</sub> compensation and anesthetic gas compensation exceeds 100%. In such case, change the O<sub>2</sub> compensation value after changing the anesthetic gas compensation value.

## ●N<sub>2</sub>O Compensation

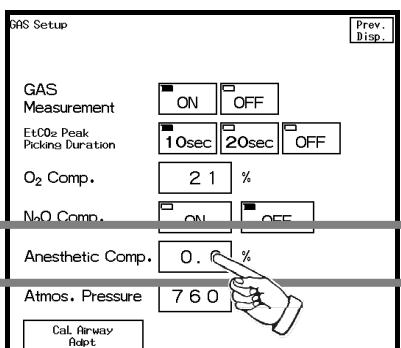
If N<sub>2</sub>O is present in the respiration circuit, the CO<sub>2</sub> value tends to be displayed higher than the actual value. By setting the N<sub>2</sub>O compensation ON, this can be adjusted.



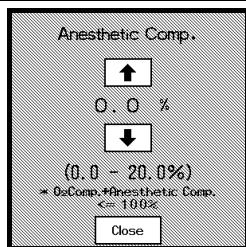
Select ON or OFF for N<sub>2</sub>O compensation.

## ●Anesthetic Gas Compensation

By inputting the anesthetic gas concentration, compensation can be made to display more accurate value.



Pressing the key will display the tool box to set the value.



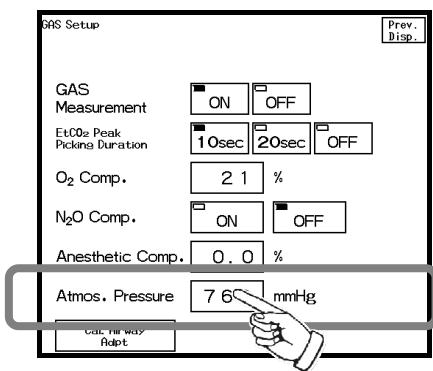
Use the keys to adjust the anesthetic gas compensation (anesthetic gas concentration). Press the key after setting the anesthetic gas compensation.

### NOTE

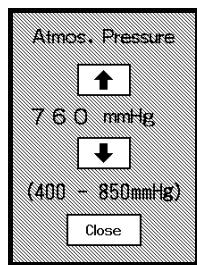
The value cannot be changed if the total value of O<sub>2</sub> compensation and anesthetic gas compensation exceeds 100%. In such case, change the anesthetic gas compensation value after changing the O<sub>2</sub> compensation value.

## ●Atmospheric Pressure Compensation

The atmospheric pressure can be adjusted to compensate for pressure differences.



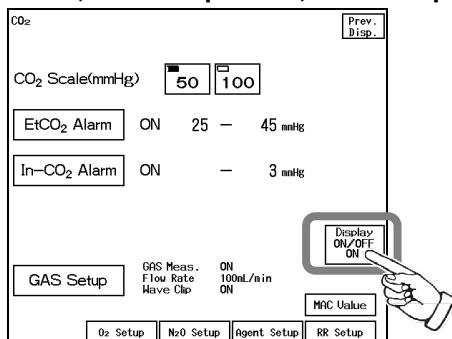
Pressing the key will display the tool box to set the value.



Use the **↑** **↓** keys to adjust the atmospheric pressure (mmHg/kPa).  
Press the **Close** key after setting the atmospheric pressure.

## ON/OFF of Parameter Display

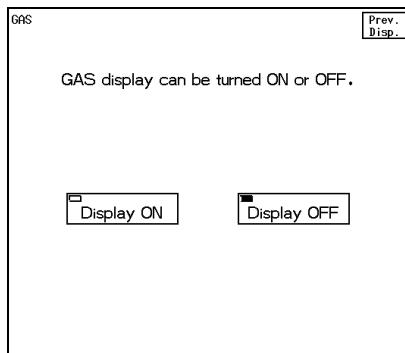
- 1** Press the **Display ON/OFF** key on the corresponded gas menu (CO<sub>2</sub> setup menu, O<sub>2</sub> setup menu, N<sub>2</sub>O setup menu, AGT setup menu).



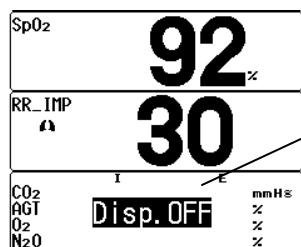
The Display ON/OFF selection will be displayed.

<CO<sub>2</sub> Setup Menu>

- 2** Select **Display ON** or **Display OFF**.



Pressing the **Display ON** key will display the gas data.  
Pressing the **Display OFF** key will not display the gas data.

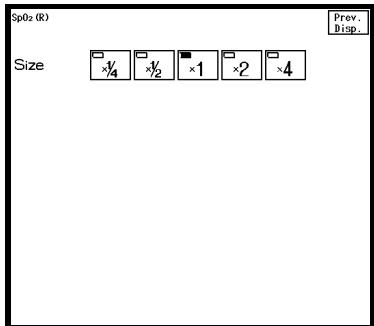


The Display OFF message will be displayed inside the numeric data box.

- |                |   |
|----------------|---|
| <b>CAUTION</b> | <ul style="list-style-type: none"> <li>When the waveform and numeric data display is set to OFF, the alarm generation and table/ trend input will also be suspended.</li> <li>When the waveform and numeric data display is set to OFF, the respiration rate measured by the multigas unit will not be displayed either.</li> </ul> |
|----------------|---|

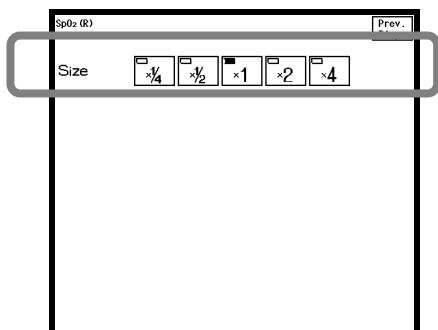
## Radical-7 Data

When pulse oximeter, Radical-7 (Masimo<sup>®</sup>) is used, SpO<sub>2</sub> (R) waveform size can be set.



## Waveform Size

### 1 Select the waveform size.



Select the waveform size for displaying and recording from  $\times 1/4$ ,  $\times 1/2$ ,  $\times 1$ ,  $\times 2$ ,  $\times 4$ .

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# Chapter 7

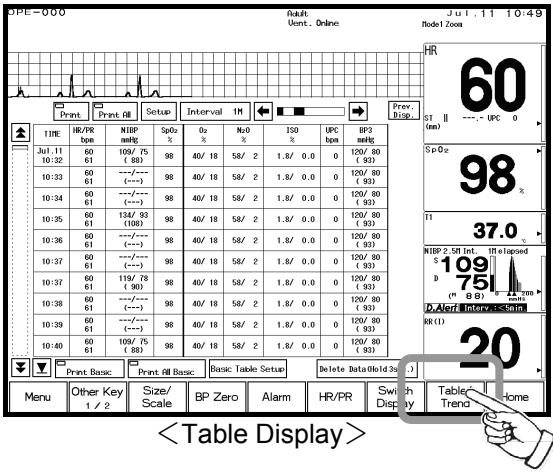
# Function

This chapter describes the function such as arrhythmia analysis, trend, and recall.

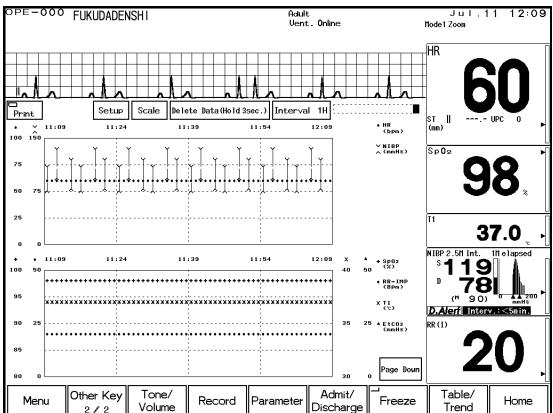
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## Table/Trend

Each time the **Table/Trend** key is pressed, the display of table and trend data can be switched.



<Table Display>



<Trend Display>

## Table Display

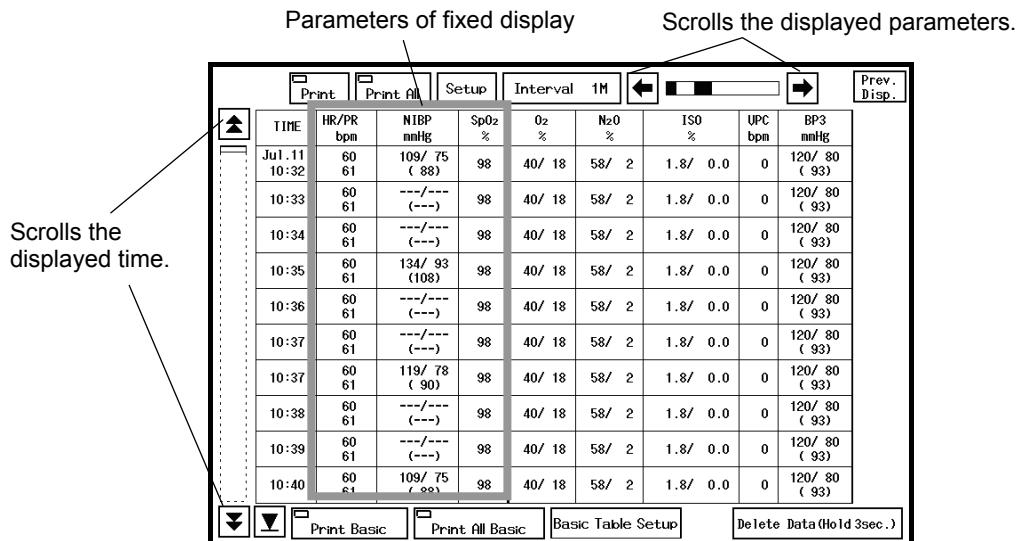
In this section, procedure to operate and print the table display is explained.

The data of approximately 20 hours for the parameters displayed on the home display will be stored and displayed in 1-minute, 2.5-minute interval, at alarm generation, and at NIBP measurement.

### 1 Press the **Table/Trend** key to display the table data.

The data for all the measured parameters will be displayed.

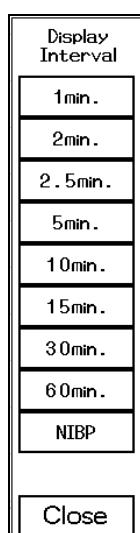
The parameters are divided by a thick borderline. The parameters on the left rows are fixed display and the parameters on the right rows can be scrolled using the arrow keys.



### 2 Set the display interval for the table data.

**Interval 2M**

Pressing the **Interval xM** key will display the selection tool for the display interval.



Select from 1min. / 2min. / 2.5min. / 5min. / 10min. / 15min. / 30min. / 60min.

**NIBP**

**NIBP** will display the table with the time of each NIBP measurement.

The data at the time of NIBP measurement and at alarm generation will be displayed regardless of the display interval setup.

#### CAUTION

- If “Save Data to Table” is set to OFF on the alarm setup menu, data at alarm occurrence will not be stored on the table.
- Depending on the data stored on the table (alarm data, NIBP manual measurement data, or NIBP continuous measurement data), the total duration of the table will differ.

### 3 Print the table data.



**Print** will print all parameters of only the displayed time range.

**Print All** will print all parameters of the whole time range.



**Print Basic** will print the basic parameters of only the displayed time range.

**Print All Basic** will print the basic parameters of the whole time range.

#### [Output example when the **Print** key is pressed]

OPE-003 Jul. 18 2007 14:48 LIST 1/1												
ID:	SEX: AGE: 0 ADULT											
FUKUDADENSHI			Jul. 18 HR/PR-Sp			NIBP	SPO <sub>2</sub>	T1	BPI	BP2	RR-CO <sub>2</sub>	
	bpm	mmHg	%	°C		mmHg	mmHg		mmHg	mmHg	mmHg	
14:25	60/50	124/ 93 (108)	98	37.0		124/ 93 (108)	23/ 14 (20)	12	0/ 35			
14:27	60/50	119/ 74 (90)	98	37.0		124/ 81 (93)	23/ 14 (20)	12	0/ 35			
14:30	60/50	109/ 75 (88)	98	37.0		124/ 81 (93)	23/ 14 (20)	12	0/ 35			
14:32	60/50	134/ 93 (108)	98	37.0		124/ 81 (93)	23/ 14 (20)	12	0/ 35			
14:35	60/50	119/ 74 (90)	98	37.0		124/ 81 (93)	23/ 14 (20)	12	0/ 35			
14:37	60/50	109/ 75 (88)	98	37.0		124/ 81 (93)	23/ 14 (20)	12	0/ 35			
14:40	60/50	134/ 93 (108)	98	37.0		124/ 81 (93)	23/ 14 (20)	12	0/ 35			
14:42	60/50	119/ 74 (90)	98	37.0		124/ 81 (93)	23/ 14 (20)	12	0/ 35			
14:45	60/50	109/ 75 (88)	98	37.0		124/ 81 (93)	23/ 14 (20)	12	0/ 35			
14:47	60/50	134/ 93 (108)	98	37.0		124/ 81 (93)	23/ 14 (20)	12	0/ 35			
14:50	60/50	119/ 74 (90)	98	37.0		124/ 81 (93)	23/ 14 (20)	12	0/ 35			

#### [Output example of Basic Table]

OPE-005 Jul. 18 2007 14:50 LIST 1/1												
ID:	SEX: AGE: 0 ADULT											
FUKUDADENSHI			Jul. 18 HR/PR-Sp			NIBP	SPO <sub>2</sub>	T1	CO <sub>2</sub>	RR-CO <sub>2</sub>	Bpm	
	bpm	mmHg	%	°C		mmHg	mmHg		mmHg	mmHg		
14:27	60/50	119/ 73 (90)	98	37.0		0/ 35	12					
14:30	60/50	109/ 75 (88)	98	37.0		0/ 35	12					
14:32	60/50	134/ 93 (108)	98	37.0		0/ 35	12					
14:35	60/50	119/ 73 (90)	98	37.0		0/ 35	12					
14:37	60/50	109/ 75 (88)	98	37.0		0/ 35	12					
14:40	60/50	134/ 93 (108)	98	37.0		0/ 35	12					
14:42	60/50	119/ 74 (90)	98	37.0		0/ 35	12					
14:45	60/50	109/ 75 (88)	98	37.0		0/ 35	12					
14:47	60/50	134/ 93 (108)	98	37.0		0/ 35	12					
14:50	60/50	119/ 74 (90)	98	37.0		0/ 35	12					

### 4 Delete the table data.

**Delete Data (Hold 3sec.)**

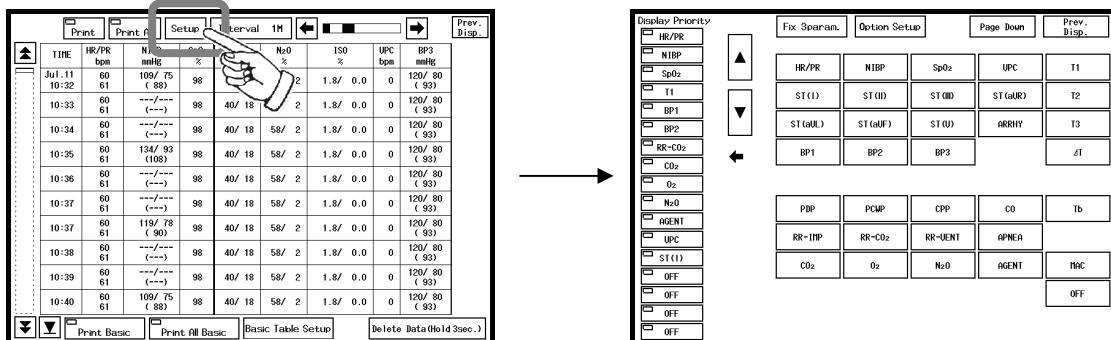
Press the **Delete Data (Hold 3sec.)** key for more than 3 seconds.

By pressing the **Yes** key on the confirmation display, all stored table/trend data will be deleted.

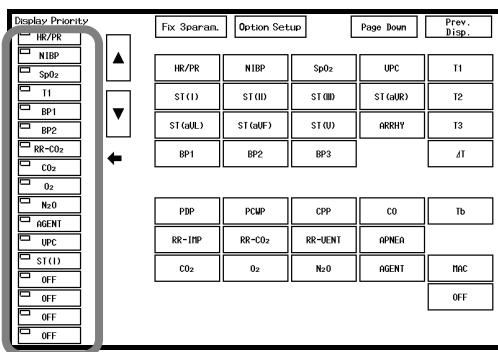
## ●Display Priority Setup for the Parameter on the Table

The display priority of the parameters on the table can be set.

- 1 Press the **Setup** key to display the table setup menu.



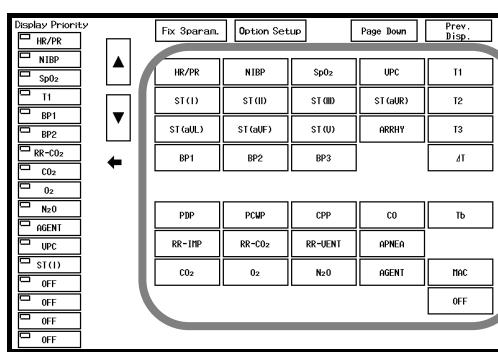
- 2 Set the priority of the parameters to be displayed on the table.



All measured parameters will be displayed on the table.  
The display priority is high from the top. On the table display, the higher priority parameter will be displayed from the left.

The parameters which priority is not set will be displayed on the right side on the table display.

- 3 Select the parameter for each priority level.

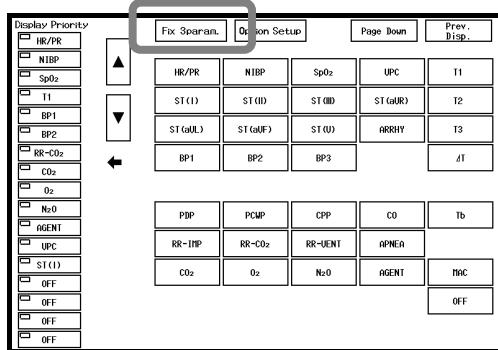


The parameter can be selected by directly pressing the key or using the up and down arrow keys.

The priority level will automatically shift downwards to allow continuous parameter selection.

<b>NOTE</b>	For apnea data (apnea duration), maximum apnea duration at 1 minute will be stored.
-------------	---

- 4 Select the numbers of high priority parameters to be set as fixed display.

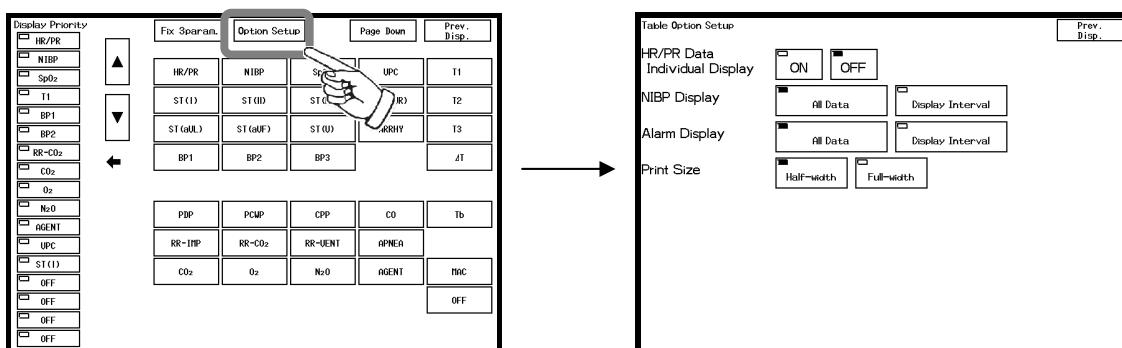


3 to 6 high priority parameters can be set as fixed display.

Pressing the **Fix Xparam.** key will sequentially set 3 → 4 → 5 → 6 → 3 for the numbers of parameters.

## ●Display Setup for the Table

- 1 Press the **Setup** key on the Display Priority setup screen.



- 2 Select whether or not to individually display the HR/PR data.

HR/PR Data Individual Display	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
----------------------------------	--	------------------------------

OFF will display both HR/PR data in one box.  
 ON will display HR/PR data individually in one box each.

- 3 Select how to display the NIBP table.

NIBP Display	<input checked="" type="checkbox"/> All Data	<input type="checkbox"/> Display Interval
--------------	--	---

All Data will display all NIBP data regardless of the table display interval setup.  
 Display Interval will display the NIBP data according to the set display interval.

- 4 Select how to display the alarm table.

Alarm Display	<input checked="" type="checkbox"/> All Data	<input type="checkbox"/> Display Interval
---------------	--	---

All Data will display all alarm data regardless of the table display interval setup.  
 Display Interval will display the alarm data according to the set display interval.

- 5 Select the print size for the table data.

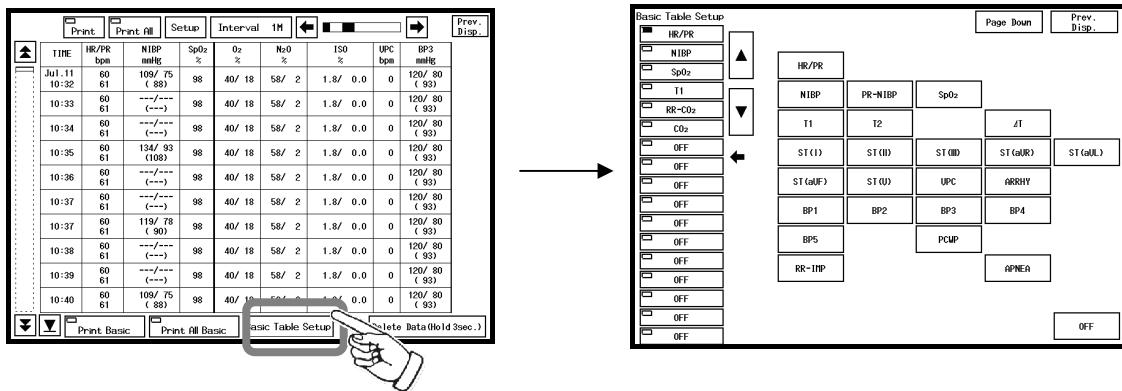
Print Size	<input checked="" type="checkbox"/> Half-width	<input type="checkbox"/> Full-width
------------	--	-------------------------------------

Half-width will print the table data font size in half-width.  
 Full-width will print the table data font size in full-width.

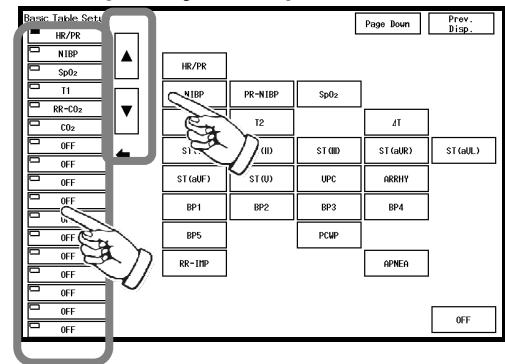
## ● Parameter Setup for the Basic Table

The parameter to be displayed on the basic table can be set.

- 1** Press the **Basic Table Setup** key on the table screen.

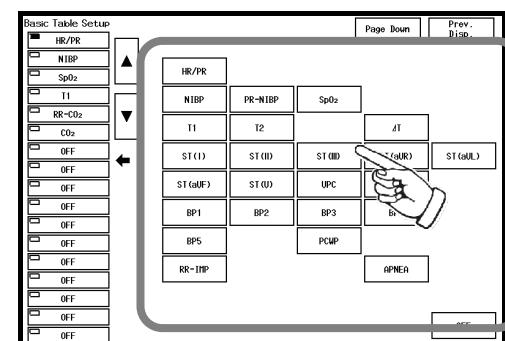


- ## **2 Set the priority of the parameters to be displayed on the basic table.**



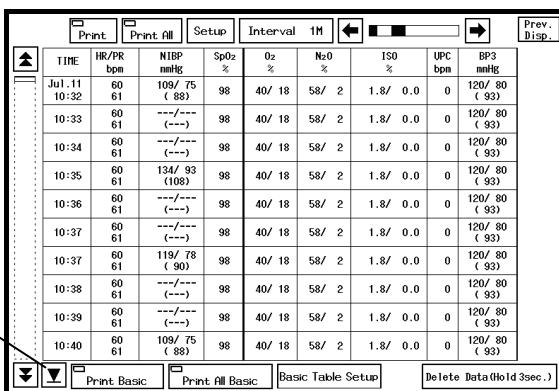
The display priority is high from the top. On the basic table display, the higher priority parameter will be displayed from the left.

- ### **3 Select the parameter for each priority level.**



The parameter can be selected by directly pressing the key or using the up and down arrow keys.  
The priority level will automatically shift downwards to allow continuous parameter selection.

## ●The Description of the Display

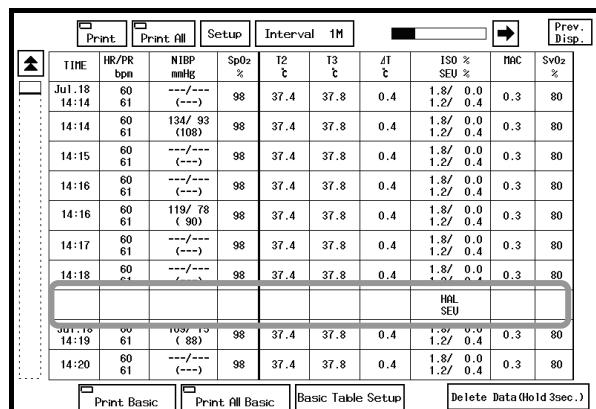


A screenshot of a computer screen displaying a table of medical measurements. The table has columns for TIME, HR/PR bpm, NIBP mmHg, SpO<sub>2</sub> %, I<sub>2</sub> c, I<sub>3</sub> c, dT c, ISO % SEU %, Hb, and SvO<sub>2</sub> %. The rows show measurements taken at various times from July 1, 11:00 to 14:40. A callout arrow points to the row for 14:37, which contains several dashes ('---') in the data fields, indicating no measurement was taken at that specific time.

Latest Measurement Time

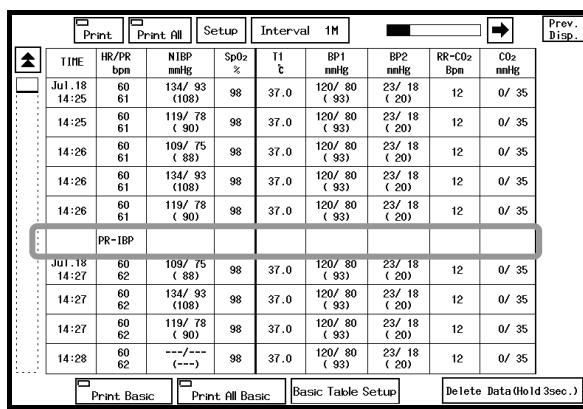
For the following case, the measurement data will be displayed as “- - -” for the corresponding time.

- If the measurement was not performed. (Ex. Before admittance of patient).
- If the monitoring was suspended.
- If the BP zero balance was not performed.
- If the communication with external equipment was not established, or if network setup was not performed.



A screenshot of a computer screen displaying a table of medical measurements. The table has columns for TIME, HR/PR bpm, NIBP mmHg, SpO<sub>2</sub> %, I<sub>2</sub> c, I<sub>3</sub> c, dT c, ISO % SEU %, Hb, and SvO<sub>2</sub> %. The rows show measurements taken at various times from July 1, 11:00 to 14:40. A callout arrow points to the row for 14:18, which contains the text 'HAL SEU' in the data fields, indicating a label change.

When the AGT label is changed during measurement, the new label will be displayed using one row on the table, and the measurement data for the new label will be displayed from the rows below it.



A screenshot of a computer screen displaying a table of medical measurements. The table has columns for TIME, HR/PR bpm, NIBP mmHg, SpO<sub>2</sub> %, I<sub>1</sub> mmHg, BP1 mmHg, BP2 mmHg, RR-CO<sub>2</sub> Bpm, and CO<sub>2</sub> mmHg. The rows show measurements taken at various times from July 1, 11:00 to 14:40. A callout arrow points to the row for 14:26, which contains the text 'PR-IBP' in the data fields, indicating a PR source change.

When the PR source is changed during measurement, the new PR source will be displayed using one row on the table, and the measurement data for the new PR source will be displayed from the rows below it.

Print		Print All		Setup		Interval		1M				Prev.
												Disp.
TIME	HR/PR bpm	NIBP mmHg	Spo2 %	T1 °C	BP1 mmHg	BP2 mmHg	R/R-CO2	Bpm	CO2 mmHg			
Jul 1, 18 14:14	60 61	119/ 78 ( 90)	98	37.0	120/ 80 ( 93)	23/ 18 ( 20)	12	0/ 35				
14:14	60 61	109/ 75 ( 88)	98	37.0	120/ 80 ( 93)	23/ 18 ( 20)	12	0/ 35				
14:15	60 61	134/ 93 (108)	98	37.0	120/ 80 ( 93)	23/ 18 ( 20)	12	0/ 35				
14:16	60 61	119/ 78 ( 90)	98	37.0	120/ 80 ( 93)	23/ 18 ( 20)	12	0/ 35				
<hr/>												
Child												
Jul 1, 19 14:17	60 61	109/ 75 ( 88)	98	37.0	120/ 80 ( 93)	23/ 18 ( 20)	12	0/ 35				
14:18	60 61	134/ 93 (108)	98	37.0	120/ 80 ( 93)	23/ 18 ( 20)	12	0/ 35				
14:18	60 61	119/ 78 ( 90)	98	37.0	120/ 80 ( 93)	23/ 18 ( 20)	12	0/ 35				
14:19	60 61	109/ 75 ( 88)	98	37.0	120/ 80 ( 93)	23/ 18 ( 20)	12	0/ 35				
14:20	60 61	----/----	98	37.0	120/ 80 ( 93)	23/ 18 ( 20)	12	0/ 35				
<hr/>												
Print Basic			Print All Basic			Basic Table Setup			Delete Data(Hold 3sec.)			

## NOTE

The new patient classification will be displayed on the table only if NIBP measurement is performed after changing the patient classification.

Print		Print All		Setup		Interval		1M				→	Prev. Disp.
Time	HR/PR bpm	NIBP mmHg	SpO2 %	T1 °C	BPF1 mmHg	BPF2 mmHg	RR-CO2 Epm	CO2 mmHg					
Jul-18 15:11	60 62	---/---	(--)	98	37.0	120/ (93)	23/ (20)	12	0/ 35				
15:12	60 62	---/---	(--)	98	37.0	120/ (93)	23/ (20)	12	0/ 35				
15:12	60 62	124/ (108)	98	37.0	120/ (93)	23/ (20)	12	0/ 35					
15:13	60 62	---/---	--	98	37.0	120/ (93)	23/ (20)	12	0/ 35				
15:14	60 62	---/---	(--)	98	37.0	120/ (93)	23/ (20)	12	0/ 35				
15:15	60 62	119/ (90)	98	37.0	120/ (93)	23/ (20)	12	0/ 35					
15:16	60 62	---/---	(--)	98	37.0	120/ (93)	23/ (20)	12	0/ 35				
15:17	60 62	---/---	(--)	98	37.0	120/ (93)	23/ (20)	12	0/ 35				
15:17	60 62	109/ (88)	98	37.0	120/ (93)	23/ (20)	12	0/ 35					
15:18	60 62	---/---	(--)	98	37.0	120/ (93)	23/ (20)	12	0/ 35				

14:11	60 61	⑧ 134 / 93 (108)	98
-------	----------	---------------------	----

When the patient classification is changed during measurement, the new patient classification will be displayed using one row on the table, and the measurement data for the new patient classification will be displayed from the rows below it.

If body motion artifact was detected during NIBP measurement, a motion artifact mark will be displayed with the data.

Print		Print All		Setup		Interval		1M				Prev.	Disp.
TIME	HR/PR Bpm	NIBP mmHg	Spo2 %	I1 c	Bp1 mmHg	Bp2 mmHg	R/R-C02 Bpm	C02 mmHg					
Jul-18 15:13	60 62	---/--- (- -)	98	37.0	120/ 80 ( 93 )	23/ 18 ( 20 )	12	0/ 35					
15:14	60 62	---/--- (- -)	98	37.0	120/ 80 ( 93 )	23/ 18 ( 20 )	12	0/ 35					
15:15	60 62	119/ 78 ( 90 )	98	37.0	120/ 80 ( 93 )	23/ 18 ( 20 )	12	0/ 35					
15:16	60 62	---/--- (- -)	98	37.0	120/ 80 ( 93 )	23/ 18 ( 20 )	12	0/ 35					
15:17	60 62	---/--- (- -)	98	37.0	120/ 80 ( 93 )	23/ 18 ( 20 )	12	0/ 35					
15:17	60 62	109/ 75 ( 88 )	9	37.0	120/ 80 ( 93 )	23/ 18 ( 20 )	12	0/ 35					
15:18	60 62	---/--- (- -)	98	37.0	120/ 80 ( 93 )	23/ 18 ( 20 )	12	0/ 35					
15:19	60 62	---/--- (- -)	98	37.0	120/ 80 ( 93 )	23/ 18 ( 20 )	12	0/ 35					
15:20	60 62	134/ 93 ( 108 )	98	37.0	120/ 80 ( 93 )	23/ 18 ( 20 )	12	0/ 35					
15:21	60 62	---/--- (- -)	98	37.0	120/ 80 ( 93 )	23/ 18 ( 20 )	12	0/ 35					

14:14	60 61	① 134 / 93 (108)	98
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If NIBP measurement using Dyna Alert function was performed, a Dyna Alert mark will be displayed with the data.

## Trend Display

In this section, procedure to operate and print the trend display is explained.

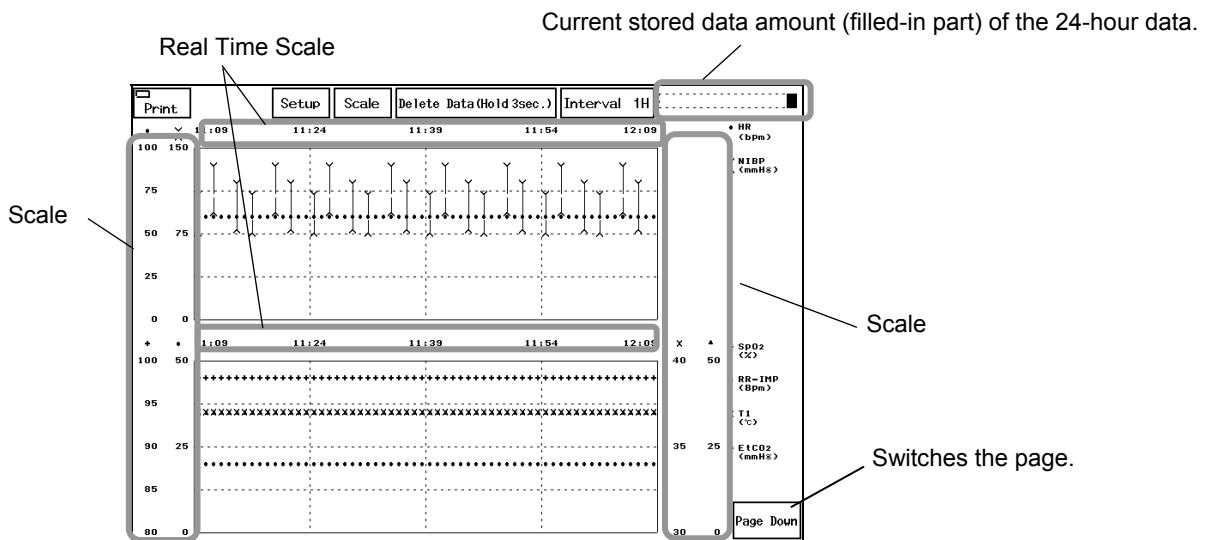
The data of 24 hours will be automatically stored and displayed in 1 minute interval for the parameters displayed on the home display.

### 1 Press the **Table/Trend** key to display the trend data.

The trend display is composed of 2 pages which can be switched by using the **Page Down** or **Page Up** keys.

The graph is divided into upper and lower row on each page.

On each row, a graph trend of 4 parameters can be displayed simultaneously.



### 2 Set the display interval for the trend data.

**Interval 1H**

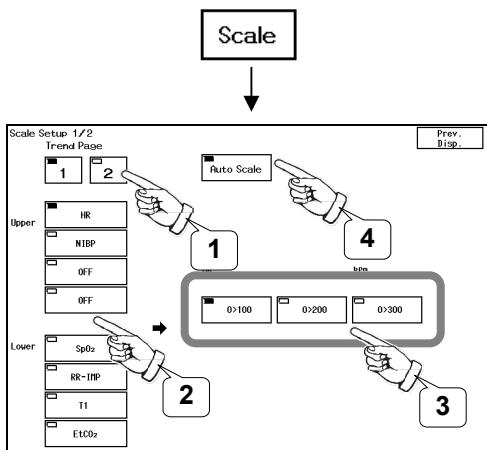
Pressing the **Interval xH** key will display the selection tool to select the display interval.

Display Interval
1H
2H
4H
8H
12H
24H
<b>Close</b>

Select from **1H**/**2H**/**4H**/**8H**/**12H**/**24H**.

<b>Time Range</b>	<b>Sample Rate</b>
1 hour	1 minute
2 hours	2 minutes
4 hours	4 minutes
8 hours	8 minutes
12 hours	12 minutes
24 hours	24 minutes

### 3 Select the displaying scale.



Press the **Scale** key to display the scale setup menu.

- (1) First, select the page to perform the setup.
- (2) Then, select the parameter from the left side to set the scale.
- (3) If **Auto Scale** is not selected, the scale selection for the selected parameter will be displayed. Select the appropriate scale from the selection.
- (4) If **Auto Scale** is selected, the scale will be automatically set depending on the selected parameter.

The scale selection for each parameter is as follows.

<b>Parameter</b>	<b>Scale</b>	<b>Unit</b>
HR	100, 200, 300	bpm
VPC	20, 50, 100	beat
SpO <sub>2</sub>	0–100, 50–100, 80–100	%
PR-SpO <sub>2</sub>	100, 200, 300	bpm
ST	±0.2, ±0.5, ±1.0, ±2.0 ±2, ±5, ±10, ±20	mV mm
NIBP	100, 150, 200, 300 16, 20, 24, 40	mmHg kPa
TEMP1, 2, 3	20–45, 30–40 68–113, 86–104	°C °F
Tb	20–45, 30–40 68–113, 86–104	°C °F
ΔT	0.0–10.0, 0.0–25.0 0.0–18.0, 0.0–45.0	°C °F
BP1, BP2, BP3, BP4, BP5, BP6	20, 50, 100, 150, 200, 300 4, 8, 16, 20, 24, 40	mmHg kPa
CVP	20, 40 20, 50, 100, 150, 200, 300 4, 8, 16, 20, 24, 40	cmH <sub>2</sub> O mmHg kPa
PCWP	20, 50, 100, 150, 200, 300	mmHg
PR-IBP	100, 200, 300	bpm
PDP	20, 50, 100, 150, 200, 300	mmHg
CPP	20, 50, 100, 150, 200, 300	mmHg
CO	6.0, 12.0, 20.0	L/min
SvO <sub>2</sub>	0–100, 50–100, 80–100	%
ScvO <sub>2</sub>	0–100, 50–100, 80–100	%
CCO	6.0, 12.0, 20.0, 60.0	L/min
CCI	6.0, 12.0, 20.0	L/min/m <sup>2</sup>
BT	20–46, 30–40	°C
MV	6.0, 12.0, 20.0, 60.0	L/min
SQI	25, 50, 75, 100	%
EMG	25, 50, 75, 100	dB
SR	25, 50, 75, 100	%
RR-IMP	50, 100, 150	bpm
APNEA	16, 30, 70	s
RR-CO <sub>2</sub>	50, 100, 150	bpm
RR-VENT	50, 100, 150	bpm
FiO <sub>2</sub> EX-O <sub>2</sub>	50, 100	%
In-N <sub>2</sub> O Ex-N <sub>2</sub> O	50, 100	%
In-AGT Ex-AGT	4.0, 8.0, 10.0	%

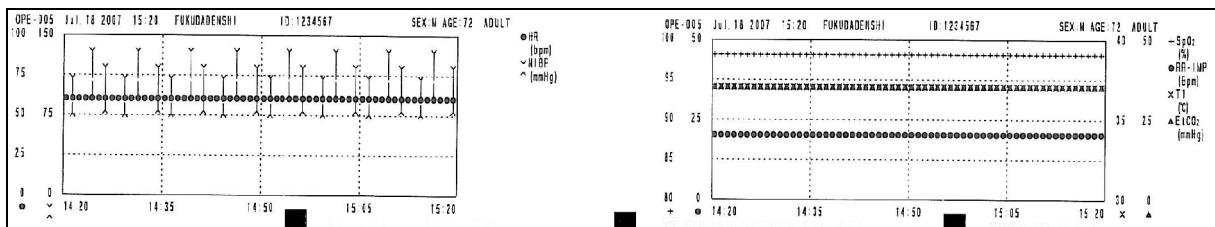
Parameter	Scale	Unit
In-CO <sub>2</sub>	50, 100	mmHg
EtCO <sub>2</sub>	4.0, 8.0, 10.0	kPa, %
MAC	5.0, 10.0	None
BIS	25, 50, 75, 100	None
PR(R)	100, 200, 300	bpm
PI(R)	10.00, 20.00	%
PVI(R)	30, 60, 100	%
SpCO(R)	20, 40, 100	%
SpMet(R)	20.0, 40.0, 100.0	%
SpHb(R)	10.0, 20.0, 30.0	g/dL
SpOC(R)	10, 20, 40	mL/dL

#### 4 Print the trend data.



[Print] will print the trend of only the displayed page.

#### [Output Example]



#### 5 Delete the trend data.

**Delete Data (Hold 3sec.)**

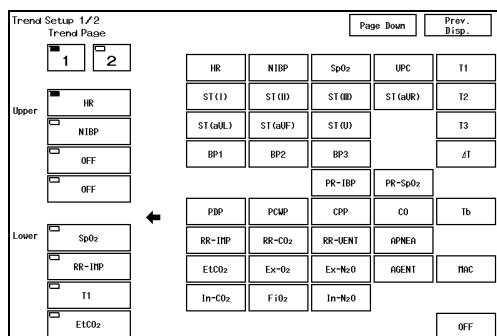
Press the [Delete Data (Hold 3sec.)] key for more than 3 seconds.

By pressing the [Yes] key on the confirmation display, all stored table/trend data will be deleted.

### ●Trend Display Setup

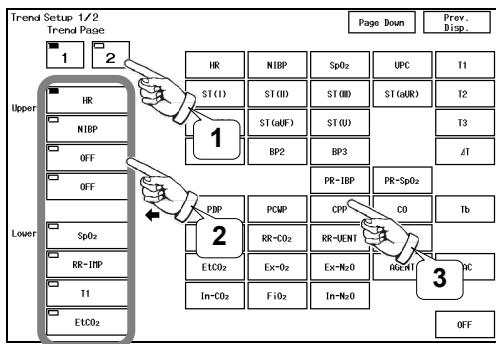
On each page of the trend display, the graph is divided into upper row and lower row, and a graph trend of 4 parameters can be displayed simultaneously for each row.  
Set the parameters to be displayed for each row.

#### 1 Press the **Setup** key on the trend display.



The trend setup menu will be displayed.

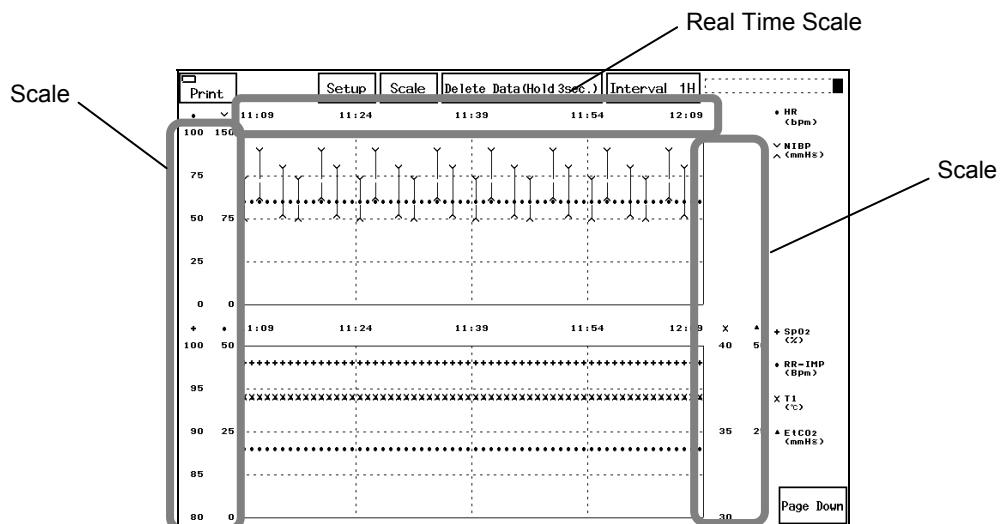
## 2 Select the parameter to display.



- (1) First, select the page to perform the setup.
- (2) Select the displaying location.
- (3) Then, select the displaying parameter from the right side. The parameters can be set continuously from the top location.

<b>Parameter</b>	<b>Description</b>
HR	Heart Rate
VPC	VPC beats
SpO <sub>2</sub>	SpO <sub>2</sub> value
PR-SpO <sub>2</sub>	SpO <sub>2</sub> pulse rate
ST (I), ST (II), ST (III), ST (aVR), ST (aVL), ST (aVF), ST (V)	ST Level
NIBP	Non-Invasive Blood Pressure (S/M/D)
TEMP1, 2, 3	Temperature
Tsk, Tre, Tes, Tco	User-programmed TEMP Label
Tb	Blood Temperature (Cardiac Output Measurement)
ΔT	Temperature Difference (Absolute Value)
BP1, BP2, BP3, BP4, BP5, BP6	Invasive Blood Pressure (S/M/D)
ART, RAP, RVP, PAP, CVP, ICP, UAP, IAP, LAP, LVP	User-programmed BP Label
PCWP	Pulmonary Capillary Wedge Pressure
PR-IBP	Blood Pressure Pulse Rate (BP1 or ART)
PDP	Peak Diastolic Pressure of IABP
CPP	Cerebral Perfusion Pressure
CO	Cardiac Output
SvO <sub>2</sub>	Mixed Venous Oxygen Saturation
ScvO <sub>2</sub>	Central Venous Oxygen Saturation
CCO	Continuous Cardiac Output
CCI	Continuous Cardiac Index
BT	Blood Temperature
RR-IMP	Impedance Respiration
APNEA	Apnea Time (Impedance, CO <sub>2</sub> , ventilator)
RR-CO <sub>2</sub>	CO <sub>2</sub> Respiration Rate
RR-VENT	Ventilator Respiration Rate
FiO <sub>2</sub>	Inspired Oxygen
Ex-O <sub>2</sub>	Expired Oxygen
In-N <sub>2</sub> O	Inspired Nitrous Oxide
Ex-N <sub>2</sub> O	Expired Nitrous Oxide
AGENT	Inspired/Expired Agent Gas
In-CO <sub>2</sub>	Inspired Carbon Dioxide
EtCO <sub>2</sub>	End-Tidal CO <sub>2</sub> Concentration
MAC	MAC
MV	Minute Ventilation (NICO Monitor Measurement)
BIS	BIS Value (BIS Monitor Measurement)
SQI	Signal Quality Index (BIS Monitor Measurement)
EMG	Electromyograph (BIS Monitor Measurement)
SR	Suppression Ratio (BIS Monitor Measurement)
SpO <sub>2</sub> (R)	Arterial Oxygen Saturation
PR(R)	Pulse Rate
PI(R)	Perfusion Index
PVI(R)	Pleth Variability Index
SpCO(R)	Carboxyhemoglobin Concentration
SpMet(R)	Methemoglobin Concentration
SpHb(R)	Total Hemoglobin Concentration
SpOC(R)	Oxygen Content

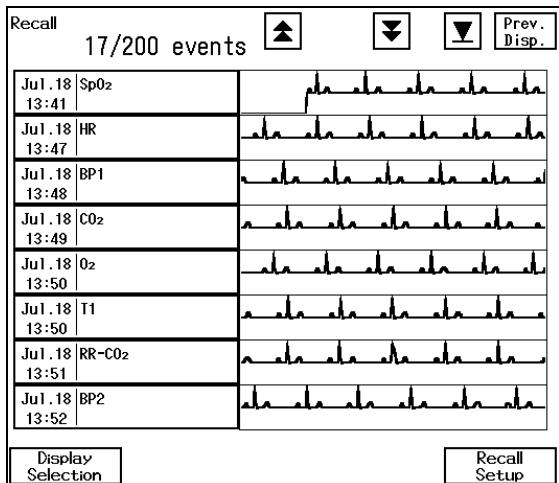
## ●The Description of the Display



This section explains the recall operation and printing procedure.

## To Display the Recall Menu

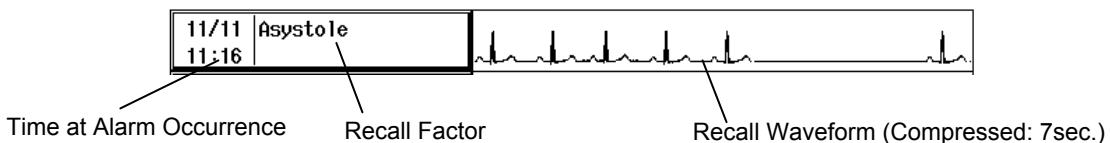
The recall menu can be accessed from the menu, or from the preprogrammed user key.



When an assigned alarm factor occurs, its waveform (12 seconds) and numeric data will be stored for up to 200 data.

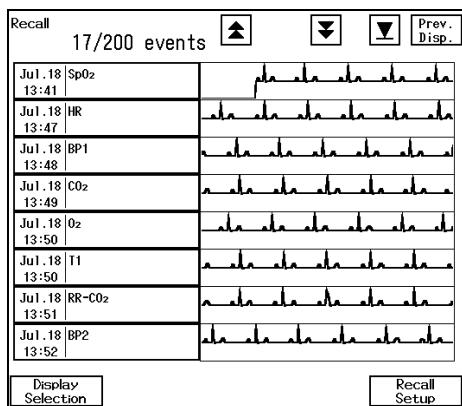
The recall data to be displayed can be selected on the display selection menu.

On the recall list display, 8 compressed recall waveform will be displayed. Pressing one of the compressed recall waveform will enlarge the waveform.



## ● Recall List Display

- 1** Press the **Menu** → **Function** → **Recall** keys.

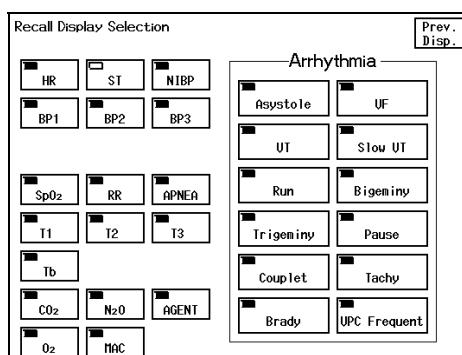


The recall list will be displayed.

The compressed 7 sec. waveforms will be displayed.

The alarm occurrence time, the recall factor, and the compressed waveform of recall waveform 1 will be displayed.

- 2** Select the recall factor to display on the recall list.



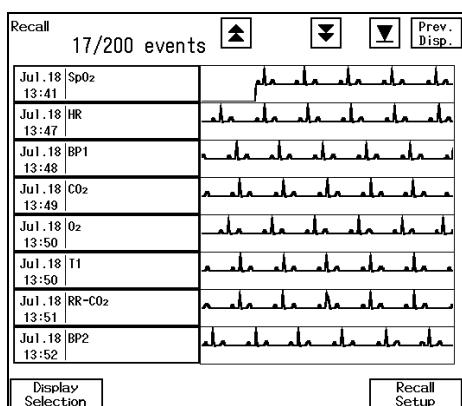
Press the **Display Selection** key and select the recall factor.

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** Switch the recall list display.



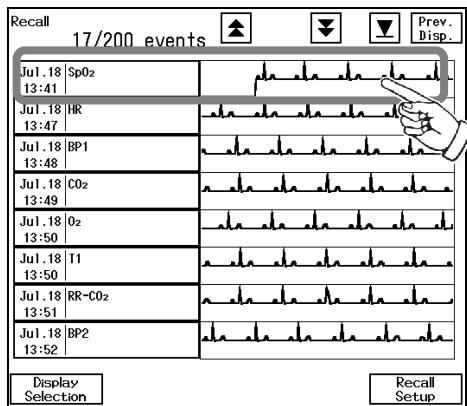
**▼** The newest 8 data will be displayed from the recall list.

**▼** Shifts the recall list to the newer data by 1 page (8 data).

**▲** Shifts the recall list to the older data by 1 page (8 data).

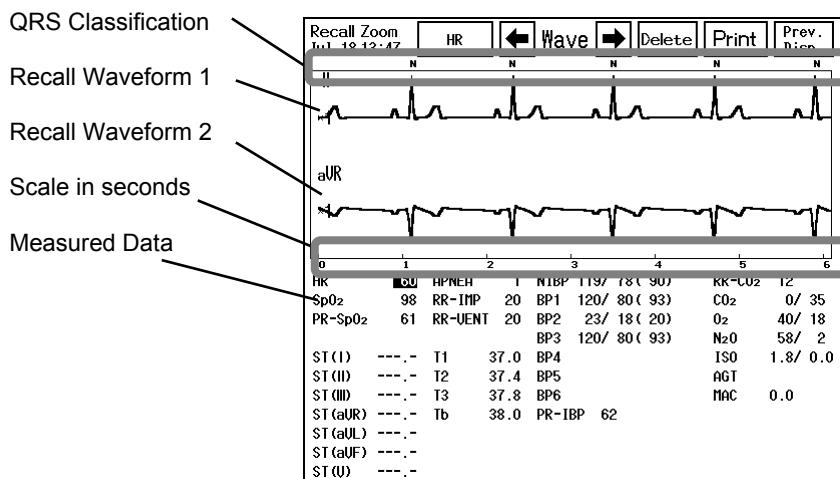
## To Display and Record the Zoom Recall Waveform

On the recall list display, pressing one of the recall factors will display its zoom recall waveform. On the zoom 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.

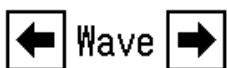


Press one of the recall factors on the recall list.

- 1 Pressing one of the recall factors will display the zoom recall waveform.



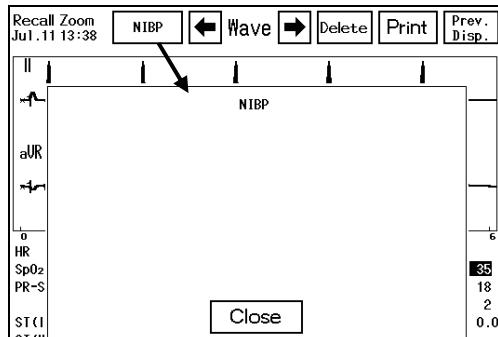
- 2 Move the waveform to the left or the right.



The recall waveform display can be moved to the left or to the right.

← key will move to the older data, → key will move to the newer data.

- 3 The alarm factor occurred at the same time will be displayed.



Pressing the recall factor key will display the recall factor occurred at the same time.

#### 4 Print the recall waveform.

**Print**

Pressing the **Print** key will print the displayed recall waveform and numeric data.

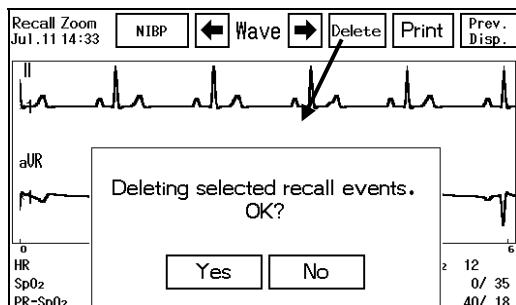
The data and waveform will be printed on the recorder selected for graphic recording on the recording setup menu.



Refer to "4. Monitoring Setup –Recording Setup– Recorder Setup" for recorder setup procedure.

#### 5 Delete the recall waveform.

The unnecessary recall waveform can be deleted.



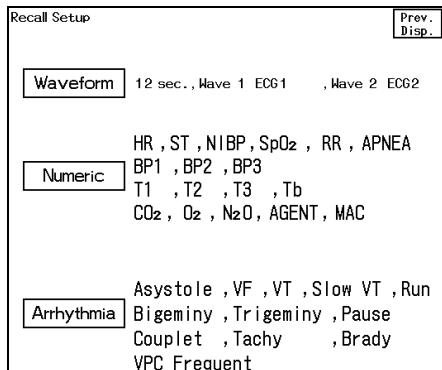
Pressing the **Delete** key will display the confirmation message.

**Yes** will delete the waveform and displays the recall list display.

**No** will return to the previous display.

## 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.

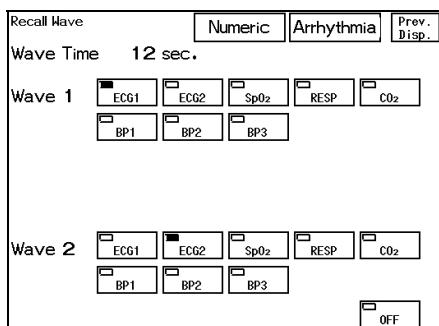


Press the **Recall Setup** key to display the "Recall Setup" window.

### 1 Select the recall waveform.

**Waveform**

Pressing the **Waveform** key will display the menu to select the recall waveform.

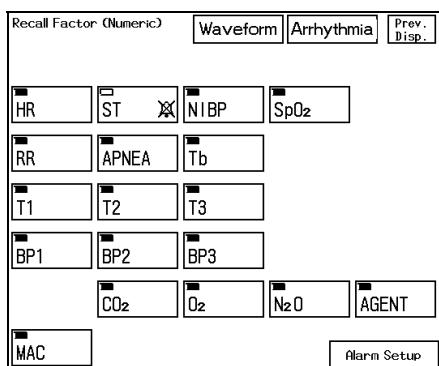


Up to 2 waveforms can be selected for recall waveform.  
Select the recall waveform for Wave 1 and Wave 2.  
The key with the LED lighted is the selected waveform.

### 2 Select the recall factor (numeric data).

**Numeric**

Pressing the **Numeric** key will display the menu to select the numeric data recall factor.

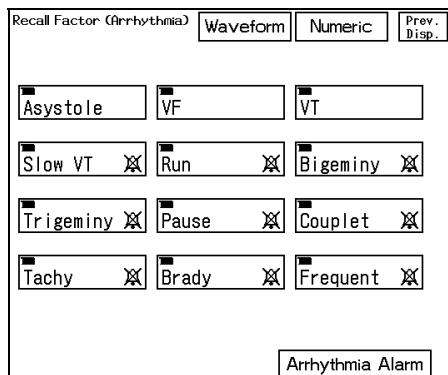


Select the recall factors by pressing their keys.  
The key with the LED lighted will be the recall factors.  
The alarm OFF mark will be displayed inside the parameter key if the alarm is set to OFF for that parameter.

### 3 Select the recall factor (arrhythmia).

**Arrhythmia**

Pressing the **Arrhythmia** key will display the menu to select the arrhythmia alarm factor.



Select the arrhythmias for recall factors. The key with the LED lighted will be the recall factor.

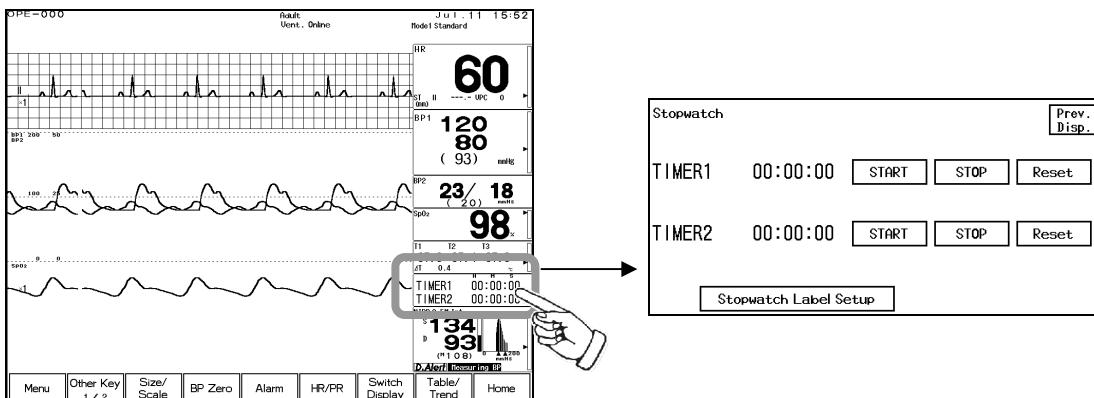
The alarm OFF mark will be displayed inside the arrhythmia key if the alarm is set to OFF for that arrhythmia.

NOTE	<ul style="list-style-type: none"><li>The recall waveform will start with the following delay time tracing back from the alarm occurrence.</li></ul>				
		Adult	Child	Neonate	
	Delay Time	12 sec.	12 sec.	Meas. Data Alarm	Arrhy. Alarm
					12sec.

- For multigas data alarm, the delay time is 8 seconds.

## Stopwatch

By setting the stopwatch key on the home display, the stopwatch function can be used.

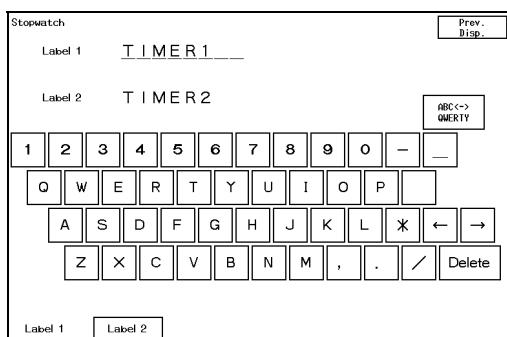


Timer 1, 2 : Starts/stops the stopwatch function.

Label 1, 2 : A label can be set for each timer.

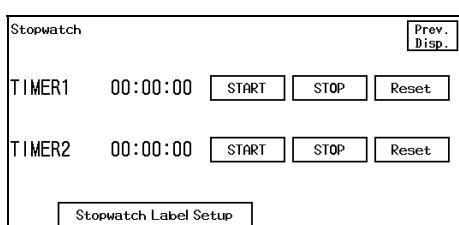
## Label Setup

1 Press the **Stopwatch Label Setup** key.



The stopwatch label setup menu will be displayed. Enter 8 characters (max.) using the alphanumeric keypad.

## Start / Stop of Stopwatch



**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 counting, the counting 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.

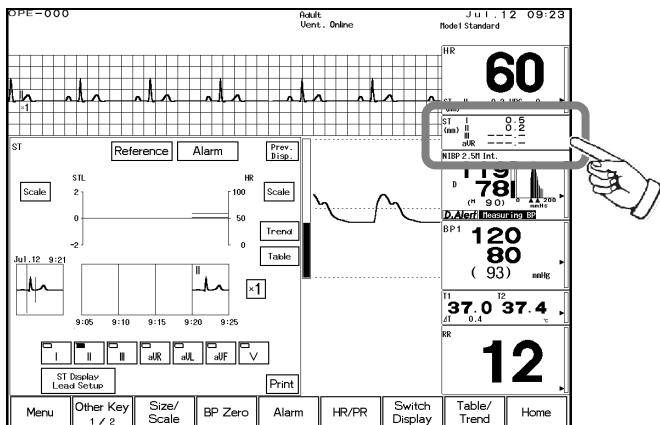
# ST Measurement

# ST Display, Alarm Setup, etc.

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.

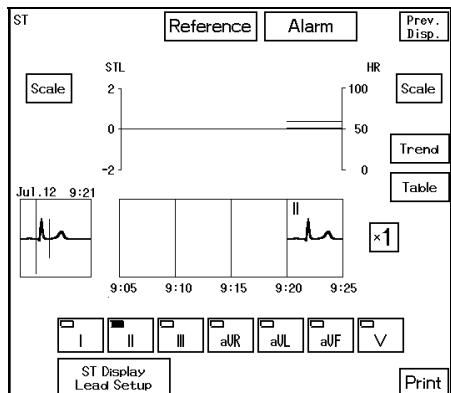


On the ST display, the averaged ECG waveform of 16 beats will be superimposed for 5 minutes. 3 frames of superimposed waveform will be displayed. Also, HR and ST level will be simultaneously displayed as graphic trend. ST level will be measured for each lead. On the ST display, ST alarm limit and ST 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 the reference waveform is not set for ST measurement.

1 Press the **Menu** → **Function** → **ST** keys.



The ST measurement display will appear.

2 Select the superimposed waveform to display.



Select the lead for the superimposed waveform display.

### 3 Select the waveform size for the superimposed waveform.

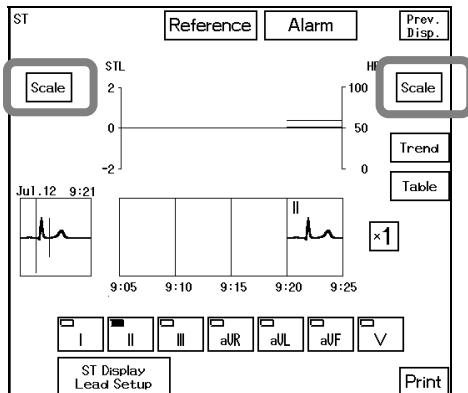
x1

Pressing the key will sequentially change the key as follows;  
 $\times 1/4 \rightarrow \times 1/2 \rightarrow \times 1 \rightarrow \times 2 \rightarrow \times 4 \rightarrow \times 1/4$

#### NOTE

The selection of the displayed waveform size for the superimposed waveform is synchronized with the ECG waveform size on the home display.

### 4 Select the trend scale.



Select the displaying scale for the trend.

If "Auto Scale" is set for the trend scale, the displaying scale cannot be changed.

Trend	Scale	Unit
HR	100, 200, 300	bpm
ST	$\pm 0.2, \pm 0.5, \pm 1.0, \pm 2.0$	mV
	$\pm 2, \pm 5, \pm 10, \pm 20$	mm

### 5 Print the ST trend display.

Print

The currently displayed trend and waveform on the ST display will be printed.

## ST Display Lead Setup

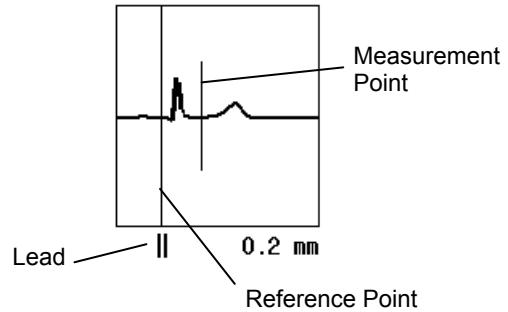
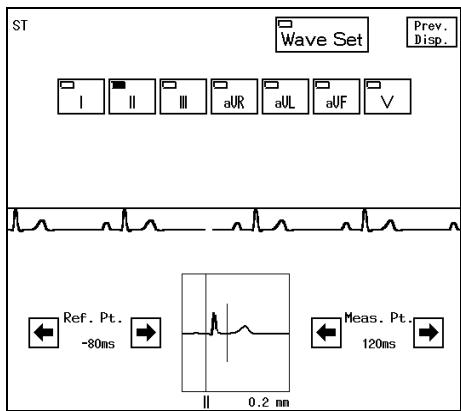
The leads to be displayed inside the ST data box can be set by pressing the **ST Display Lead Setup** key.

For procedure, refer to P4-31 "4. Monitoring Description of the Display ●Lead Selection for ST Data Box".

## 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** → **Reference** keys to display the reference waveform setup menu.



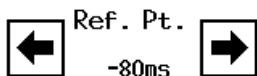
- 2 Read the waveform by pressing the **Wave Set** key.



16 beats average of the ECG judged as normal QRS by arrhythmia analysis will be read. If arrhythmia learning is in process, or if VPC is present, the reference waveform setup will take more than 16 beats.

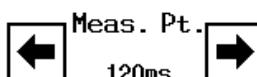
During the reference waveform setup, the key LED will light.

- 3 Set the reference point for ST measurement.



The reference point can be set in the range of -240ms to 0ms in increments of 10ms from the peak of QRS to the P wave direction.

- 4 Set the measurement point for ST measurement.



The measurement point can be set in the range of 0ms to 560ms in increments of 10mS from the peak of QRS to the T wave direction.  
The currently measured ST value will be displayed by moving the cursor.

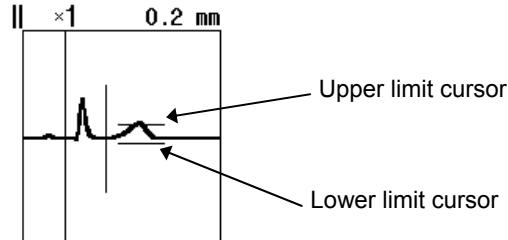
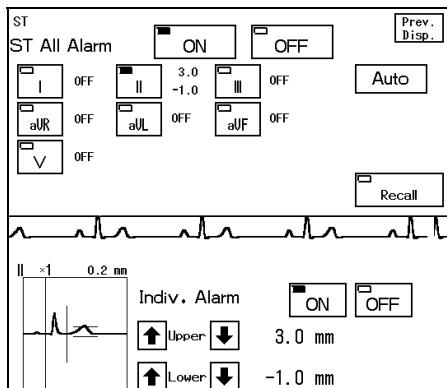


- For the lead which the electrode is detached, the reference waveform setup cannot be performed. Check if the electrode is correctly attached, and perform the setup again.
- When the electrodes are properly attached, the reference waveform setup will be automatically performed.  
To display the correct ST data, the reference point and measurement point must be set.

## 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** → **Alarm** keys to display the alarm setup menu.



- 2** Select ON/OFF for “ST All Alarm”.

ST All Alarm       ON       OFF

ON will generate a ST alarm.  
However, the alarm will not be generated for the lead where the individual alarm is set to  OFF.  
 OFF will not generate a ST alarm.

- 3** Select the lead to set the alarm limit.

I OFF       II 3.0       III OFF  
 aVR OFF       aVL -1.0       aVF OFF  
 V OFF

Press one of the lead keys to set the alarm limit.

- 4** Set the upper and lower alarm limit.

Up Upper       Down  
 Up Lower       Down

Use the  Up,  Down keys to adjust the alarm limit.

Item	Description
Lower Alarm Limit	Select a lower alarm limit (-20.0 to 19.0mm/-2.00 to 1.90mV). Alarm will be set to OFF if the value -20mm/-2.0mV or lower is selected.
Upper Alarm Limit	Select an upper alarm limit (-19.0 to 20.0mm/-1.90 to 2.00mV). 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 a ST alarm for the selected lead.  
 OFF will not generate a 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.

The limits will be automatically set even if the upper or lower limit is set to OFF.

This section explains about the ST table display and printing procedure.

## To Display the ST Table

The ST table 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 Table** keys.

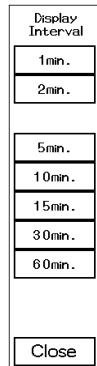
ST Table	<input type="checkbox"/> Print	<input checked="" type="checkbox"/> Print All	Setup	Interval	1M	◀▶	Prev Disp
▲	Time	ST(I) mm	ST(II) mm	ST(III) mm	ST(aVR) mm	ST(aVL) mm	ST(aVF) mm
▼	Jan.15 9:29	-0.1	-0.1	0.0	0.0	-0.1	-0.1
9:30	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3
9:31	-0.2	-0.2	-0.1	0.1	-0.1	-0.1	0.3
9:32	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3
9:33	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3
9:34	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3
9:35	-0.2	-0.2	-0.1	0.1	-0.1	-0.1	0.3
9:36	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3
9:37	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3
9:38	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3

ST level for I, II, III, aVR, aVL, aVF, V, and HR, VPC, arrhythmia factor will be displayed in tabular format.

### 2 Select the display interval.

Interval 1M

Press the **Interval ×M** key to display the interval selection.



Select from **1min.** / **2min.** / **5min.** / **10min.** / **15min.** / **30min.** / **60min.**.

If **5min.** is selected, the time will be displayed in real time as follows. 10:00, 10:05, ... 10:25.

If **60min.** is selected, it will be displayed as 10:00, 11:00, 12:00.

If the ST table is displayed at 10:35, the data from 10:00 will be displayed.

### 3 Switch the page.



Displays the previous page (older data).

Displays the next page (newer data).

Displays the newest page.

### 4 Print the ST table.



**Print** will print the currently displayed ST table.

**Print All** will print all data on the ST table.

## The Description of the Display

ST Table		Print	Print All	Setup	Interval	1m			Prev.	Disp.	
		Time	ST(I) mm	ST(II) mm	ST(III) mm	ST(gUR) mm	ST(gUL) mm	ST(gUF) mm	ST(U) mm	HR bpm	UPC /min
		Jan.15 9:29	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3	60	0
		9:30	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3	60	0
		9:31	-0.2	-0.2	-0.1	0.1	-0.1	-0.1	0.3	60	0
		9:32	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3	60	0
		9:33	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3	60	0
		9:34	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3	60	0
		9:35	-0.2	-0.2	-0.1	0.1	-0.1	-0.1	0.3	60	0
		9:36	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3	60	0
		9:37	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3	60	0
		9:38	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.3	60	0

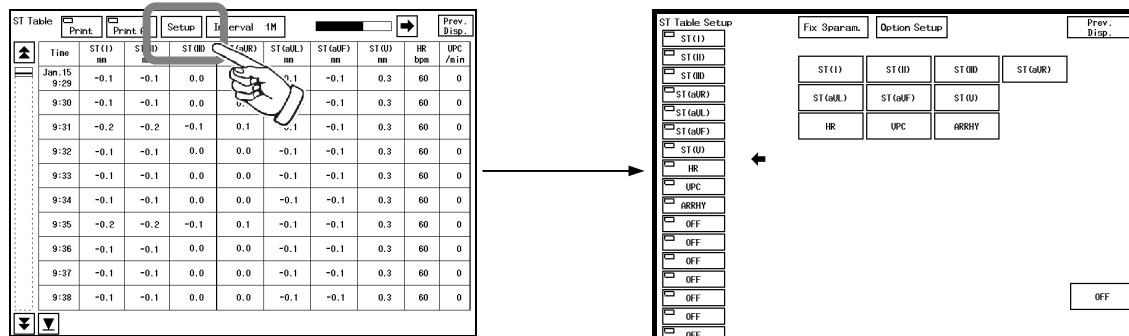
For the following case, the measurement data will be displayed as “— — —” for the corresponding time.

- If the measurement was not performed. (Ex. Before admittance of patient).
  - If the monitoring was suspended.

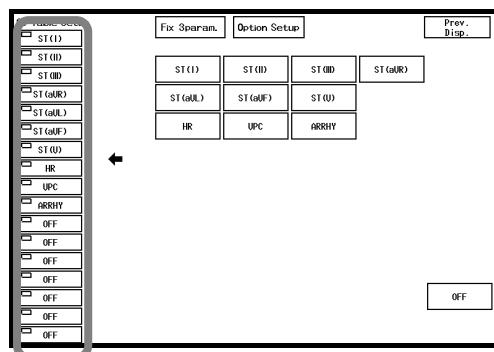
# ST Table Setup

The parameter to display on the ST table can be selected.

**1** Press the **Setup** key on the ST table display.

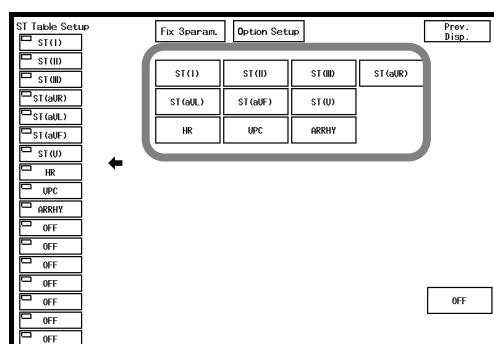


## **2 Select the display position on the table.**



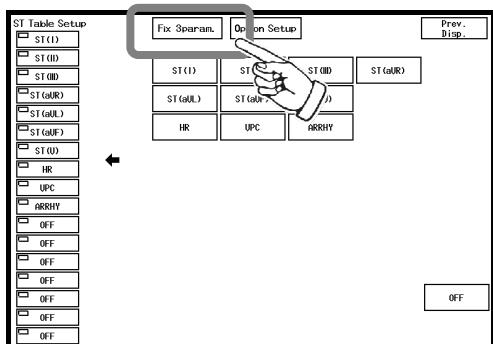
Maximum of 17 parameters can be displayed on the table.

### **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.

#### 4 Select the numbers of high priority parameters to be set as fixed display.



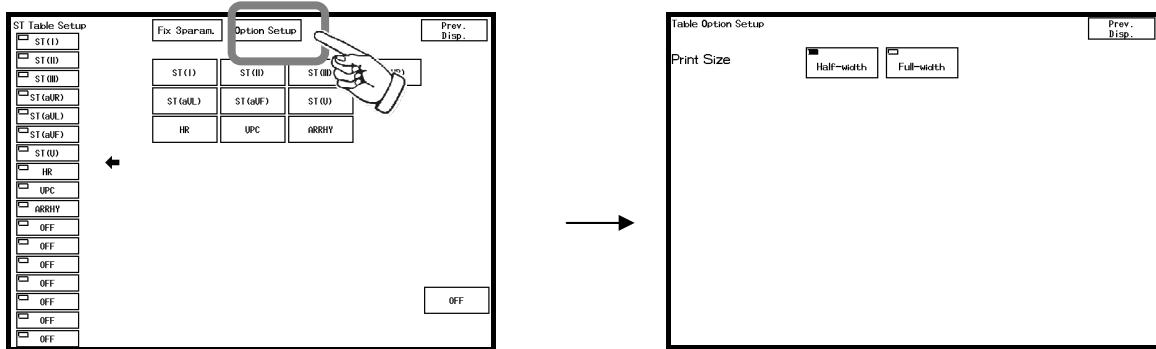
3 to 6 high priority parameters can be set as fixed display.

Pressing the **Fix X param.** key will sequentially set 3→4→5→6→3 for the numbers of parameters.

### Print Font Size for the BIS Table

The print font size for the BIS table can be set.

#### 1 Press the **Setup** key on the “BIS Table Setup” screen to display the “Table Option Setup” screen.



#### 2 Select the print size for the table data.



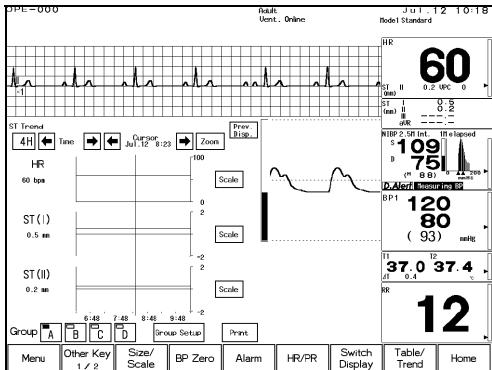
**Half-width** will print the table data font size in half-width.

**Full-width** will print the table data font size in full-width.

This section explains about the ST trend display and printing procedure.

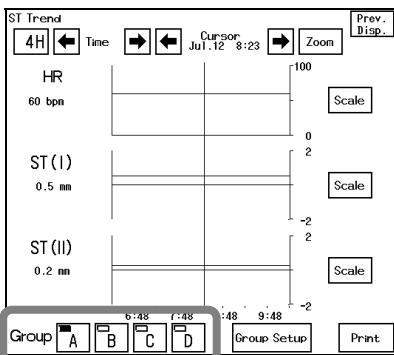
## To Display the ST Trend

The ST 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.

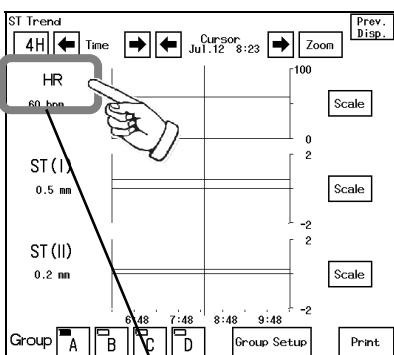
- 1 Press the **Menu** → **Function** → **ST Trend** keys.



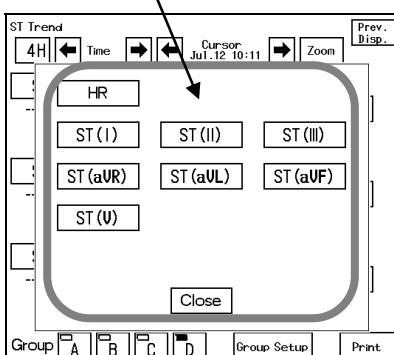
The ST trend will be displayed.

Pressing one of the **A**, **B**, **C**, **D** keys will switch the display.

- 2 Displaying Group D will allow parameter selection on the ST trend menu.

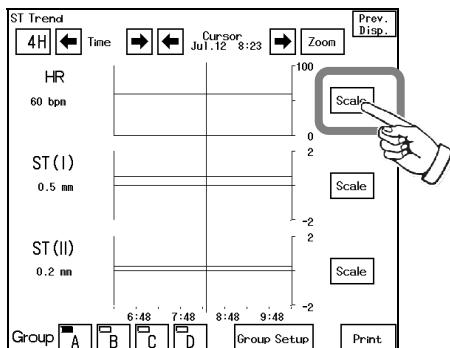


Select the position to set the parameter.



Select the parameter from the displayed selection tool and then press the **Close** key.

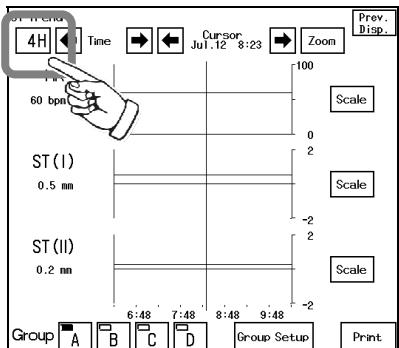
### 3 Select the displaying scale.



Pressing the [Scale] key will sequentially switch the scale depending on the displayed parameter as follows.

Parameter	Scale	Unit
HR	100, 200, 300	bpm
ST	$\pm 0.2, \pm 0.5, \pm 1.0, \pm 2.0$	mV
	$\pm 2, \pm 5, \pm 10, \pm 20$	mm

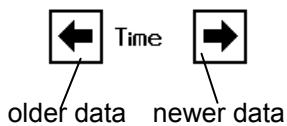
### 4 Select the displaying time span.



Pressing the time span key will sequentially select the time in the order of 1H→2H→4H→8H→12H→24H→1H.

Time Span	Sample Rate
1 hour	1 minute
2 hours	1 minute
4 hours	1 minute
8 hours	2 minutes
12 hours	3 minutes
24 hours	6 minutes

### 5 Move the display.

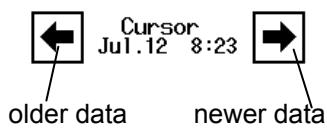


The ST trend display can be moved to the older or newer data with the currently displayed time span.

[←] key will display the older data with the selected time span.

[→] key will display the newer data with the selected time span.

### 6 Move the cursor.

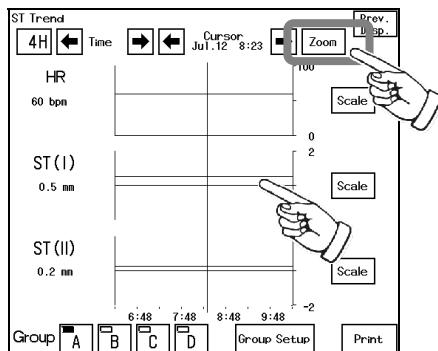


The cursor can be moved to the older or newer data. The time and data at the cursor point will be displayed.

[←] key will display older data.

[→] key will display newer data.

## 7 Enlarge the display.



Pressing the **Zoom** key will display 1 hour of data with the cursor point in the center.

Directly pressing the graph area will move the cursor position.

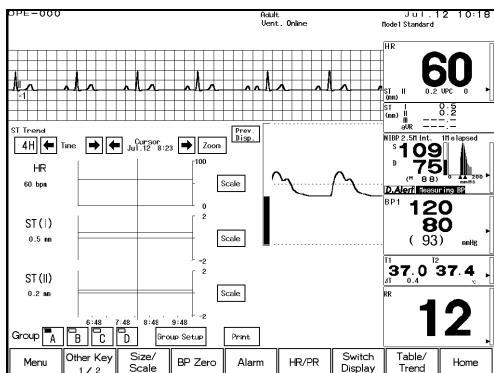
## 8 Print the ST trend.



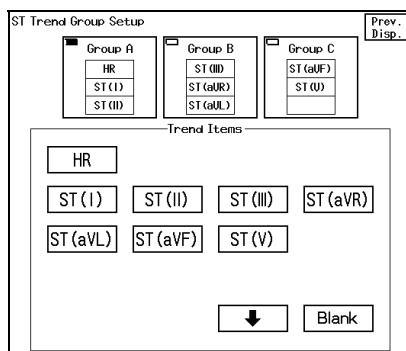
The currently displayed ST trend will be printed.

## ST Trend Group Setup

Each trend group displays combination of 3 parameters simultaneously. 3 types of trend group can be programmed.



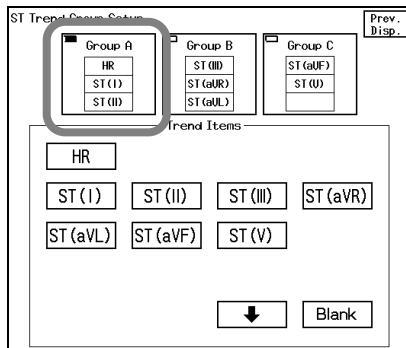
- 1 Press the **Menu** → **Function** → **ST Trend** → **Group Setup** keys.



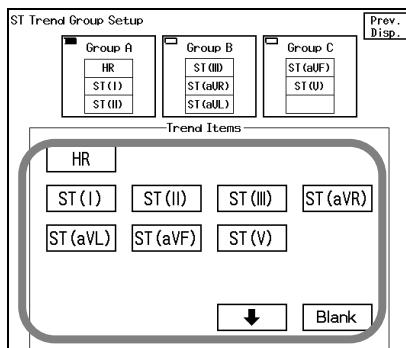
The ST trend group setup menu will be displayed.

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.

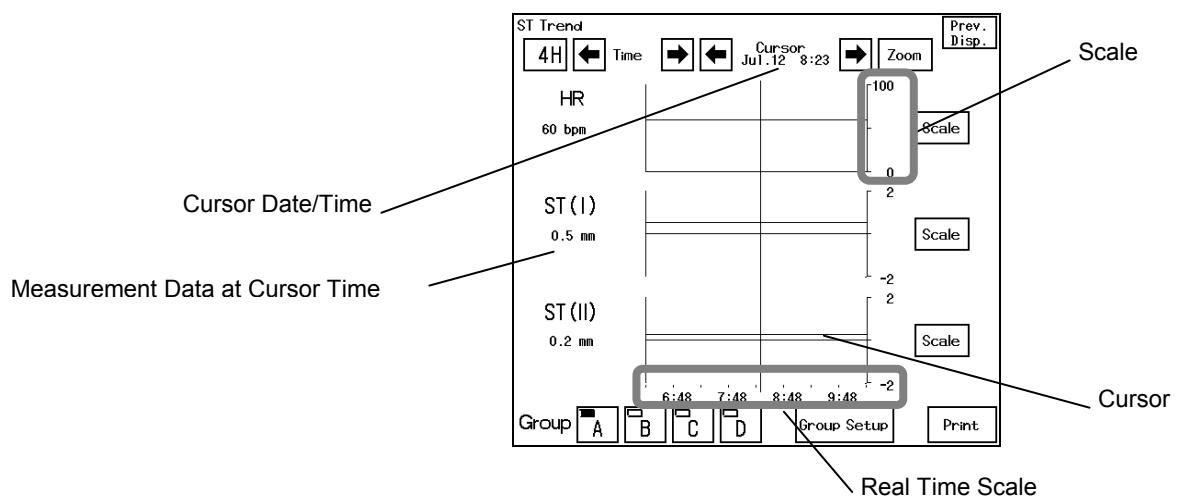


Select the trend group by pressing the **Group A**, **Group B**, or **Group C** key.



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



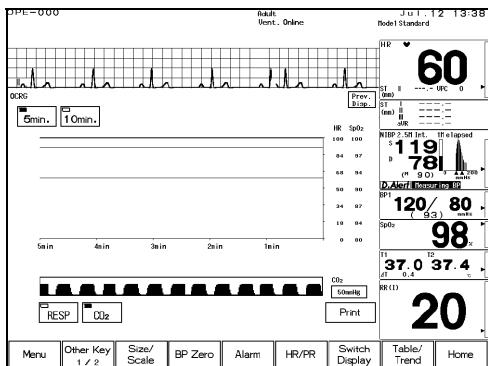
The measured data will be compressed for the 8-hour / 12-hour / 24-hour display.

<b>Parameter</b>	<b>Compressed Form</b>
HR	Average Value
ST	Average Value

## OCRG

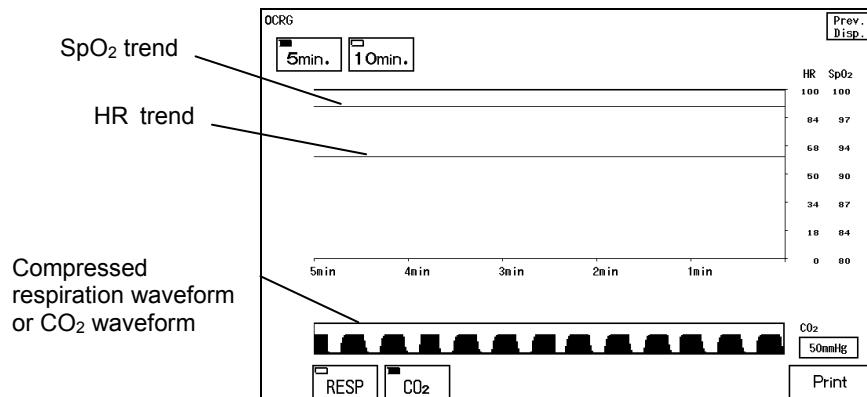
This section describes the procedure for OCRG display.

The OCRG display can be accessed from the menu or from the preprogrammed user key.



On the OCRG display, compressed waveform (RESP or CO<sub>2</sub>), HR trend and SpO<sub>2</sub> trend are displayed simultaneously.

- 1 Press the **Menu** → **Function** → **OCRG** keys.



The trend scale synchronizes with the scale set on the trend setup.

- 2 Select the respiration waveform.



Select **RESP** or **CO<sub>2</sub>** to display the compressed respiration waveform from the impedance respiration (RESP) or CO<sub>2</sub> waveform.

- 3 Select the displaying duration.



Select the displaying duration from **5min.** or **10min.**.

- 4 Select the waveform scale for compressed CO<sub>2</sub> waveform.



Pressing the key will sequentially change the waveform scale.

<b>Respiration Waveform</b>	<b>Size, Scale</b>
Impedance RESP	×1/4→×1/2→×1→×2→×4→×1/4
CO <sub>2</sub>	100→50→100 (unit: mmHg) 4→8→10→4 (unit: % or kPa)

- 5 Print the OCRG display.



The currently displayed trend and compressed waveform on the OCRG display will be printed.

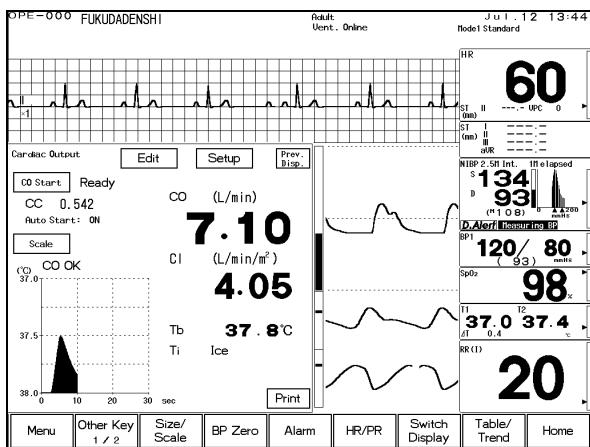
**NOTE**

The OCRG cannot be printed on the central monitor recorder.

# Cardiac Output Measurement

## Measure / Edit

This section explains about the cardiac output measurement using the thermodilution method, setup procedure for catheter type, and procedure for editing the measurement result.

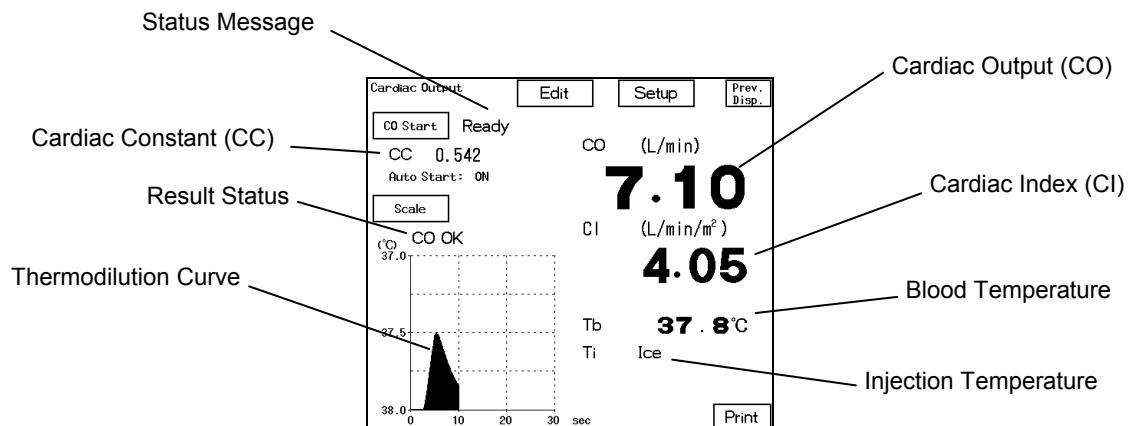


### NOTE

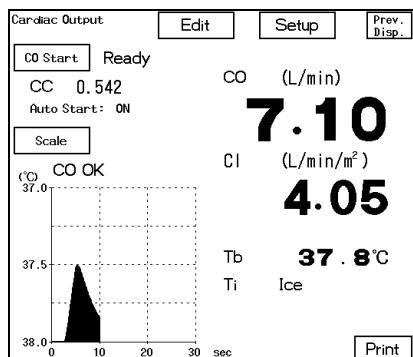
If the HU-73 Option Unit is not connected, **Cardiac Output** key will not be displayed.

## To Display the Cardiac Output Menu

The cardiac output menu can be accessed from the menu, or from the preprogrammed user key.



- 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

<b>Message</b>	<b>Description</b>
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.
Finished	Measurement is finished.
Result Status	
CO OK	CO is correctly measured.
Upper Fault	Measurement error • Blood temperature is out of the measurable range after the injection. • Thermistor connector or relay cable is not properly connected. • Line is cut on the sensor or relay cable.
Peak Fault	Measurement error • Peak of the thermodilution curve can not be detected. • Thermistor connector or relay cable is not properly connected. • Line is cut on the sensor or relay cable.
Lower Fault	Measurement error • Blood temperature has not returned to a stable condition after measurement. • Thermistor connector or relay cable is not properly connected. • Line is cut on the sensor or relay cable.
Sensor Err.	Measurement error • Thermistor connector and relay cable is not properly connected. • Line is cut on the sensor or relay cable.
Over Range	Measurement error • 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** → **Setup** keys.

Cardiac Output		
Prev. Disp.		
Auto Start	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
Time Scale	<input checked="" type="checkbox"/> 30sec.	<input type="checkbox"/> 60sec.
CC	0.542	<input type="button" value="Auto Input"/> <input type="button" value="Manual Input"/>

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”.

Cardiac Output		
Prev. Disp.		
Auto Start	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
Time Scale	<input checked="" type="checkbox"/> 30sec.	<input type="checkbox"/> 60sec.
CC	0.542	<input type="button" value="Auto Input"/> <input type="button" value="Manual Input"/>

**ON** will automatically start the measurement without pressing the **CO Start** key.

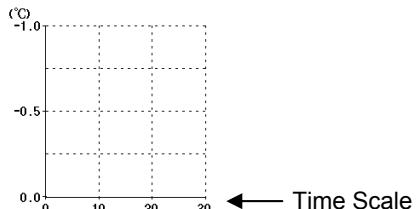
**OFF** will start the measurement only when the **CO Start** key is pressed.

Even when **ON** is selected, the measurement can be manually started by pressing the **CO Start** key.

- 3 Set the time scale.

Cardiac Output		
Prev. Disp.		
Auto Start	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
Time Scale	<input checked="" type="checkbox"/> 30sec.	<input type="checkbox"/> 60sec.
CC	0.542	<input type="button" value="Auto Input"/> <input type="button" value="Manual Input"/>

Select the time scale of the thermodilution curve from **30sec.** / **60sec.**



← Time Scale

- 4 Set the computation constant.

Cardiac Output		
Prev. Disp.		
Auto Start	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
Time Scale	<input checked="" type="checkbox"/> 30sec.	<input type="checkbox"/> 60sec.
CC	0.542	<input type="button" value="Auto Input"/> <input type="button" value="Manual Input"/>

**Auto Input** key will automatically input a pre-determined computation constant into the formula for the cardiac output calculation. The constant depends 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]

CC Auto Input			Prev. Disp.	
Relay Cable      Catheter Only				
Manuf.	<input checked="" type="checkbox"/> BIOSENSORS	<input type="checkbox"/> BD	<input type="checkbox"/> EDWARDS	
Catheter Size (F)	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input checked="" type="checkbox"/> 7	<input type="checkbox"/> 7.5
Injectate Volume(mL)	<input type="checkbox"/> 3	<input type="checkbox"/> 5	<input checked="" type="checkbox"/> 10	
Injectate Temperature	<input checked="" type="checkbox"/> Ice	<input type="checkbox"/> Room		
CC	0 . 5 4 2			
<input type="button" value="Input"/>		<input type="button" value="Cancel"/>		

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)

Injectate Temperature  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.

CC

When CC is set, finalize it by pressing the  key. If the CC does not correspond to the used catheter, or if you desire to return to the previous CC value, press the  key, and input the value manually.

### [Manual Input of CC]

CC Manual Input			History Input	Prev. Disp.
<input checked="" type="checkbox"/> BIOSENS	<input type="text" value="0.000"/>	<input type="text" value="0.000"/>	<input type="text" value="0.000"/>	
<input type="checkbox"/> BD	<input type="text" value="0.000"/>	<input type="text" value="0.000"/>	<input type="text" value="0.000"/>	
<input type="checkbox"/> EDWARDS				
Manuf. Setup				
Injectate Temperature	<input checked="" type="checkbox"/> Ice	<input type="checkbox"/> Room		
CC	<input type="text" value="   "/>	<input type="text" value="7"/> <input type="text" value="8"/> <input type="text" value="9"/> <input type="text" value="4"/> <input type="text" value="5"/> <input type="text" value="6"/> <input type="text" value="1"/> <input type="text" value="2"/> <input type="text" value="3"/> <input type="text" value="0"/> <input type="text" value="."/>		
<input type="button" value="Input"/>		<input type="button" value="Cancel"/>		

Injectate Temperature  Ice  Room

Select 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  key will switch the manufacturer name.

CC

When using the catheter relay cable, CJ-382, make sure to set the "Injectate Temperature"

After setting the CC value, press the  key to finalize the value.

## To Measure the Cardiac Output

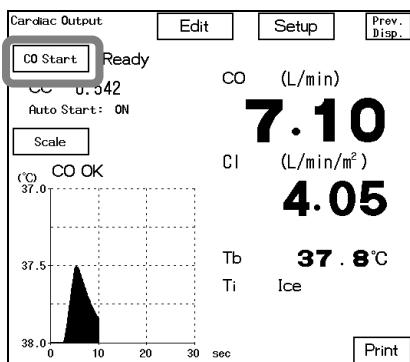
The measurement can be started when "Ready" is displayed.

If "Wait", "Busy", "CO\_OK" message is displayed, the measurement cannot be started. Wait until it is ready to measure.

Particularly when "Wait" message is continuously displayed, verify that the catheter relay cable is properly connected to the cardiac output module, and the 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.



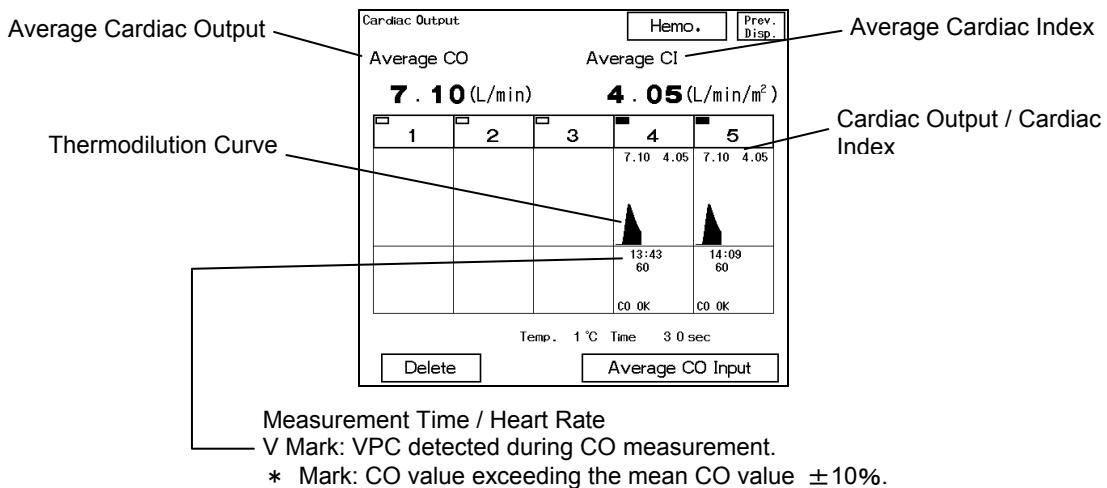
Pressing the **Print** key will print the displayed thermodilution curve, cardiac output, and cardiac index.

#### NOTE

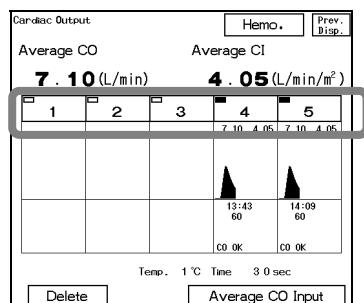
- Before injecting, check that the Ti (injectate temperature) setting is correct.
- When repeatedly performing the measurement, inject at intervals of 30 to 60 seconds
- In the following cases, the measurements may be inaccurate.
  - Shunt disease, tricuspid regurgitation or pulmonic regurgitation.
  - During exercise stress  
As body temperature differs sequentially by exercise, the constant CO value cannot be measured.
  - Excessive Arrhythmia  
Body Temperature varies non-continuously as a result of arrhythmia.  
Accurate CO value cannot be measured.
  - CI value will be displayed if BSA is previously entered in the patient admit/discharge menu.
- The CI value will not be displayed unless height/weight or BSA value is input on the admit/discharge 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.



- 1** Press the **Menu** → **Function** → **Cardiac Output** → **Edit** keys.

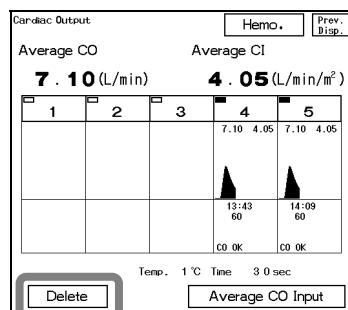


The cardiac output edit menu will be displayed.

The mean CO and mean CI value obtained from the measurement results will be displayed.

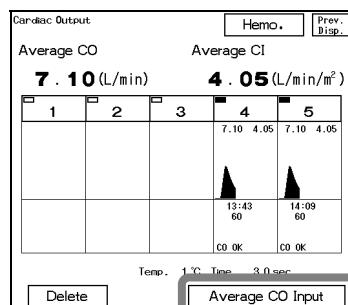
The data can be omitted from the averaging by turning OFF the LED of the corresponded data.

- 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 table.



Pressing the **Average CO Input** key will input the displayed mean CO data to the table.

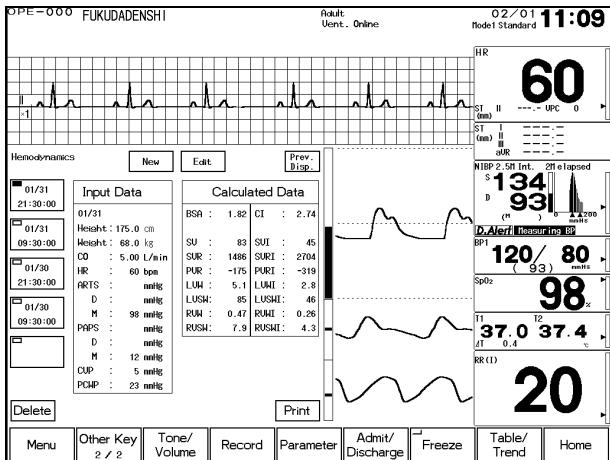
### NOTE

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 hemodynamics calculation, store the average CI with the hemodynamics calculation before changing the height, weight, and BSA.

## Hemodynamics

## Calculation/Print

This section explains the procedure for hemodynamics calculation and printing.



## Calculation Data

Data	Description	Formula
BSA	Body Surface Area ( $m^2$ )	$h^{0.725} \times w^{0.425} \times 71.84 \times 10^{-4}$ (Dubois Formula)
CI	Cardiac Index (L/min/ $m^2$ )	$\frac{CO}{BSA}$
SV	Stroke Volume (mL/beat)	$\frac{CO \times 1000}{HR}$
SVI	Stroke Volume Index (mL/beat/ $m^2$ )	$\frac{SV}{BSA}$
SVR	Systemic Vascular Resistance (dynes·sec·cm $^{-5}$ )	$\frac{(MAP - CVP) \times 79.90}{CO}$
SVRI	Systemic Vascular Resistance Index (dynes·sec·cm $^{-5} \cdot m^2$ )	SVR $\times$ BSA
PVR	Pulmonary Vascular Resistance (dynes·sec·cm $^{-5}$ )	$\frac{(MPAP - PCWP) \times 79.90}{CO}$
PVRI	Pulmonary Vascular Resistance Index (dynes·sec·cm $^{-5} \cdot m^2$ )	PVRI $\times$ BSA
LVW	Left Ventricular Work (kg·m)	$CO \times (MAP - PCWP) \times 0.0136$
LVWI	Left Ventricular Work Index (kg·m/ $m^2$ )	$\frac{LVW}{BSA}$
LVSW	Left Ventricular Stroke Work (g·m)	$SV \times (MAP - PCWP) \times 0.0136$
LVSWI	Left Ventricular Stroke Work Index (g·m/ $m^2$ )	$\frac{LVSW}{BSA}$
RVW	Right Ventricular Work (kg·m)	$CO \times (MPAP - CVP) \times 0.0136$
RVWI	Right Ventricular Stroke Work Index (kg·m/ $m^2$ )	$\frac{RVW}{BSA}$
RVSW	Right Ventricular Stroke Work (g·m)	$SV \times (MPAP - CVP) \times 0.0136$
RVSWI	Right Ventricular Stroke Work Index (g·m/ $m^2$ )	$\frac{RVSW}{BSA}$

### NOTE

The blood pressure unit for hemodynamics is mmHg. The unit,  $cmH_2O$  cannot be used.

## To Display the Hemodynamics Data

The latest 5 hemodynamics data will be displayed.

- 1 Press the **Menu** → **Function** → **Hemodynamics** keys.

The hemodynamics menu will be displayed.

Height	Weight	CO	HR	ARTS	D	M	PAPs	D	M	CVP	PCWP
175.0 cm	68.0 kg	5.00 L/min	60 bpm	mmHg							

BSA	CI	SU	SUR	PUR	LWM	LUSH	RUM	RUSH	
1.82	2.74	83	45	1486	2704	5.1	2.8	0.47	0.26

- 2 Select the data to display.

Select the data to be displayed with the calculation result by pressing the data selection key.

On the data selection key, the calculated date and time will be displayed.

Height	Weight	CO	HR	ARTS	D	M	PAPs	D	M	CVP	PCWP
175.0 cm	68.0 kg	5.00 L/min	60 bpm	mmHg							

BSA	CI	SU	SUR	PUR	LWM	LUSH	RUM	RUSH	
1.82	2.74	83	45	1486	2704	5.1	2.8	0.47	0.26

- 3 Print the calculation data.

**Print**

The currently displayed hemodynamics calculation data will be printed.

## To Calculate the Newly Input Hemodynamics Data

The hemodynamics calculation can be performed using the newly input data.

The data can be manually input using the numeric keys, or the current measurement data can be automatically input.

- 1 Press the **Menu** → **Function** → **Hemodynamics** → **New** keys.

The hemodynamics menu to input the new data will be displayed.

Height	Weight	BSA	HR	CO	MAP	MPAP	CVP	PCWP
cm	kg	m <sup>2</sup>	bpm	L/min	mmHg	mmHg	mmHg	mmHg

.	7	8	9
4	5	6	
1	2	3	
0	.	C	

## 2 Automatically input the current measurement data.

Hemodynamics		Prev. Disp.
Height	1 7 5. 0 cm	
Weight	6 8. 0 kg	
BSA	1. 8 2 m <sup>2</sup>	
HR	6 0 bpm	7 8 9
CO	5. 0 0 L/min	4 5 6
MAP	9 8 mmHg	1 2 3
MPAP	1 2 mmHg	0 . C
CVP	5 mmHg	
PCWP	2 3 mmHg	
		Auto Calc.



The data already set (height, weight, etc.) and measured data (HR, etc.) will be automatically input.

MAP (ART), MPAP (PAP), CVP (CVP) can be automatically input by setting the BP label.

If [Auto] key is pressed after inputting the data, the input data will be cleared.

### NOTE

CVP data with the unit "cmH<sub>2</sub>O" cannot be automatically input.

## 3 Input the data using the numeric keypad.

Hemodynamics		Prev. Disp.
Height	1 7 5. 0 cm	
Weight	6 8. 0 kg	
BSA	1. 8 2 m <sup>2</sup>	7 8 9
HR	6 0 bpm	4 5 6
CO	5. 0 0 L/min	1 2 3
MAP	9 8 mmHg	0 . C
MPAP	1 2 mmHg	
CVP	5 mmHg	
PCWP	2 3 mmHg	
		Auto Calc.

### [Input Data]

Data	Description (Unit)
Height	(cm)
Weight	(kg)
BSA	Body Surface Area (m <sup>2</sup> )
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 hemodynamics will not be recalculated with the new CI data.

## 4 Execute the hemodynamics calculation.

Hemodynamics		Prev. Disp.
Height	1 7 5. 0 cm	
Weight	6 8. 0 kg	
BSA	1. 8 2 m <sup>2</sup>	7 8 9
HR	6 0 bpm	4 5 6
CO	5. 0 0 L/min	1 2 3
MAP	9 8 mmHg	0 . C
MPAP	1 2 mmHg	
CVP	5 mmHg	
PCWP	2 3 mmHg	
		Auto Calc.



After inputting the data, press the [Calc.] key.

The calculation result will be displayed.

To cancel the calculation, press the [Prev. Disp.] key.

## To Edit the Hemodynamics Data

The hemodynamics data can be edited.

- 1** Press the **Menu** → **Function** → **Hemodynamics** keys.

Hemodynamics		New	Edit	Prev. Disp.
		Input Data		
		Calculated Data		
01/31 21:30:00		BSA :	1.82	CI : 2.74
01/31 09:30:00		SU :	83	SUI : 45
	Height : 175.0 cm	SUR :	1486	SURI : 2704
	Weight : 68.0 kg	PUR :	-175	PURI : -319
01/30 21:30:00		LWH :	5.1	LWU : 2.8
	CO : 5.00 L/min	LUSH :	85	LUSHI : 46
	HR : 60 bpm	RWH :	0.47	RWI : 0.26
01/30 09:30:00		RUSH :	7.9	RUSHI : 4.3
	ARTS : mmHg			
	D :			
	M : 98 mmHg			
	NPS : mmHg			
	D :			
	M : 12 mmHg			
	CUP : 5 mmHg			
	PCWP : 23 mmHg			

Select the hemodynamics data to perform editing.

- 2** Press the **Edit** key to edit the data.

Hemodynamics	
Height	1 7 5 . 0 cm
Weight	6 8 . 0 kg
BSA	1 . 8 2 m <sup>2</sup>
HR	6 0 bpm
CO	5 . 00 L/min
MAP	9 8 mmHg
MPAP	1 2 mmHg
CVP	5 mmHg
PCWP	2 3 mmHg

Input the value using the numeric keypads, and press the corresponded key from Height, Weight, BSA, CO, HR, MAP, CVP, MPAP, PCWP keys.

- ### **3 Recalculate the hemodynamics data.**

Hemodynamics			Prev. Disp.
Height	1 7 5 .	0 cm	
Weight	6 8 .	0 kg	
BSA	1 .	8 2 m <sup>2</sup>	
HR	6 0	bpm	
CO	5 .	0 0 L/min	
MAP	9 8	mmHg	
MPAP	1 2	mmHg	
CVP	5	mmHg	
PCWP	2 3	mmHg	
	7	8	9
	4	5	6
	1	2	3
	0	.	C
		Auto	Calc.

After inputting 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.

## BIS Table

## Display/Print

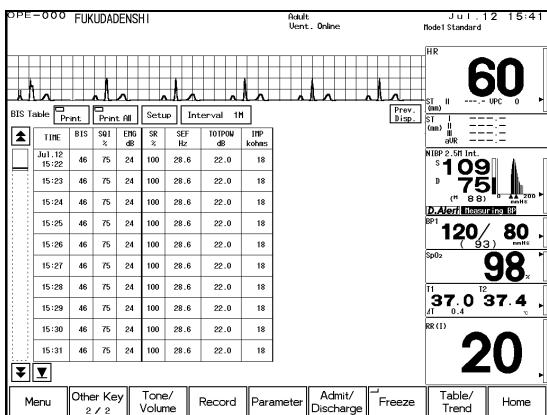
By connecting the A-2000 BIS Monitor (ASPECT® MEDICAL SYSTEMS), BIS monitor data can be displayed in tabular format.

### NOTE

If "A-2000" is not selected on the serial communication setup menu, the **BIS Table** key will not be displayed.

## To Display the BIS Table

The BIS table 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.

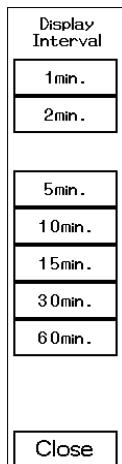


**1** Press the **Menu** → **Function** → **BIS Table** keys.

**2** Select the display interval.

**Interval 1M**

Press the **Interval XM** key to display the interval selection.



Select from **1min.** / **2min.** / **5min.** / **10min.** / **15min.** / **30min.** / **60min.**.

If **5min.** is selected, the time will be displayed in real time as follows. 10:00, 10:05, ... 10:25.

If **60min.** is selected, it will be displayed as 10:00, 11:00, 12:00.

**3** Switch the page.



Displays the previous page (older data).



Displays the next page (newer data).



Displays the newest page.

**4** Print the BIS table.

**Print**

**Print All**

**Print** will print the currently displayed BIS table.

**Print All** will print all data from the BIS table.

## The Description of the Display

Prev.  
Disp.

BIS Table		<input type="button" value="Print"/>	<input type="button" value="Print all"/>	<input type="button" value="Setup"/>	<input type="button" value="Interval 1M"/>				
		TIME	BIS	SOI %	ENG dB	SR %	SEF Hz	TOTPOW dB	IMP kohms
		Jul1.12 15:22	46	75	24	100	28.6	22.0	18
		15:23	46	75	24	100	28.6	22.0	18
		15:24	46	75	24	100	28.6	22.0	18
		15:25	46	75	24	100	28.6	22.0	18
		15:26	46	75	24	100	28.6	22.0	18
		15:27	46	75	24	100	28.6	22.0	18
		15:28	46	75	24	100	28.6	22.0	18
		15:29	46	75	24	100	28.6	22.0	18
		15:30	46	75	24	100	28.6	22.0	18
		15:31	46	75	24	100	28.6	22.0	18

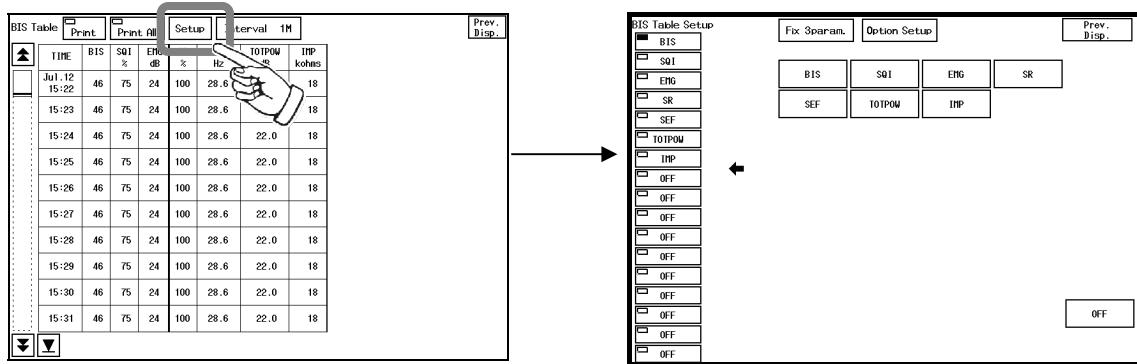
For the following case, the measurement data will be displayed as “— — —” for the corresponding time.

- If the measurement was not performed. (Ex. Before admittance of patient).
  - If the monitoring was suspended.
  - If the communication with external equipment was not established, or if network setup was not performed.

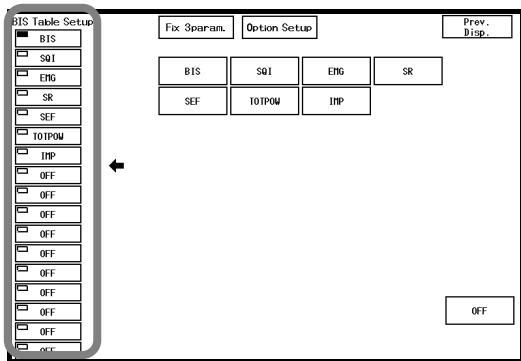
# BIS Table Setup

The parameter to display on the BIS table can be selected.

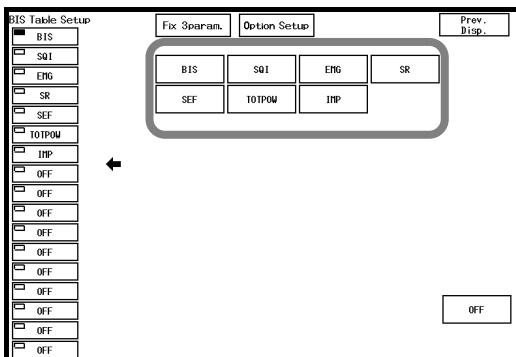
**1** Press the **Setup** key on the BIS table display.



## **2 Select the display position on the table.**

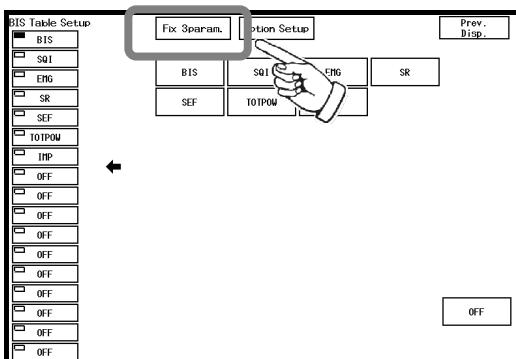


### 3 Select the parameter to display.



Select the parameter by pressing the corresponded key. The display will automatically shift downward to allow continuous parameter selection.

### 4 Select the numbers of high priority parameters to be set as fixed display.



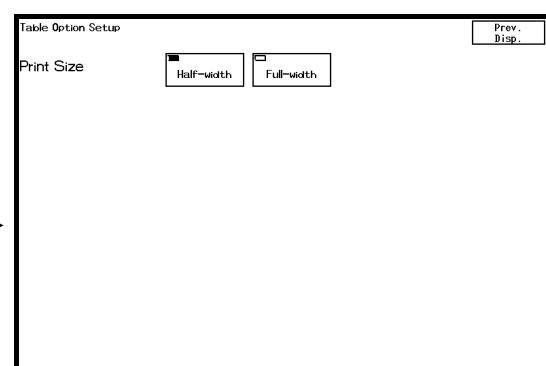
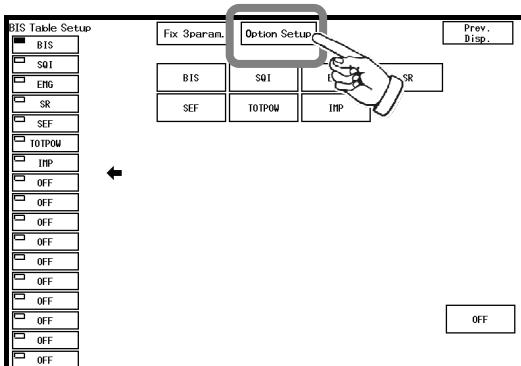
3 to 6 high priority parameters can be set as fixed display.

Pressing the **Fix X param.** key will sequentially set 3→4→5→6→3 for the numbers of parameters.

## Print Font Size for the BIS Table

The print font size for the BIS table can be set.

- 1 Press the **Setup** key on the “BIS Table Setup” screen to display the “Table Option Setup” screen.



- 2 Select the print size for the table data.



**Half-width** will print the table data font size in half-width.

**Full-width** will print the table data font size in full-width.

## Vigilance Table

## Display/Print

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 tabular format.

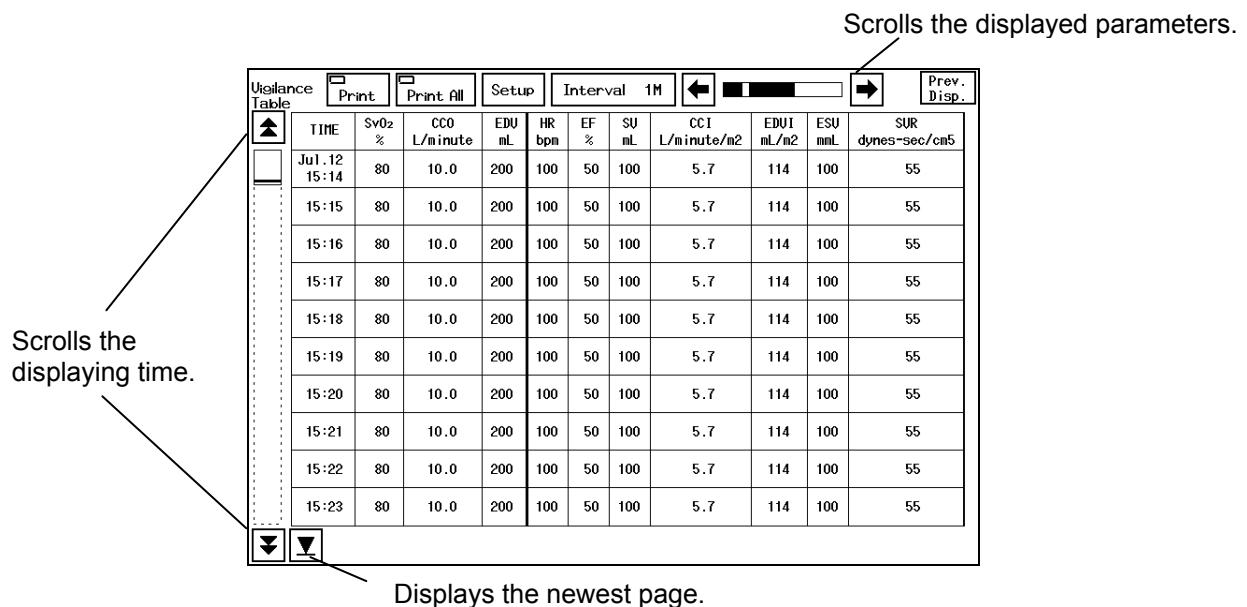
### NOTE

If "Vigilance" is not selected on the serial communication setup menu, the "Vigilance Table" key will not be displayed.

## To Display the Vigilance Table

The Vigilance table 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.

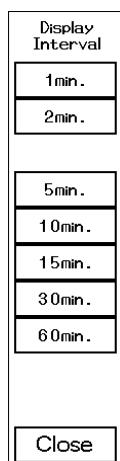
- 1 Press the **Menu** → **Function** → **Vigilance Table** keys.



- 2 Select the display interval.

Interval 1M

Press the **Interval XM** key to display the interval selection.



Select from **1min.** | **2min.** | **5min.** | **10min.** | **15min.** | **30min.** | **60min.**

If **5min.** is selected, the time will be displayed in real time as follows. 10:00, 10:05, ... 10:25.

If **60min.** is selected, it will be displayed as 10:00, 11:00, 12:00.

### 3 Switch the page.



Displays the previous page (older data).

Displays the next page (newer data).

Displays the newest page.

### 4 Print the Vigilance table.



**Print** will print the currently displayed Vigilance table.

**Print All** will print all data from the Vigilance table.

## The Description of the Display

TIME	SvO <sub>2</sub>	CCO L/minute	EDU ml	HR bpm	EF %	SU nl	CC1 L/minute/m <sup>2</sup>	EDU1 nl/m <sup>2</sup>	ESU ml	SUR dynes-sec/cm <sup>5</sup>
Jul 1 12:15:14	80	10.0	200	100	50	100	5.7	114	100	55
15:15	80	10.0	200	100	50	100	5.7	114	100	55
15:16	80	10.0	200	100	50	100	5.7	114	100	55
15:17	80	10.0	200	100	50	100	5.7	114	100	55
15:18	80	10.0	200	100	50	100	5.7	114	100	55
15:19	80	10.0	200	100	50	100	5.7	114	100	55
15:20	80	10.0	200	100	50	100	5.7	114	100	55
15:21	80	10.0	200	100	50	100	5.7	114	100	55
15:22	80	10.0	200	100	50	100	5.7	114	100	55
15:23	80	10.0	200	100	50	100	5.7	114	100	55

For the following case, the measurement data will be displayed as “- - -” for the corresponding time.

- If the measurement was not performed. (Ex. Before admittance of patient).
- If the monitoring was suspended.
- If the communication with external equipment was not established, or if network setup was not performed.

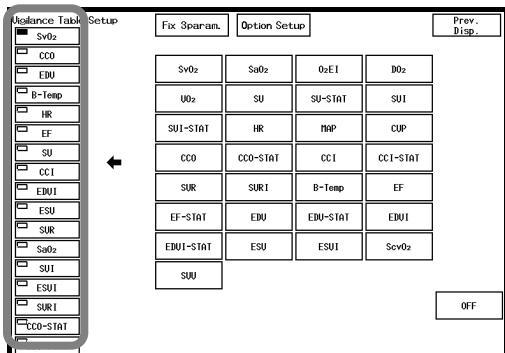
## Vigilance Table Setup

The parameter to display on the Vigilance/Vigileo table can be selected.

### 1 Press the **Setup** key on the Vigilance table display.

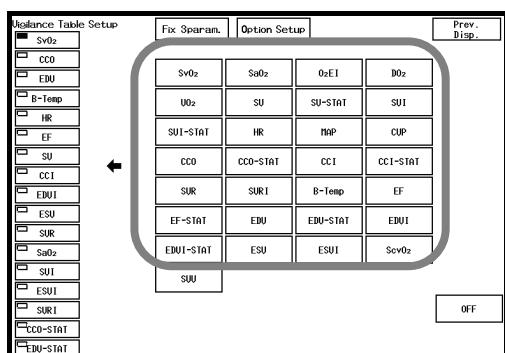
TIME	SvO <sub>2</sub>	CCO L/minute	EDU ml	HR bpm	EF %	SU nl	CC1 L/minute/m <sup>2</sup>	EDU1 nl/m <sup>2</sup>	ESU ml	SUR dynes-sec/cm <sup>5</sup>
Jul 1 12:15:14	80	10.0	200	100	50	100	5.7	114	100	55
15:15	80	10.0	200	100	50	100	5.7	114	100	55
15:16	80	10.0	200	100	50	100	5.7	114	100	55
15:17	80	10.0	200	100	50	100	5.7	114	100	55
15:18	80	10.0	200	100	50	100	5.7	114	100	55
15:19	80	10.0	200	100	50	100	5.7	114	100	55
15:20	80	10.0	200	100	50	100	5.7	114	100	55
15:21	80	10.0	200	100	50	100	5.7	114	100	55
15:22	80	10.0	200	100	50	100	5.7	114	100	55
15:23	80	10.0	200	100	50	100	5.7	114	100	55

## 2 Select the display position on the table.



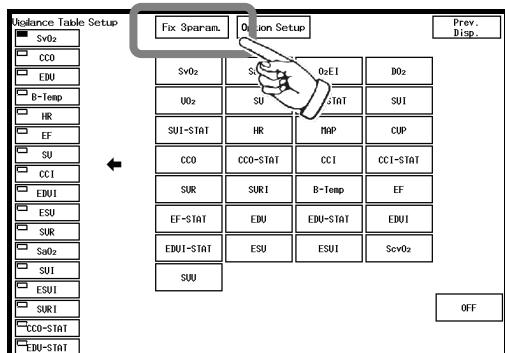
Maximum of 17 parameters can be displayed on the table.

## 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.

## 4 Select the numbers of high priority parameters to be set as fixed display.



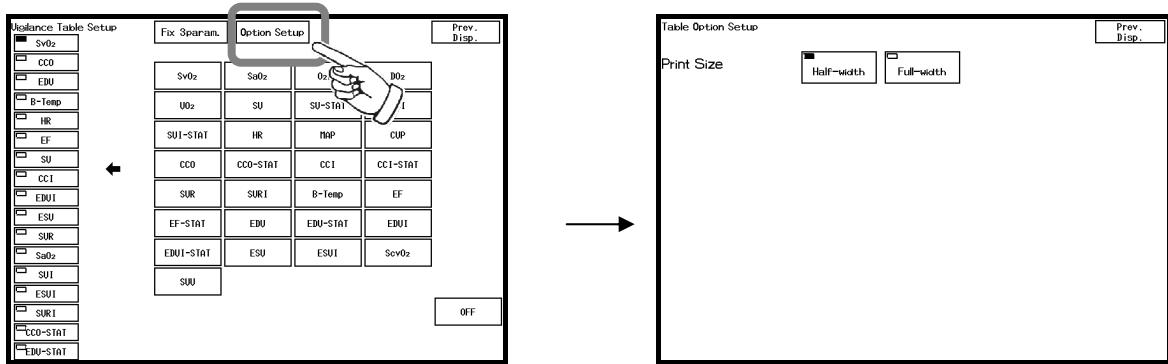
3 to 6 high priority parameters can be set as fixed display.

Pressing the **Fix param.** key will sequentially set 3 → 4 → 5 → 6 → 3 for the numbers of parameters.

## Print Font Size for the Vigilance Table

The print font size for the Vigilance table can be set.

- 1 Press the **Setup** key on the “Vigilance Table Setup” screen to display the “Table Option Setup” screen.



- 2 Select the print size for the table data.



**Half-width** will print the table data font size in half-width.

**Full-width** will print the table data font size in full-width.

## NICO Table

## Display/Print

By connecting the NICO-7300 Monitor (NOVAMETRIX®), NICO monitor data can be displayed in tabular format.

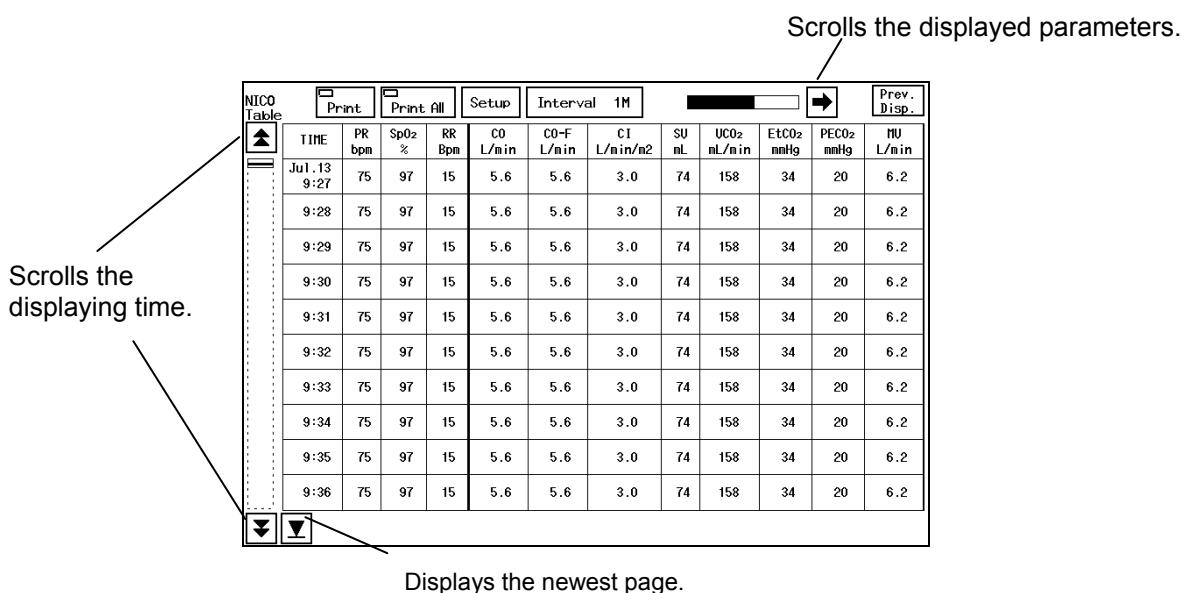
### NOTE

If "NICO-7300" is not selected on the serial communication setup menu, the "NICO Table" key will not be displayed.

## To Display the NICO Table

The NICO table 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.

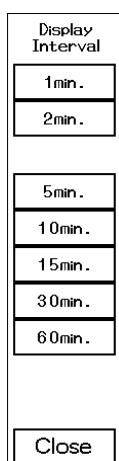
- 1 Press the **Menu** → **Function** → **NICO Table** keys.



- 2 Select the display interval.

Interval 1M

Press the **Interval xM** key to display the interval selection.



Select from **1min.** / **2min.** / **5min.** / **10min.** / **15min.** / **30min.** / **60min.**

If **5min.** is selected, the time will be displayed in real time as follows. 10:00, 10:05, ... 10:25.

If **60min.** is selected, it will be displayed as 10:00, 11:00, 12:00.

### 3 Switch the page.



Displays the previous page (older data).

Displays the next page (newer data).

Displays the newest page.

### 4 Record the NICO table.



**Print.** will print the currently displayed NICO table.

**Print All** will print all data from the NICO table.

## The Description of the Display

Latest Measurement Time

NICO Table	Print		Print All		Setup		Interval 1M				Prev. Disp.	
	TIME	PR bpm	SpO <sub>2</sub> %	RR Bpm	CO L/min	CO-F L/min	CI L/min/m <sup>2</sup>	SU mL	UCO <sub>2</sub> mL/min	EtCO <sub>2</sub> mmHg	PECO <sub>2</sub> mmHg	MU L/min
Jul.13 9:27	75	97	15		5.6	5.6	3.0	74	158	34	20	6.2
9:28	75	97	15		5.6	5.6	3.0	74	158	34	20	6.2
9:29	75	97	15		5.6	5.6	3.0	74	158	34	20	6.2
9:30	75	97	15		5.6	5.6	3.0	74	158	34	20	6.2
9:31	75	97	15		5.6	5.6	3.0	74	158	34	20	6.2
9:32	75	97	15		5.6	5.6	3.0	74	158	34	20	6.2
9:33	75	97	15		5.6	5.6	3.0	74	158	34	20	6.2
9:34	75	97	15		5.6	5.6	3.0	74	158	34	20	6.2
9:35	75	97	15		5.6	5.6	3.0	74	158	34	20	6.2
9:36	75	97	15		5.6	5.6	3.0	74	158	34	20	6.2

For the following case, the measurement data will be displayed as “- - -” for the corresponding time.

- If the measurement was not performed. (Ex. Before admittance of patient).
- If the monitoring was suspended.
- If the communication with external equipment was not established, or if network setup was not performed.

## NICO Table Setup

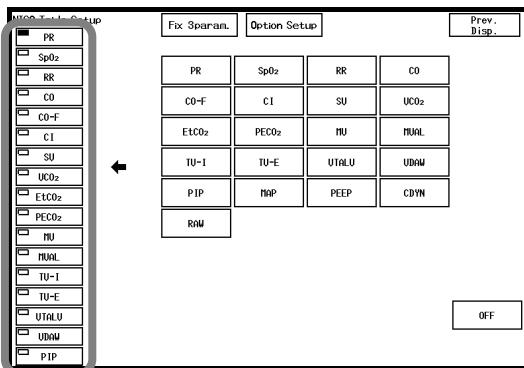
The parameter to display on the NICO table can be selected.

### 1 Press the **Setup** key on the NICO table display.

NICO Table											
Print		Print All		Setup		Interval 1M				Prev. Disp.	
TIME	PR bpm	SpO <sub>2</sub> %	RR Bpm	CO L/min	CO-F L/min	CI L/min/m <sup>2</sup>	SU mL	UCO <sub>2</sub> mL/min	EtCO <sub>2</sub> mmHg	PECO <sub>2</sub> mmHg	MU L/min
Jul.13 9:27	75	97	15	5.6	5.6	3.0	74	158	34	20	6.2
9:28	75	97	15	5.6	5.6	3.0	74	158	34	20	6.2
9:29	75	97	15	5.6	5.6	3.0	74	158	34	20	6.2
9:30	75	97	15	5.6	5.6	3.0	74	158	34	20	6.2
9:31	75	97	15	5.6	5.6	3.0	74	158	34	20	6.2
9:32	75	97	15	5.6	5.6	3.0	74	158	34	20	6.2
9:33	75	97	15	5.6	5.6	3.0	74	158	34	20	6.2
9:34	75	97	15	5.6	5.6	3.0	74	158	34	20	6.2
9:35	75	97	15	5.6	5.6	3.0	74	158	34	20	6.2
9:36	75	97	15	5.6	5.6	3.0	74	158	34	20	6.2

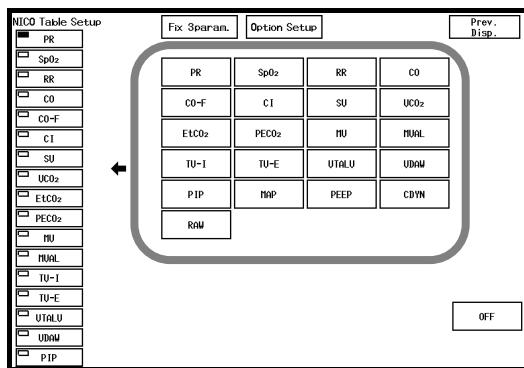
NICO Table Setup			
Fix SpParam.		Option Setup	
PR	SpO <sub>2</sub>	RR	CO
SpO <sub>2</sub>	CO	CI	SU
RR	CO-F	UCO <sub>2</sub>	EtCO <sub>2</sub>
CO	CI	MU	MUAL
CO-F	SU	ETALU	UDAW
CI	UCO <sub>2</sub>	TU-I	TU-E
SU	EtCO <sub>2</sub>	UTALU	UDAW
UCO <sub>2</sub>	PECO <sub>2</sub>	PIP	PEEP
EtCO <sub>2</sub>	PECO <sub>2</sub>	MAP	CDYN
PECO <sub>2</sub>	MU	RAW	
MU	MUAL		
MUAL	TU-I		
TU-I	TU-E		
TU-E	UTALU		
UTALU	UDAW		
UDAW	PIP		
PIP			OFF

## 2 Select the display position on the table.



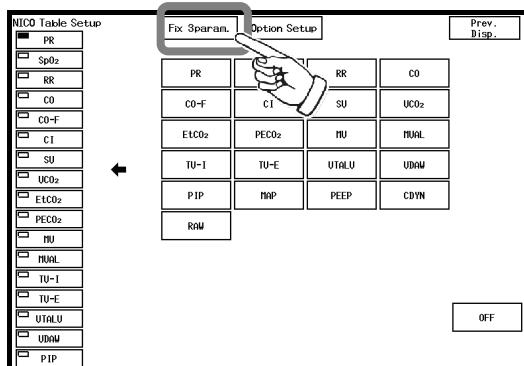
Maximum of 17 parameters can be displayed on the NICO table.

## 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.

## 4 Select the numbers of high priority parameters to be set as fixed display.



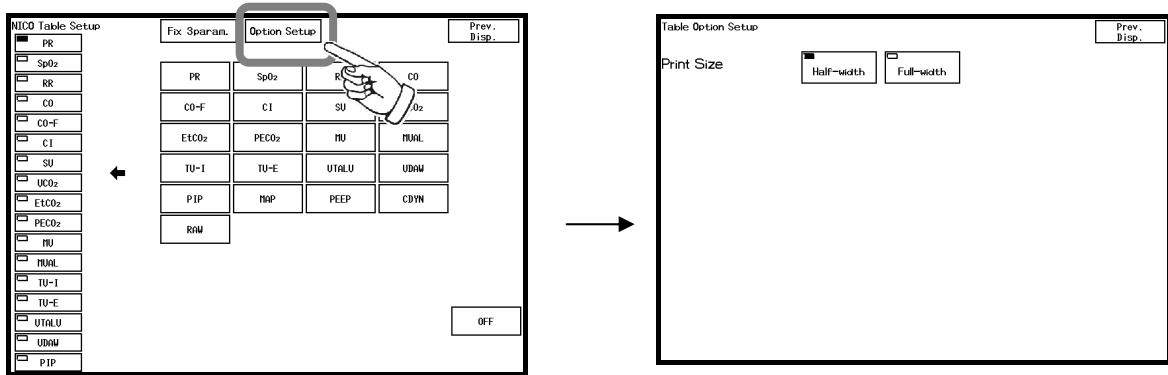
3 to 6 high priority parameters can be set as fixed display.

Pressing the **Fix param.** key will sequentially set 3 → 4 → 5 → 6 → 3 for the numbers of parameters.

## Print Font Size for the NICO Table

The print font size for the NICO table can be set.

- 1 Press the **Setup** key on the “NICO Table Setup” screen to display the “Table Option Setup” screen.



- 2 Select the print size for the table data.



**Half-width** will print the table data font size in half-width.

**Full-width** will print the table data font size in full-width.

## Respiration Table

## Display/Print

This section explains about the respiration table display and printing procedure.

### To Display the Respiration Table

The respiration table display can be accessed from the menu, or from the preprogrammed user key. If the respiration data is displayed on the home display, 20 hours of data will be automatically stored and displayed in 1-minute interval.

- 1** Press the **Menu** → **Function** → **Resp. Table** keys.

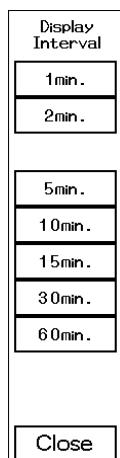
Scrolls the displayed parameters.

TIME	RR-IMR Bpm	APNEA s	RR-UENT Bpm	SpO2 %	P-Peak cmH20	P-Pause cmH20	P-Mean cmH20	PEEP cmH20	E-TU mL	I-TU mL
Jul 1, 13 9:38	20	3	20	98	15	21	11	3	436	449
9:39	20	3	20	98	15	21	11	3	436	449
9:40	20	3	20	98	15	21	11	3	436	449
9:41	20	3	20	98	15	21	11	3	436	449
9:42	20	3	20	98	15	21	11	3	436	449
9:43	20	3	20	98	15	21	11	3	436	449
9:44	20	3	20	98	15	21	11	3	436	449
9:45	20	3	20	98	15	21	11	3	436	449
9:46	20	3	20	98	15	21	11	3	436	449
9:47	20	3	20	98	15	21	11	3	436	449

- 2** Select the display interval.

**Interval 1M**

Press the **Interval XM** key to display the interval selection.



Select from **1min.** / **2min.** / **5min.** / **10min.** / **15min.** / **30min.** / **60min.**

If **5min.** is selected, the time will be displayed in real time as follows. 10:00, 10:05, ... 10:25.

If **60min.** is selected, it will be displayed as 10:00, 11:00, 12:00.

- 3** Switch the page.



Displays the previous page (older data).



Displays the next page (newer data).



Displays the newest page.

- 4** Record the respiration table.

**Print**

**Print All**

**Print** will print the currently displayed respiration table.

**Print All** will print all data from the respiration table.

# The Description of the Display

Resp. Table	Print		Print All		Setup		Interval 1M				→		Prev. Disp.	
	TIME	RR-IMP Bpm	APNEA s	RR-UENT Bpm	SpO <sub>2</sub> %	P-PEAK cmH20	P-PAUSE cmH20	P-MEAN cmH20	PEEP cmH20	E-TU mL	I-TU mL			
	Jul.13 9:38	20	3	20	98	15	21	11	3	436	449			
	9:39	20	3	20	98	15	21	11	3	436	449			
	9:40	20	3	20	98	15	21	11	3	436	449			
	9:41	20	3	20	98	15	21	11	3	436	449			
	9:42	20	3	20	98	15	21	11	3	436	449			
	9:43	20	3	20	98	15	21	11	3	436	449			
	9:44	20	3	20	98	15	21	11	3	436	449			
	9:45	20	3	20	98	15	21	11	3	436	449			
	9:46	20	3	20	98	15	21	11	3	436	449			
	9:47	20	3	20	98	15	21	11	3	436	449			

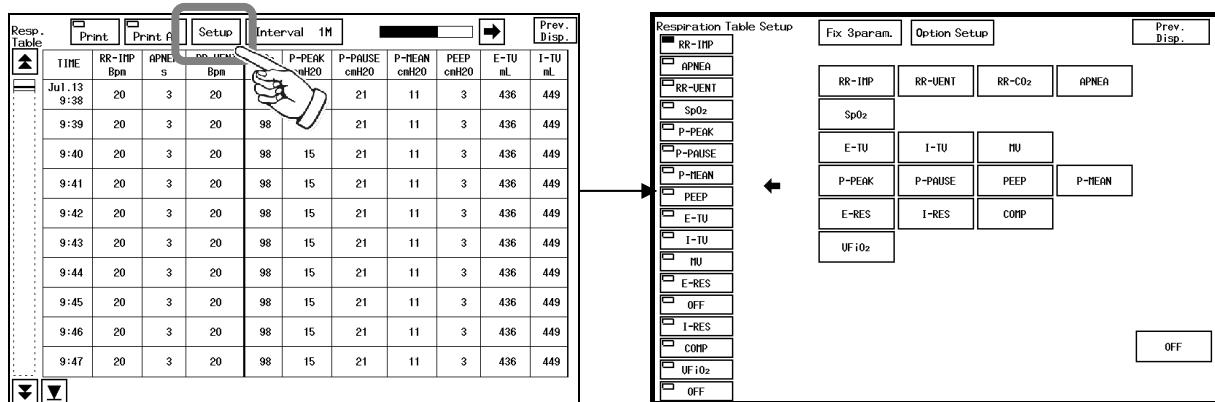
For the following case, the measurement data will be displayed as “- - -” for the corresponding time.

- If the measurement was not performed. (Ex. Before admittance of patient).
- If the monitoring was suspended.
- If the communication with external equipment was not established, or if network setup was not performed.

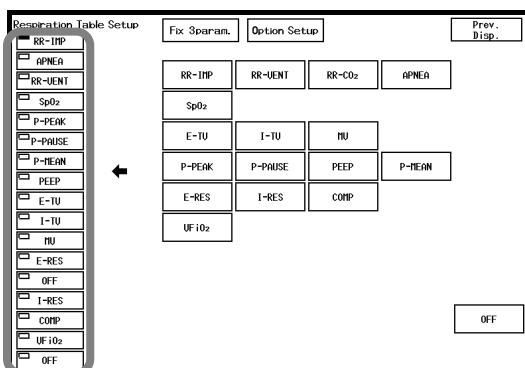
## Respiration Table Setup

The parameter to display on the respiration table can be selected.

- 1 Press the **Setup** key on the respiration table display.

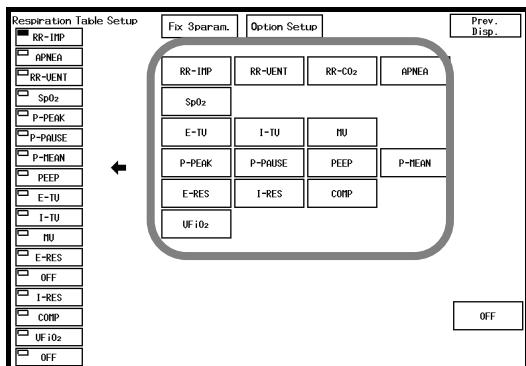


- 2 Select the display position on the table.



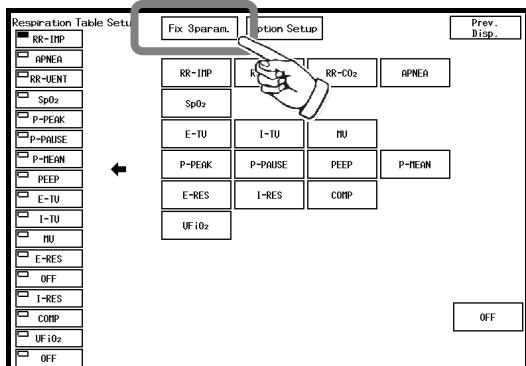
Maximum of 17 parameters can be displayed on the table.

### 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.

### 4 Select the numbers of high priority parameters to be set as fixed display.



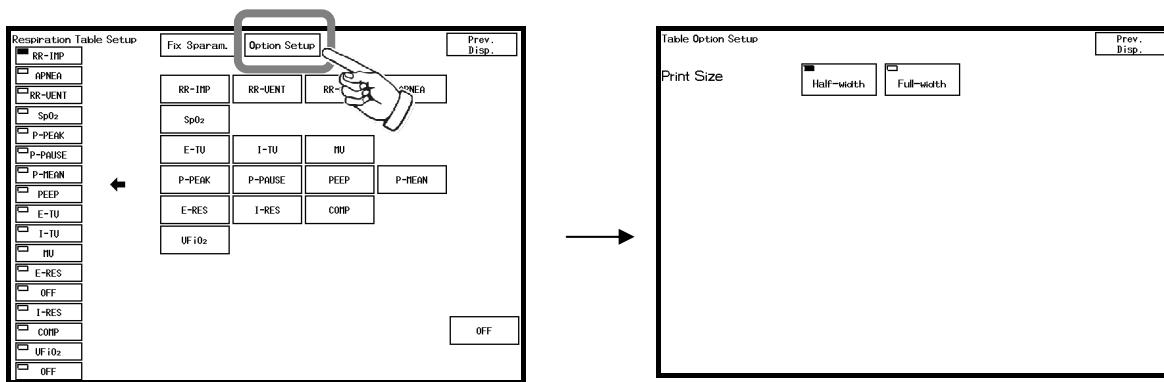
3 to 6 high priority parameters can be set as fixed display.

Pressing the [Fix param.] key will sequentially set 3 → 4 → 5 → 6 → 3 for the numbers of parameters.

## Print Font Size for the Respiration Table

The print font size for the respiration table can be set.

### 1 Press the [Setup] key on the “Respiration Table Setup” screen to display the “Table Option Setup” screen.



### 2 Select the print size for the table data.



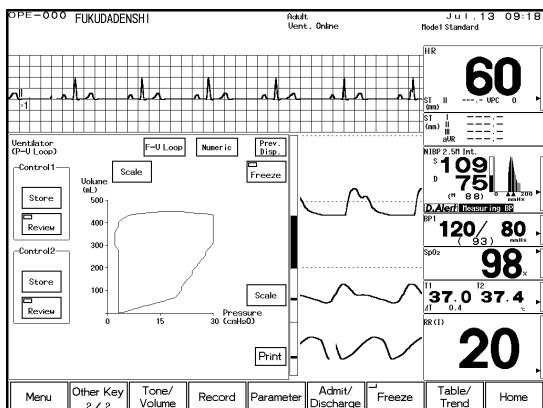
[Half-width] will print the table data font size in half-width.

[Full-width] will print the table data font size in full-width.

# Ventilator

## P-V, F-V Loop Display

By connecting the ventilator, P-V loop (airway pressure / volume) and F-V loop (airway flow / volume) can be monitored on the ventilator display.



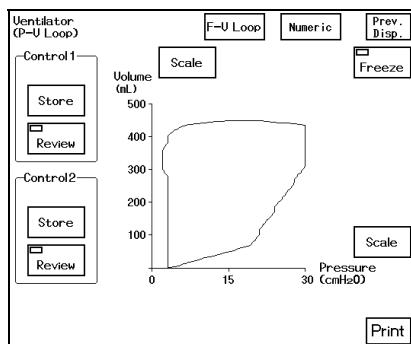
### NOTE

If "Servo-i" is not selected on the serial communication setup menu, "Ventilator" key will not be displayed.

## P-V Loop

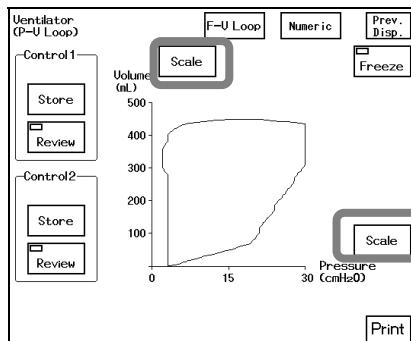
The P-V loop is sampled every 60ms and displayed for each respiration. The beginning of the loop trace is displayed in white, and the rest of the loop is displayed in cyan. The horizontal axis shows AWP (Unit: cmH<sub>2</sub>O), and the vertical axis shows Volume (Unit: mL).

- 1 Press the **Menu** → **Function** → **Ventilator** keys.



The P-V loop display will appear.

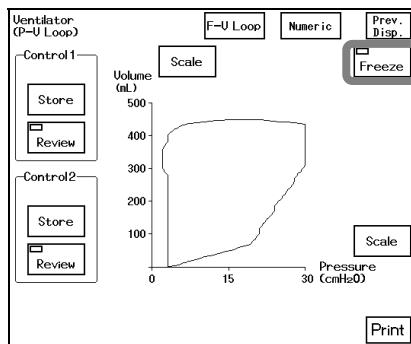
- 2 Select the scale for P-V loop.



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<sub>2</sub>O).

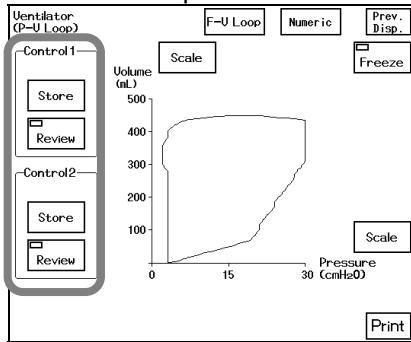
### 3 Freeze the loop drawing.



Pressing the **Freeze** key will freeze the P-V loop. 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.



The currently displayed P-V loop will be printed.

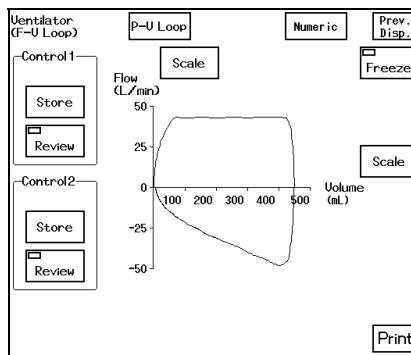
**NOTE**

The P-V loop cannot be printed on the central monitor recorder.

## F-V Loop

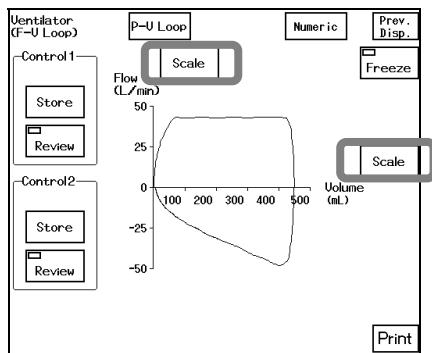
The F-V loop is sampled every 60ms and displayed for each respiration. The beginning of the loop trace is displayed in white, and the rest of the loop is displayed in cyan. The horizontal axis shows Volume (Unit: mL), and the vertical axis shows AWF ( Unit: L/min ).

### 1 Press the **Menu** → **Function** → **Ventilator** → **F-V** keys.

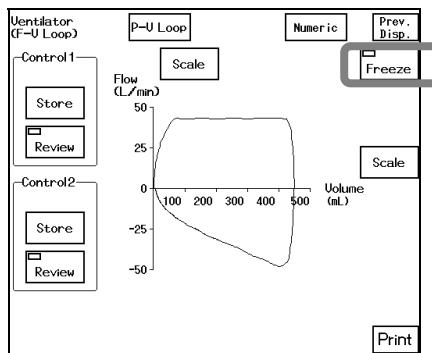


The F-V loop will be displayed.

## 2 Select the scale for F-V loop.

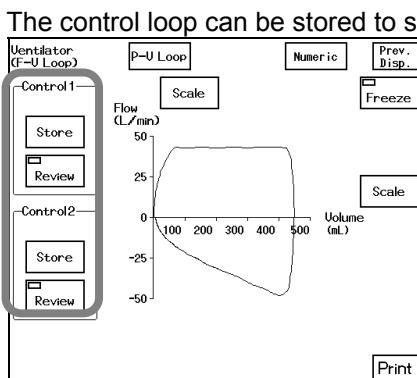


## 3 Freeze the loop drawing.



Pressing the **Freeze** key will freeze the F-V loop. 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 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 and anesthetic machine can be displayed.

- 1 Press the [Menu] → [Function] → [Ventilator] → [Numeric] keys.**

Ventilator	P-U Loop	F-U Loop	Prev. Disp.
TU Insp	449 mL	RESISTANCE	
Exp	436 mL	Insp 17.5 cmH <sub>2</sub> O/L/sec	
MU	9.0 L/min	Exp 21.4 cmH <sub>2</sub> O/L/sec	
UFiO <sub>2</sub>	18.20 %	COMPLIANCE	
PRESSURE			
PEAK	15 cmH <sub>2</sub> O	14.0 mL/cmH <sub>2</sub> O	
PAUSE	21 cmH <sub>2</sub> O	RR 20 bpm	
PEEP	3 cmH <sub>2</sub> O		
MEAN	11 cmH <sub>2</sub> O		

The data from the ventilator will be displayed.

(When Servo-i is connected)

Ventilator	Prev. Disp.
TU Exp	436 mL
MU	9.0 L/min
UFiO <sub>2</sub>	21.00 %
PRESSURE	
PEAK	15 mbar
PEEP	3 mbar
MEAN	11 mbar
PAUSE	21 mbar

(When Fabius GS is connected)

- 2 Print the measurement data.**



The currently displayed ventilator measurement data will be printed.

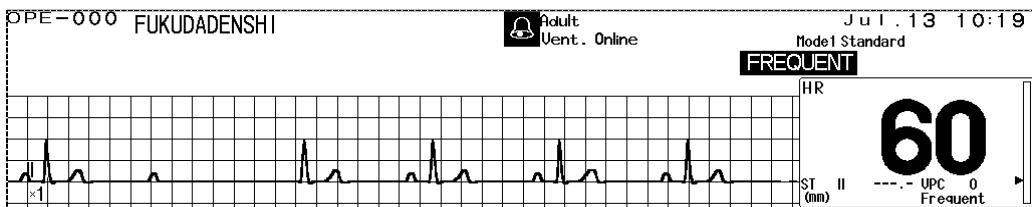
## Arrhythmia Analysis

## Definition, etc.

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 after discriminating the noise from VPC, it is established as VPC.



### ●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

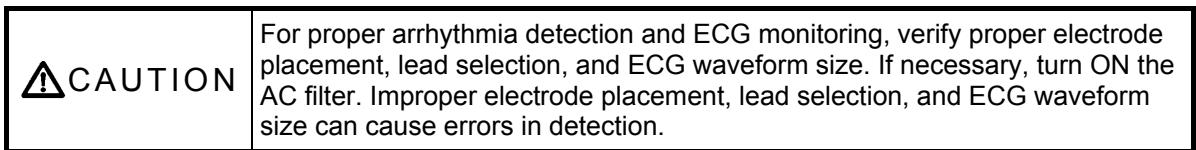
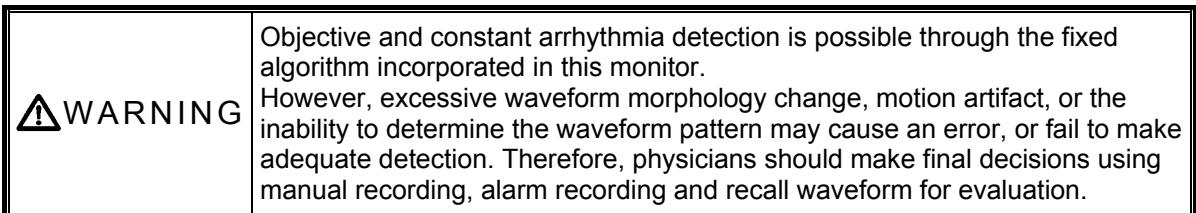
### ●Arrhythmia Type

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	9 or more continuous ventricular beats are detected. (HR: 140bpm/120bpm or over)
SLOW VT		9 or more continuous ventricular beats are detected. (HR: 140bpm/120bpm or below)
TACHY	Tachycardia	HR is over the upper alarm limit.
BRADY	Bradycardia	HR is below the lower alarm limit.
RUN	Consecutive VPC	Continuous VPC exceeding the preprogrammed value is detected.
COUPLET	Couplet Ventricular Extrasystole	2 continuous VPC beats are detected.
PAUSE		Cardiac arrest exceeding the preprogrammed value is detected.
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.



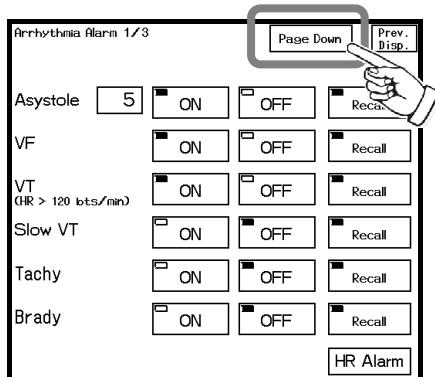
Refer to "6. Parameter Setup –ECG– ●HR Low Limit for VT" for setup of HR reference for VT analysis.



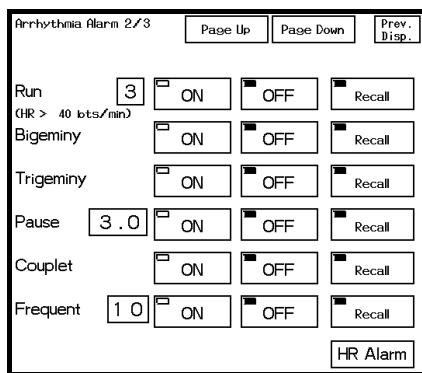
## To Set the Arrhythmia Alarm

ON/OFF of arrhythmia alarm and reference of arrhythmia analysis can be set.

- 1 Press the **Menu** → **Settings** → **Alarm** → **Basic Alarm** → **Arrhythmia** keys.

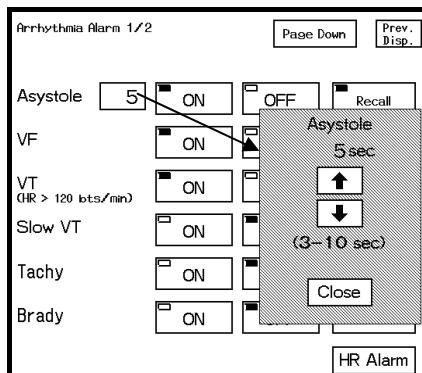


On page 1/2, the alarm setup menu of Asystole, VF, VT, Slow VT, Tachy, Brady will be displayed.



On page 2/2, the alarm setup menu of Run, Bigeminy, Trigeminy, Pause, Couplet, Frequent will be displayed.

- 2 Set the reference range.



Pressing the reference value key will display the **↑** **↓** keys.

Use the **↑** **↓** keys to set the reference value. After setting the reference value, press the **Close** key.

**<Arrhythmia Reference Range>**

<b>Arrhythmia</b>	<b>Reference Range</b>	<b>Default</b>
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.

**3 Select ON or OFF for the alarm.**

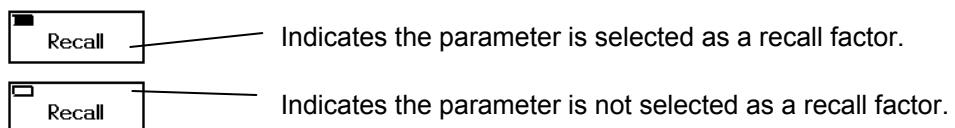


Alarm will generate.      Alarm will not generate.

**CAUTION** Asystole alarm cannot be set to OFF.

**4 Select ON or OFF for recall factor.**

ON/OFF of recall factor can be set on the alarm setup menu.

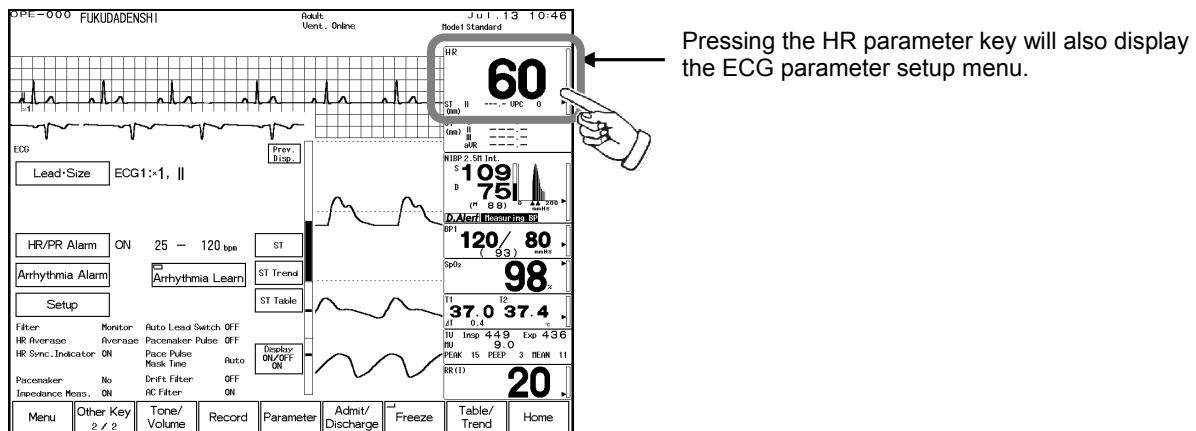


Pressing the **Recall** key will switch the ON/OFF selection.

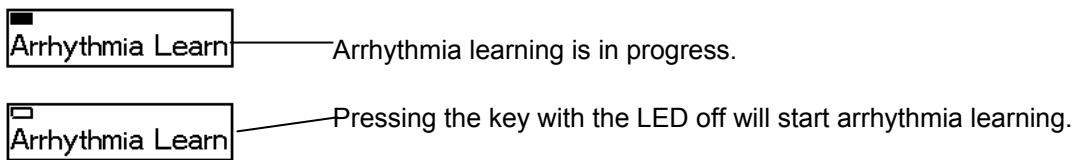
## To Perform Arrhythmia Learning

Learning the normal ECG largely affects the accuracy of the 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 a 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** → **Settings** → **Parameter** → **ECG** keys.

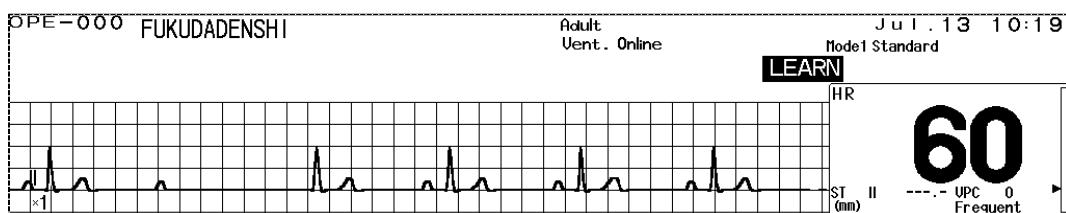


- 2 Start arrhythmia learning.



Arrhythmia learning process cannot be stopped by pressing the key again.

- 3 During arrhythmia learning, the message "LEARN" will be displayed.



<b>NOTE</b>	If a pacemaker is used, the LED on the <b>Arrhythmia Learn</b> key will not light and the "LEARN" message will not be displayed although the arrhythmia learn procedure is performed.
-------------	---

## Other Monitor Data

## Display/Alarm

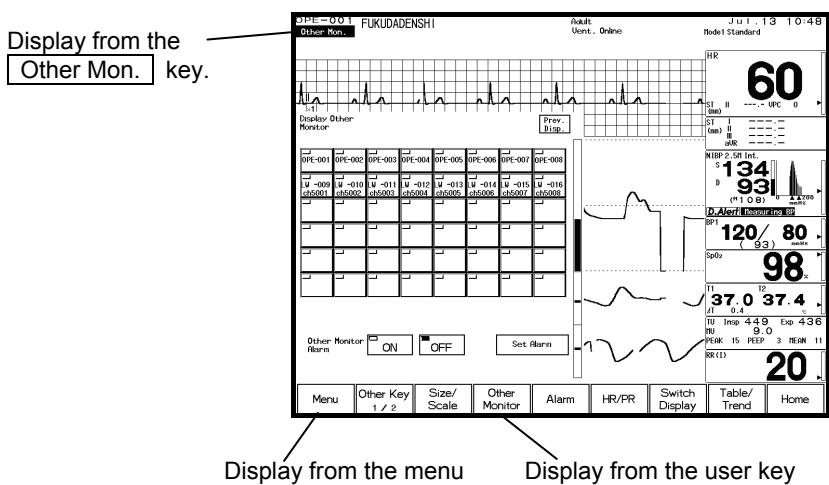
This section explains about the function to display the waveform and numeric data and to set alarms for other monitors.

To use this function, a DS-LAN II wired network connection is required.

### Other Monitor Display

The other monitor display can be accessed from the menu or from the preprogrammed user key.

Also, by setting the other monitor alarm ON, **Other Mon.** key will be displayed when other monitor generates an alarm. By pressing this **Other Mon.** key, the display for the other monitor can be accessed.

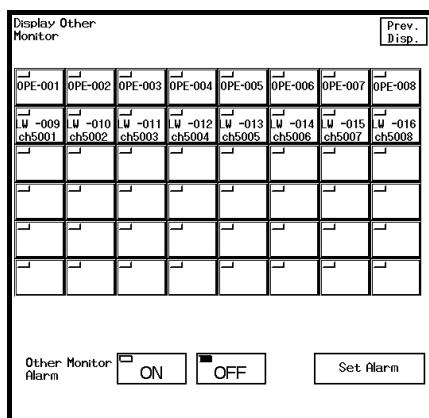


Display from the  
**Other Mon.** key.

Display from the menu

Display from the user key

- 1 Press the **Menu** → **Function** → **Other Monitor** keys to display the other monitor selection menu.



On the other monitor selection menu, select the Operation Room ID to display from the beds connected to the wired network.

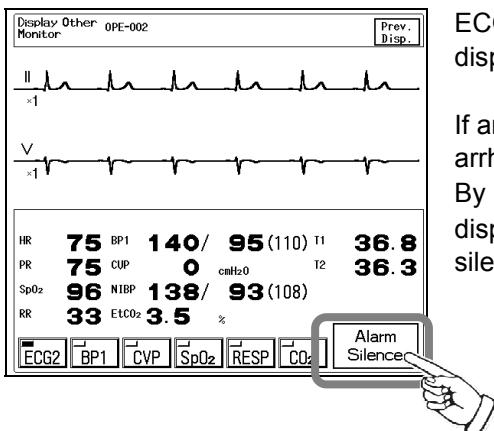
For the DS-LANII network, there are 48 beds selection, and for the DS-LANIII network, there are 100 beds selection.

The Operation Room ID for the alarm generating monitor will be displayed in red.

The monitor displaying this menu will be displayed in gray.

The key LED for the selected monitor will be lighted.

## 2 Press the Operation Room ID key to access the display for the other monitor.



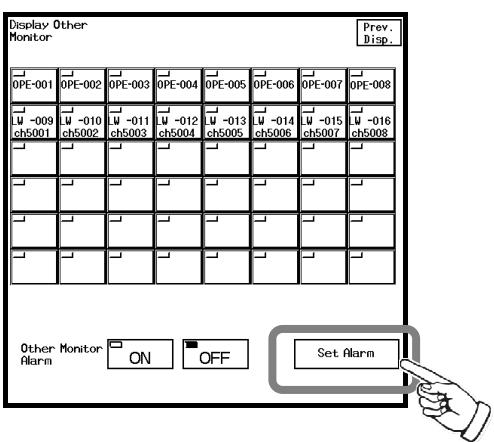
ECG waveform and numeric data for the selected monitor will be displayed.

If an alarm is generated for this bed, the physiological alarm / arrhythmia alarm message will be displayed.

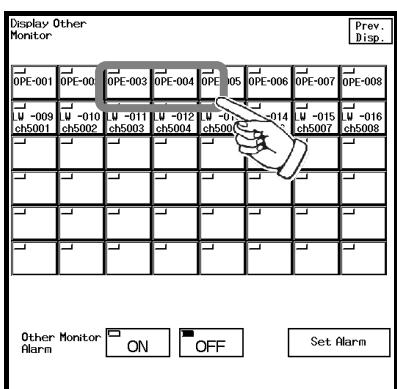
By pressing the **Alarm Silence** key on the other monitor display, the alarm sound for the displayed monitor can be silenced.

## Other Monitor Alarm Setup

From the 48 monitors, the monitors to generate an Other Monitor Alarm can be selected and ON/OFF of Other Monitor Alarm display can be set.



## 1 Select the monitors to generate the "Other Monitor Alarm".

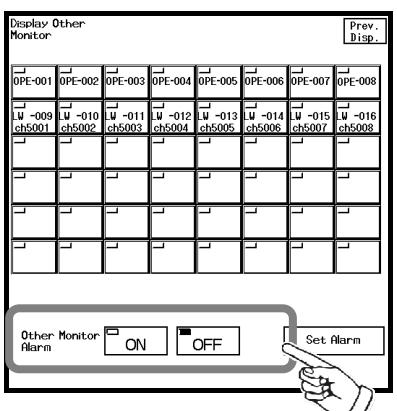


Press the **Set Alarm** key to display the "Other Monitor Alarm" setup menu.

Select the monitors to generate the "Other Monitor Alarm".

The key LED for the selected monitors will be lighted.

## 2 Select **ON** for the other monitor alarm.



Press the **Prev. Disp.** key to display the other monitor selection menu.

Selecting **ON** will generate an "Other Monitor Alarm" when an alarm generates at the other monitor.

Selecting **OFF** will not generate an "Other Monitor Alarm".

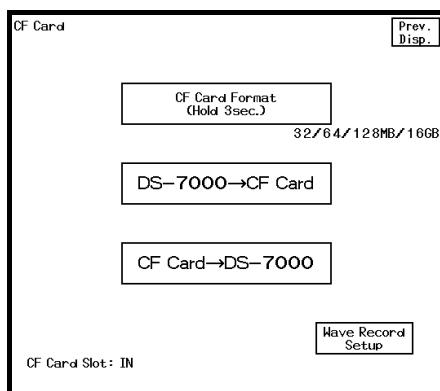
# Full Disclosure Waveform Recording

This section explains about the full disclosure waveform recording function.

## To Record the Full Disclosure Waveform Data

To record the full disclosure waveform data, a specified CF card (FCF-16GA) is required.

- 1 Press the **Menu** → **Settings** → **CF Card** keys.



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 3sec.)**

Press the **CF Card Format** key for more than 3 seconds.

The system will automatically detect the CF card type and starts the format process.

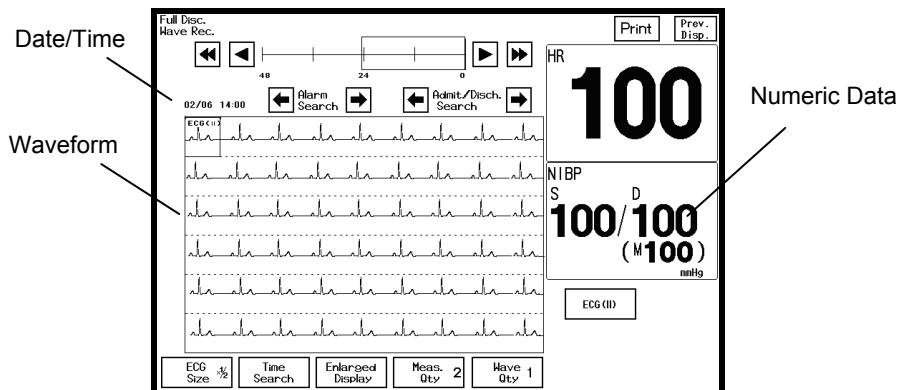
When the format process completes, full disclosure waveform data of 48 hours/6 waveforms will be recorded according to the setup.



For details of full disclosure waveform recording setup, refer to “4. Monitoring Setup CF Card”.

## To Display the Full Disclosure Waveform

- 1 To display the full disclosure waveform, press the **Menu** → **Function** → **Full Disc. Wave. Rec.** keys.**



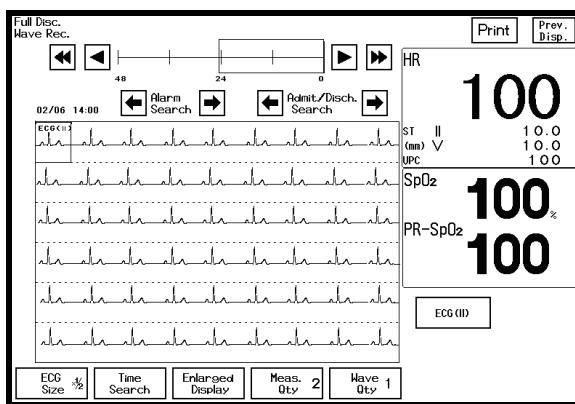
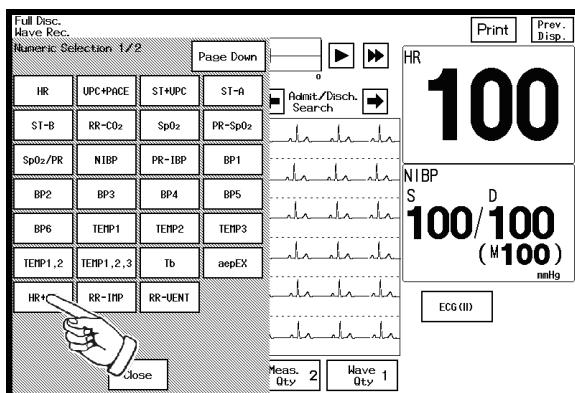
- 2 Select the quantity of numeric data to be displayed.**

**Meas. Qty 2**

Pressing the **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.



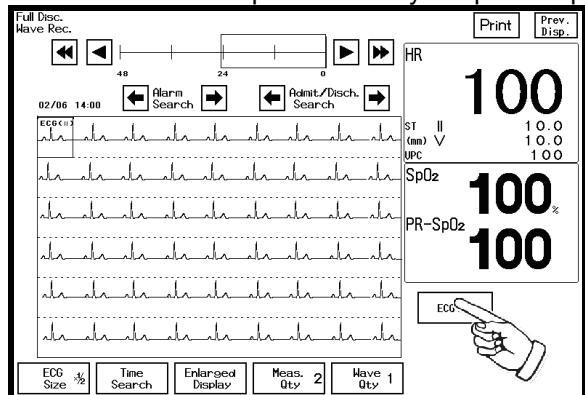
#### 4 Select the waveform quantity.



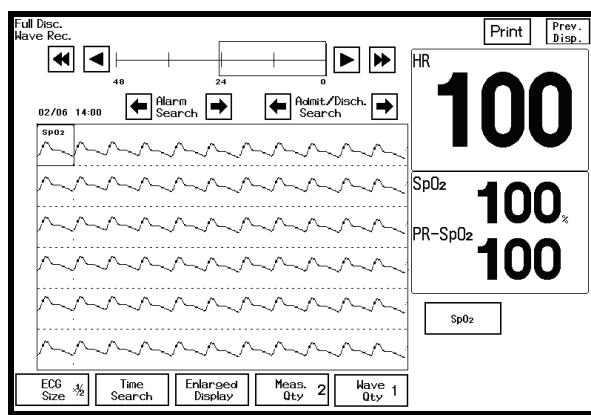
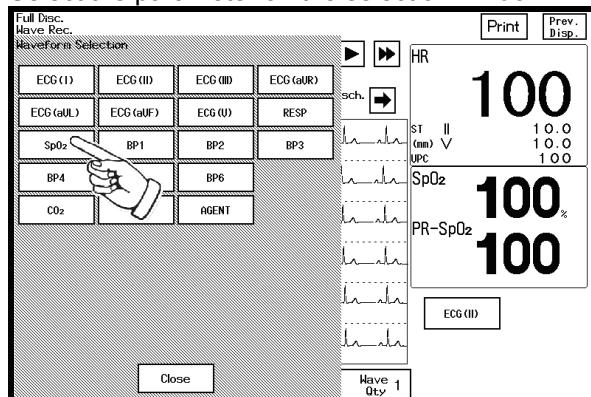
Pressing the [Wave Qty] key will sequentially change the waveform quantity in the order of 1→2→3→6→1.

#### 5 Select the waveform to display.

Press the waveform parameter key to open the parameter selection window.



Select the parameter on the selection window.



### ●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.



- ◀ The waveform will shift to older data in interval of one displayed duration.  
(60 seconds if 1 waveform is displayed)

- ◀ 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.

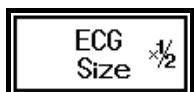


- ▶ The waveform will shift to newer data in interval of one displayed duration.  
(60 seconds if 1 waveform is displayed)

- ▶ The waveform will shift to newer data in interval of half the displayed duration.  
(30 seconds if 1 waveform is displayed)

## To Change the ECG Waveform Size

### 1 Select the ECG waveform size.



Pressing the **ECG Size** key will sequentially change the displayed ECG waveform size in the order of  $\times 1 \rightarrow \times 2 \rightarrow \times 4 \rightarrow \times 1/4 \rightarrow \times 1/2 \rightarrow \times 1$ .

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.

$\times 1/4$  :  $\pm 6.0\text{mV}$

$\times 1/2$  :  $\pm 3.0\text{mV}$

$\times 1$  :  $\pm 1.5\text{mV}$

$\times 2$  :  $\pm 0.75\text{mV}$

$\times 4$  :  $\pm 0.33\text{mV}$

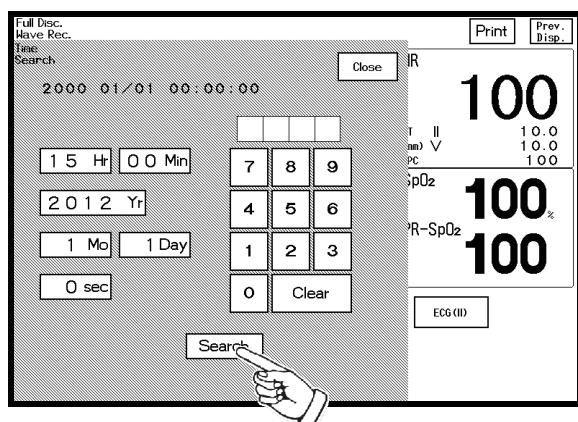
## To Search by Time

The full disclosure waveform of a specified time can be displayed.

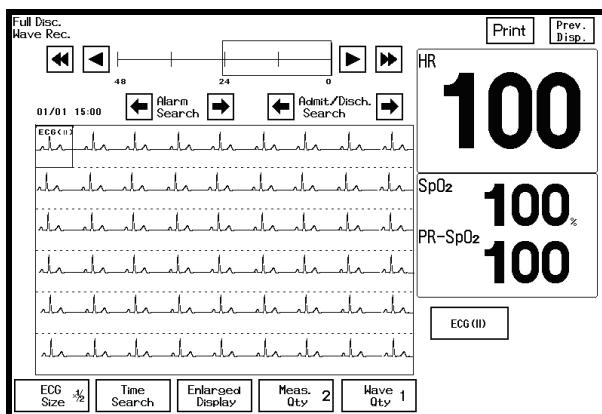
### 1 Press the **Time Search** key.



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.



## To Search by Alarm

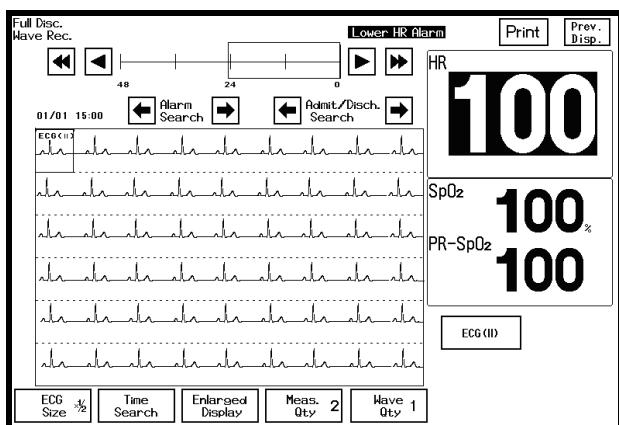
The full disclosure waveform data of an alarm generated point can be searched.

- 1** Press the arrow keys for “Alarm Search”.



Pressing the **←** / **→** keys will start the searching process.

The alarm generated numeric data will be highlighted.



## 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 “Admit/Disch. Search”.



Pressing the **←** / **→** keys will start searching.

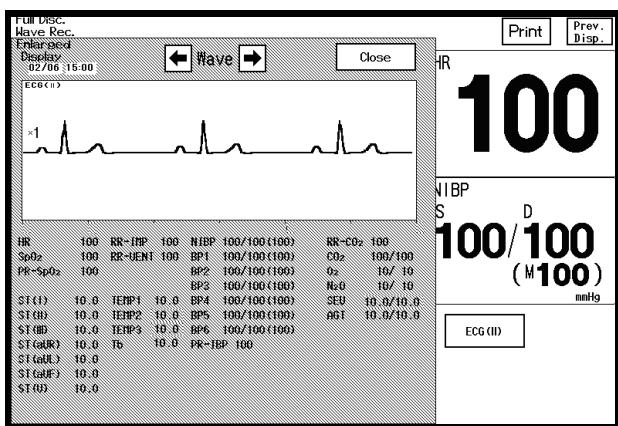
The full disclosure waveform data at the admitted/discharged date/time will be displayed.

## 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 Display** key.



## To Print the Waveform

Maximum of 3 waveforms displayed on the screen can be printed.

- 1 Select the quantity of waveform to print.

When 6 waveforms are selected, only the 3 waveforms from the top will be printed.

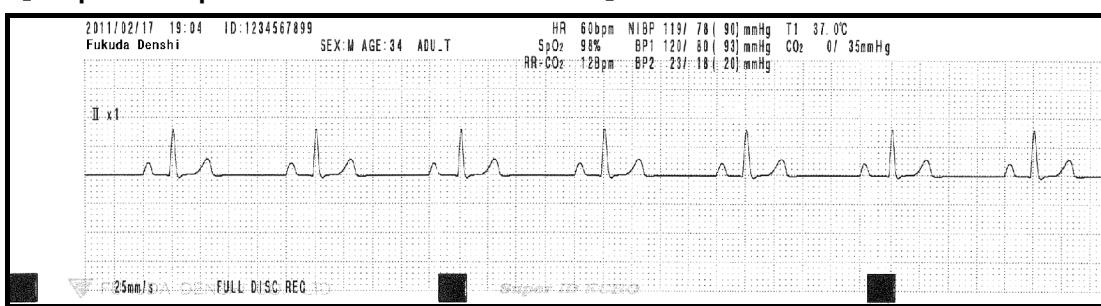
- 2 Select the waveform to print.

- 3 Print the displayed waveform.

**Print**

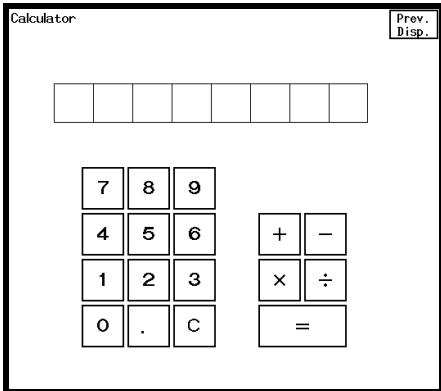
Press the **Print** key to print the displayed waveform.

### [Output Example of Full Disclosure Waveform]



# Calculator

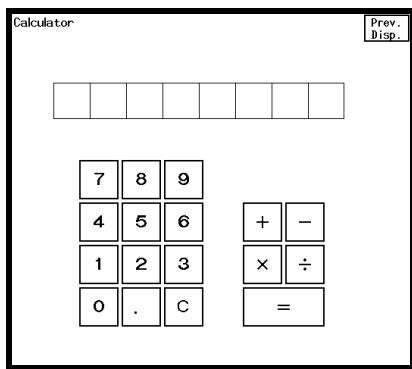
This section explains about the calculator function.



## To Use the Calculator Function

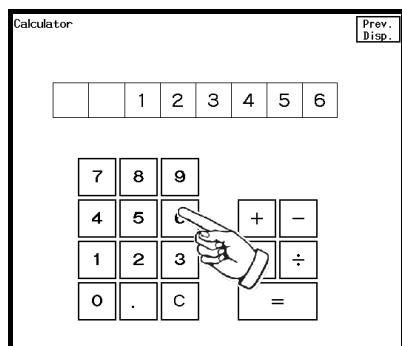
On the calculator screen, four arithmetic operations between the 2 values can be performed and displayed.

- 1 Press the **Menu** → **Function** → **Calculator** keys.



The calculator screen will be displayed.

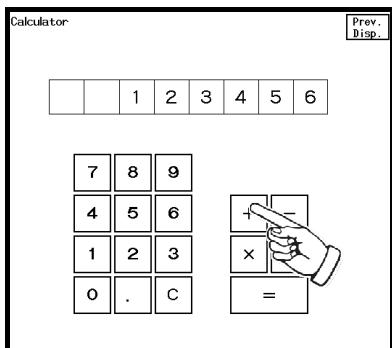
- 2 Input the data to calculate.



Use the numeric keys displayed at lower left to enter the numbers.

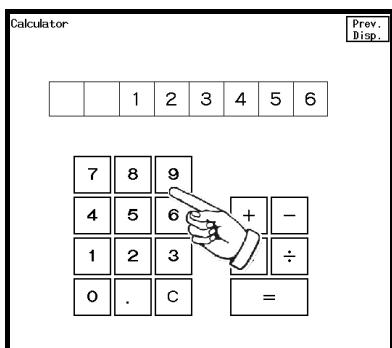
Use the “.” key to enter the decimal point.

### 3 Enter the calculation type.



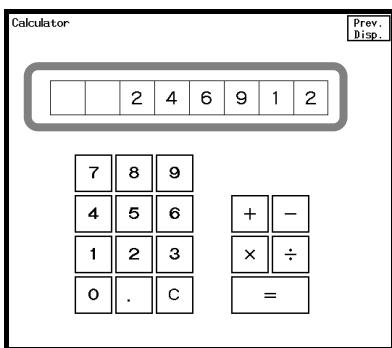
Select the calculation type from the lower right of the screen.

### 4 Input the data to calculate.



Enter the data for calculation.

### 5 Perform the calculation.



Press the "=" key at the lower right of the screen to display the calculation result.

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## Chapter 8

# Installation

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## Precautions for Installing the Equipment

This section describes the environmental condition to use the DS-7000.



The installation of this equipment should be performed by our service representative or a person who is well acquainted with this equipment.

## Precautions about the Operating Environment

- The following environmental conditions should be observed when operating the DS-7000.
  - Surrounding Temperature : 10 to 40°C
    - 15 to 35°C (with MGU-701/702)
    - 10 to 35°C (with MGU-801P/802/803)
  - Relative Humidity : 30 to 85% (non-condensing)
- The DS-7000 is intended for patient monitoring in ICU, CCU, surgery, and ward. Direct use in MRI environment or home-care should be avoided.
- The power source should fulfill the following condition.
  - Use a hospital grade 3-way outlet. If a hospital grade outlet is not available, make sure to connect the equipotential ground terminal with the accessory ground cable.
  - Verify the power voltage and frequency before connecting to an AC power source.
  - Use a power source that can provide adequate power to the device.
- Pay attention when installing or storing the device. Do not install or store in the following locations.
  - where chemicals are stored or gases may be present
  - where the equipment will be subject to splashing water or humidity from a nebulizer or vaporizer
  - where the equipment will be subject to direct sunlight
  - Unstable place with inclination, vibration, or shock.
- Ensure proper ventilation to cool the device.
  - A minimum space of 5 cm is required between vents on the rear side of the monitor and the wall. If the monitor is embedded in a wall or surrounded by a wall, a minimum space of 10 cm is required.



If the monitor is used in an environment not fulfilling the above conditions, not only the monitor will not deliver its maximum performance, but also damage to the equipment may occur and safety can not be ensured.  
If using in an environment other than specified above, contact our service representative.

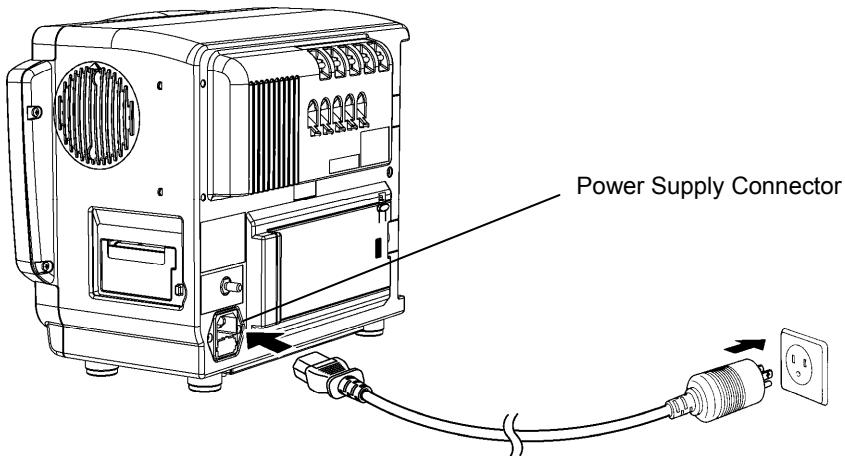


### Equipotential Grounding

When connecting multiple devices, electrical potential difference may be generated between the devices. This may result in electric shock to the patient connected to these devices. Pay special attention for use in the operating room, ICU, CCU, Cardiac Catheter Laboratory, and Cardiovascular X-ray room. To avoid such electrical potential difference, use the accessory ground cable to connect each device's potential equalization terminal to the same ground terminal. This is called equipotential grounding.

## Power Source and Ground Connection

Connect the power supply cable (CS-24) to the power supply connector on the DS-7000. Connect the other end of the power cable to the hospital grade 3-way outlet with ground terminal.



### WARNING

- Use only the supplied 3-way AC power cable. Use of other cables may result in electric shock to the patient and the operator.
- The power cable must be connected to 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.

### NOTE

#### Equipotential Grounding

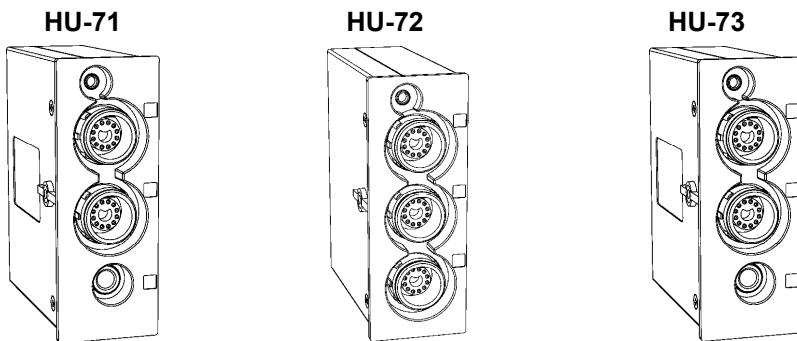
When connecting multiple devices, electrical potential difference may be generated between the devices. This may result in electric shock to the patient connected to these devices. Pay special attention for use in the operating room, ICU, CCU, Cardiac Catheter Laboratory, and Cardiovascular X-ray room. To avoid such electrical potential difference, use the accessory ground cable to connect each device's potential equalization terminal to the same ground terminal. This is called equipotential grounding.

## Connecting the Option Unit

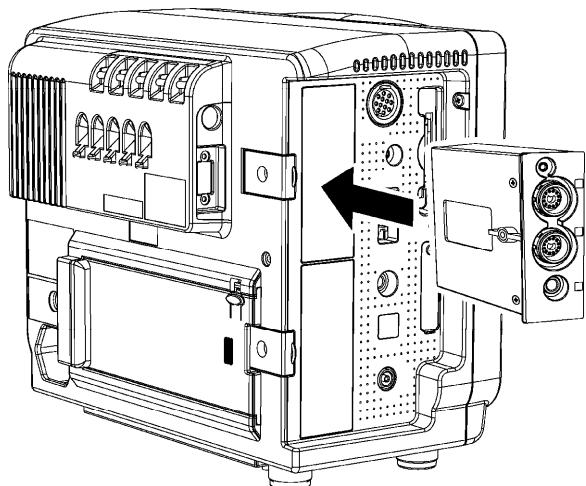
There are following 3 types of Option Unit, and up to 2 Option Units can be used simultaneously. Two units can be used simultaneously for HU-71 and HU-72, but only one unit can be used for HU-73.

[Lineup of Option Unit]

Model Type	Measurement Parameter		
	BP	TEMP	Cardiac Output
HU-71	2ch	1ch	No
HU-72	3ch	No	No
HU-73	1ch	1ch	Yes



- 1 Insert the Option Unit to the Option Unit slot located at the side of the DS-7000.



## Connecting the Gas Unit (Optional)

The following gas unit can be connected to the DS-7000.  
However, more than one gas unit cannot be used simultaneously.

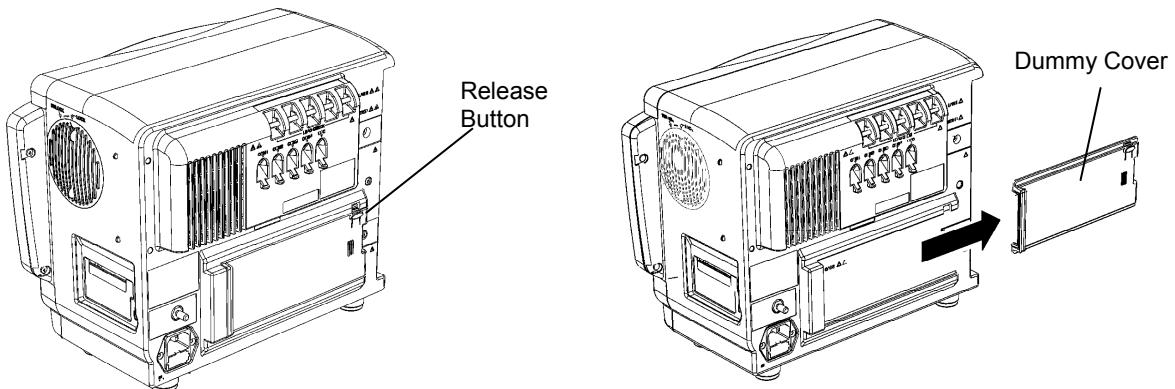
### 【Gas Unit that can be connected to the DS-7000】

Model Type	Method	Measurement Parameter				Connection
		CO <sub>2</sub>	O <sub>2</sub>	N <sub>2</sub> O	AGT	
MGU-701 : AGO <sub>2</sub> Gas Unit	Side Stream Method	Yes	Yes	Yes	Yes	Attach to the rear side of the DS-7000
MGU-702 : AG Gas Unit		Yes	No	Yes	Yes	
MGU-801P : AGO <sub>2</sub> Gas Unit P		Yes	Yes	Yes	Yes	Connect to the MGU IF Unit (OAO-41B) attached on the rear side of the DS-7000 via I/F cable.
MGU-802 : AG Gas Unit		Yes	No	Yes	Yes	
MGU-803 : CO <sub>2</sub> Gas Unit		Yes	No	Yes	No	
Capnostat5	Main Stream Method	Yes	Yes	Yes	Yes	Connect to the HPD-800 which is connected to the OAO-41B attached on the rear side of the DS-7000.

## Multigas Unit (MGU-701/MGU-702) Connection

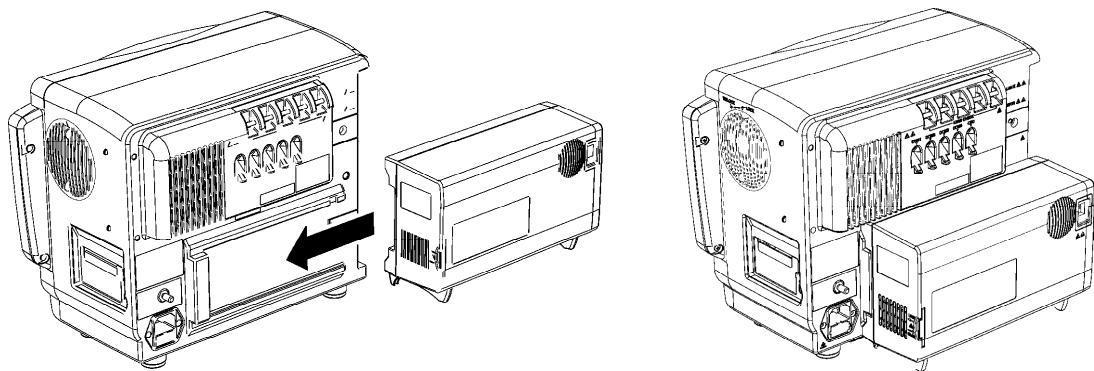
### 1 Remove the dummy cover located at the rear of the DS-7000.

Slide the cover off while pressing the release button.



### 2 Attach the Multigas Unit, MGU-701 or MUG-702 to the DS-7000 by sliding it on.

Push it in until it is securely locked into place.

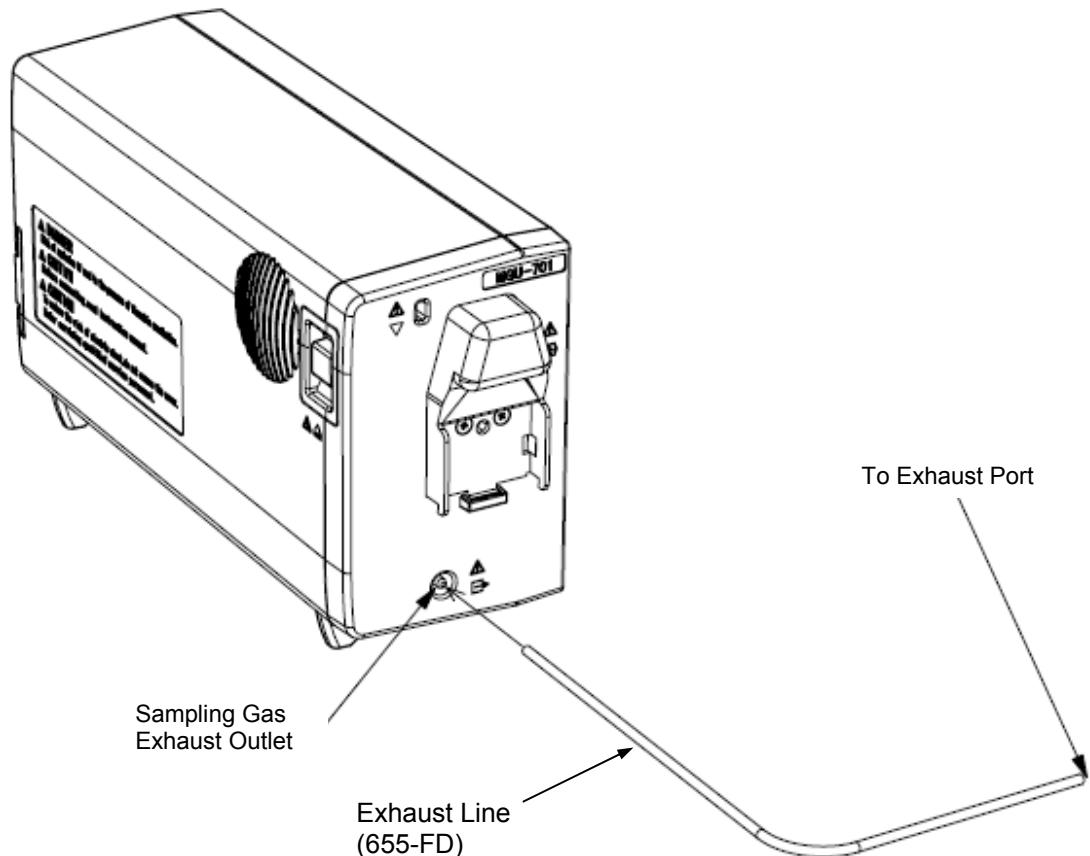


## Exhaust Line Connection (MGU-701/MGU-702)

---

### 1 Connect the exhaust line to the MGU-701/702.

Connect one end of the exhaust line (Model Type: 655-FD) to the sampling gas exhaust outlet on the multigas unit, and the other end to the exhaust port of the facility.



## Multigas Unit (MGU-801P/MGU-802/MGU-803) Connection

### ⚠ CAUTION

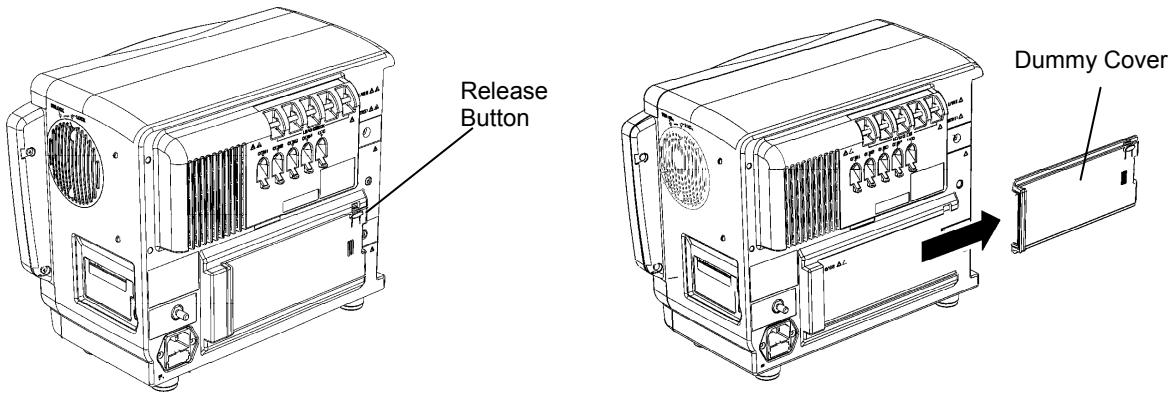
Make sure to turn OFF the patient monitor, the DS-7000 System, before connecting the MGU IF Unit (Model: OAO-41B).

The following Unit Connection Cables are available according to the installation.

Model Type	Length
CJO-09SS0.3	0.3m
CJO-09SS1.5	1.5m
CJO-09SS5	5m

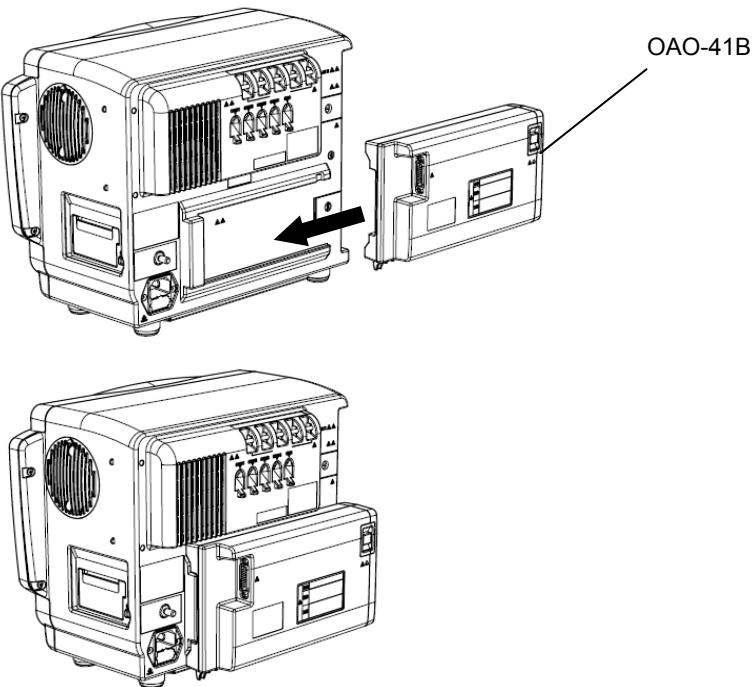
### 1 Remove the dummy cover located at the rear of the DS-7000.

Slide the cover off while pressing the release button.

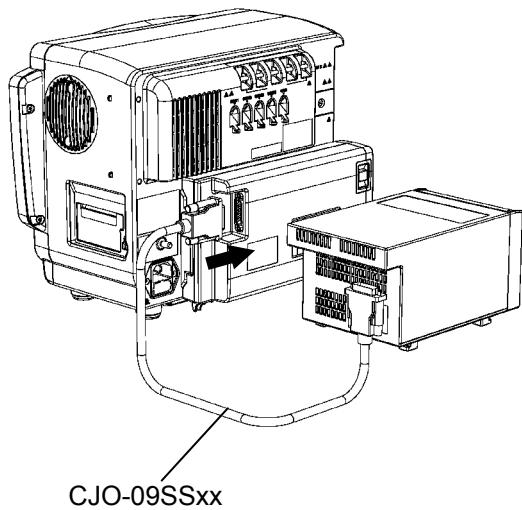


### 2 Attach the MGU IF Unit (OAO-41B) to the DS-7000 by sliding it on.

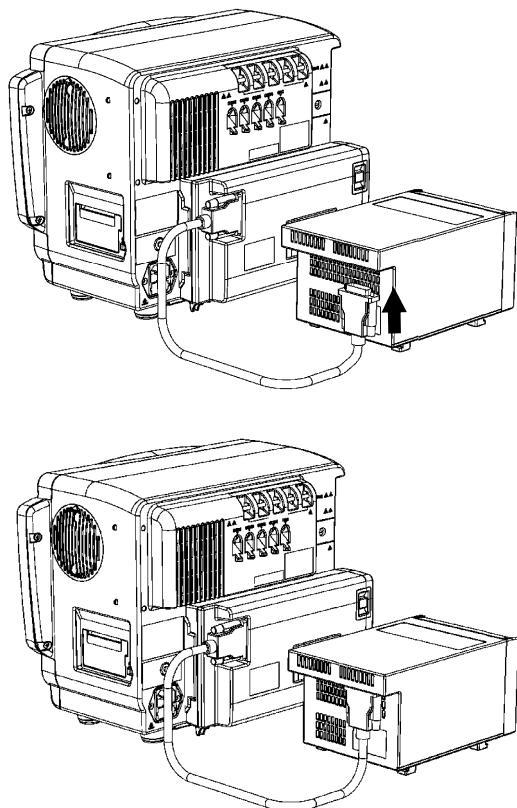
Push it until it is securely locked in to place.



**3 Connect the Unit Connection Cable (CJO-09SSxx) to the MGU IF Unit (OAO-41B).**



**4 Connect the other end of the Unit Connection Cable (CJO-09SSxx) to the MGU-800.**

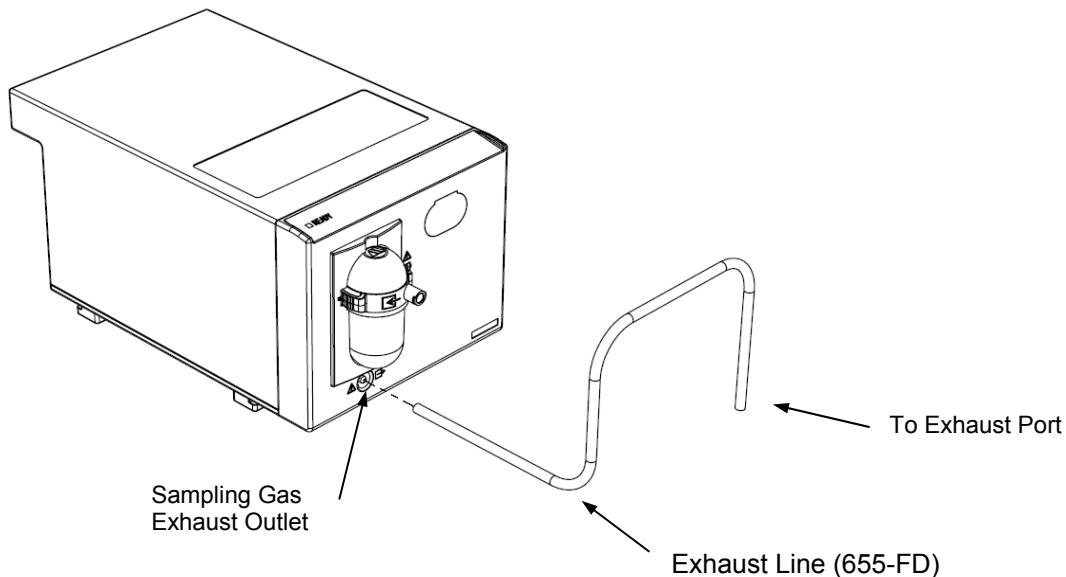


**CAUTION** When connecting with the Unit Connection Cable, make sure to secure the connector with screws.

## Exhaust Line Connection (MGU-801P/MGU-802/MGU-803)

### 1 Connect the exhaust line to the MGU-801P/802/803.

Connect one end of the exhaust line (Model Type: 655-FD) to the sampling gas exhaust outlet on the multigas unit, and the other end to the exhaust port of the facility.



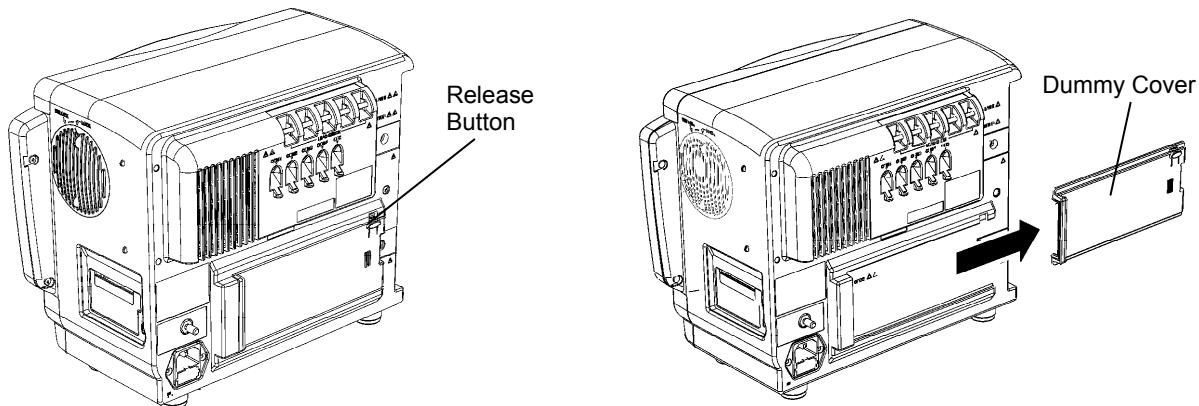
## Gas Unit I/F (HPD-800) Connection

### CAUTION

Make sure to turn OFF the DS-7000 system before connecting the Gas Module Interface Box (OAO-41B).

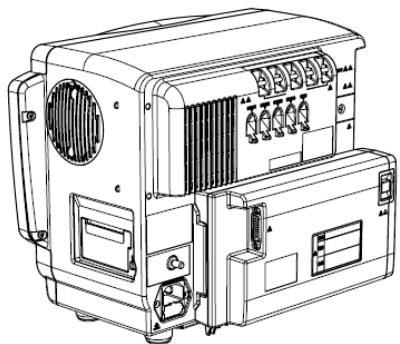
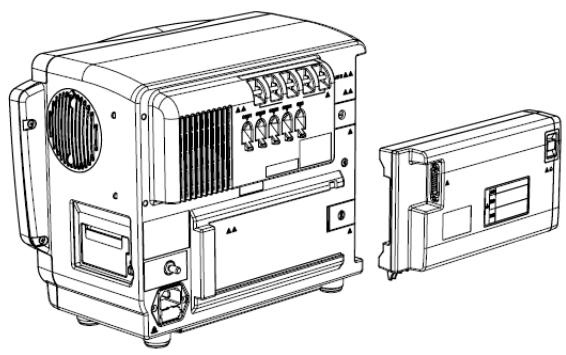
### 1 Remove the dummy cover located at the rear of the DS-7000.

Slide the cover off while pressing the release button.

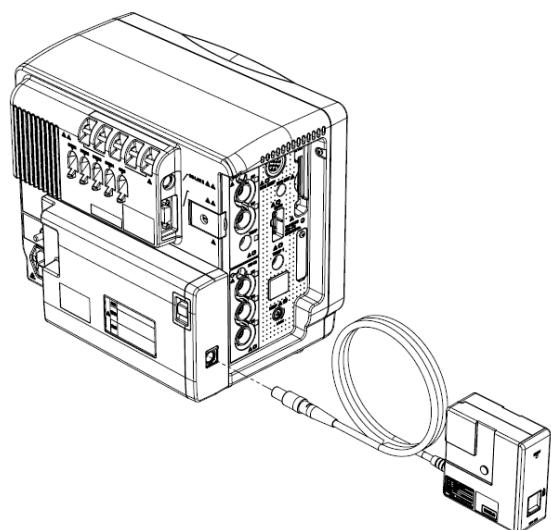


### 2 Attach the Gas Module Interface Box (OAO-41B) by sliding it on.

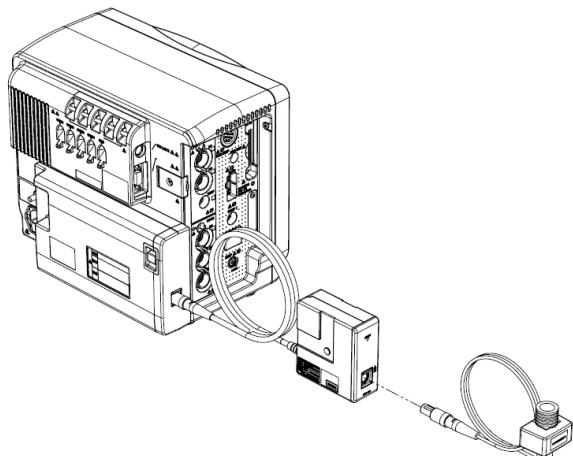
Push it in until it is securely locked into place.



**3** Connect the HPD-800 to the Gas Module Interface Box (OAO-41B).



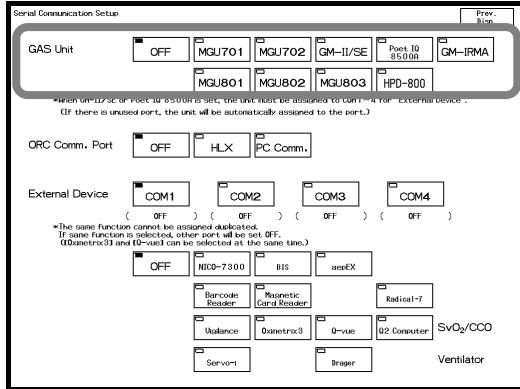
**4** Connect the CO<sub>2</sub> sensor (Capnosta 5) to the HPD-800.



# Gas Unit Selection

To display the gas data, the connecting gas unit type should be selected on the serial communication setup menu.

- 1 Press the **Menu** → **Initial Settings** → **Serial Comm.** keys.



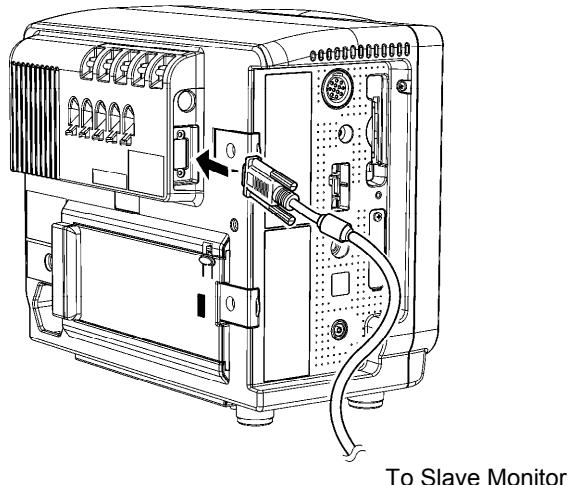
Select the connected gas unit type for “Gas Unit”.

When connecting the Capnostat 5, select **HPD-800**.



## Connecting a Slave Monitor

The DS-7000 is equipped with a video output connector for external monitoring which allows connecting a display unit via the analog RGB connection. When connecting, contact our service representative.



### Slave Monitor Specification

- A monitor satisfying the following condition should be used.
  - Resolution : XGA size (1024dot × 768dot)
  - Horizontal Frequency : 48.4kHz
  - Vertical Frequency : 60Hz
  - Cable Length : when connecting analog RGB monitor 10m (max) \*1

\*1 : For analog RGB connection, a commercial VGA cable is required.  
: If using a cable longer than 3m, use low-loss cable to maintain the performance.

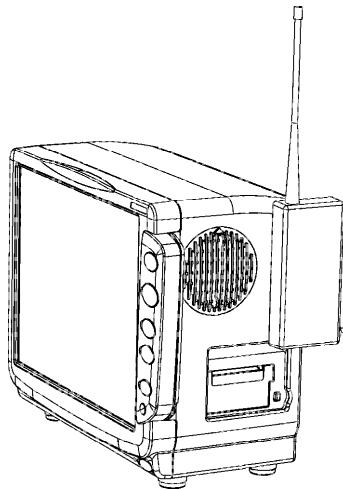
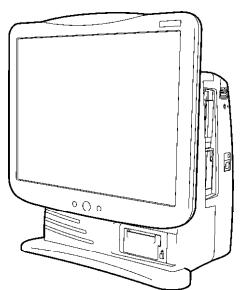
- Safety Standard : Should comply with IEC 60601-1-1, "Collateral Standard: Safety Requirements for Medical Electrical Systems"

## Wireless Network Construction

This section explains the procedure on how to use this equipment with a telemetry system.

By connecting the telemetry transmitter module (HLX-561), the DS-7000 can be connected to a wireless network system and display the data on the central monitor.

DS-7600 Series Central Monitor



DS-7000 Bedside Monitor

**DANGER**

When monitoring a patient with 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**

- 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.

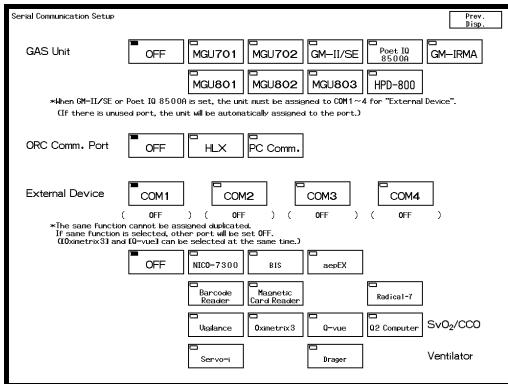
**CAUTION**

The setup of channel ID and group ID should be performed only by our service representative. Users should not perform this procedure as malfunction to the equipment may occur.

## To Attach the Telemetry Module

- 1 Connect the HLX-561 to the ORC connector on the rear of the DS-7000 using the optional OAO-23A Wire Adapter.

- 2 Press the **Menu** → **Initial Settings** → **Serial Comm.** keys.

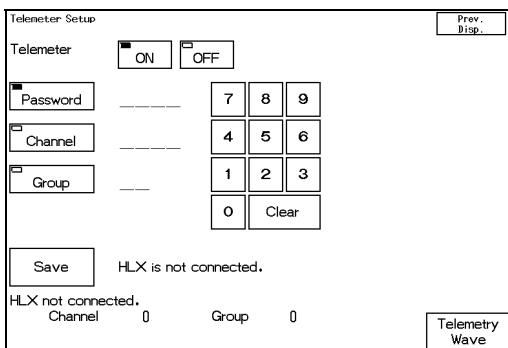


The serial communication setup menu will be displayed. Select **HLX** for "ORC Comm. Port".

## Channel ID/Transmitting Waveform Setup

Once the channel ID and group ID is set, the setting will remain even after power is turned OFF.

- 1 Press the **Menu** → **Initial Settings** → **Telemeter** keys.



The telemeter setup menu will be displayed.

- 2 Select ON/OFF for telemetry transmission.

Telemeter

<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
--	------------------------------

If **OFF** is selected, telemetry transmission will not be performed. The channel ID on the home display will be displayed as "ch OFF" and disappears afterwards. To perform telemetry transmission, select **ON**.

- 3 Set the password.

<input checked="" type="checkbox"/> Password	_____
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Press the **Password** key, and enter the password.

Use the numeric keypad to enter the password. The entered number will be displayed as "\*\*\*\*\*".

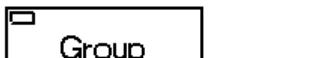
#### 4 Enter the channel ID.



Press the **Channel** key, and enter the channel ID.

Use the numeric keypad to enter the 4-digit medical telemetry channel ID. The set channel ID will be displayed on the upper left of the home display.

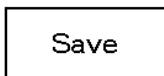
#### 5 Enter the group ID.



Press the **Group** key, and enter the group ID.

Use the numeric keypad to enter the group ID in the range of 00 to 63.

#### 6 Save the channel ID and group ID.



Pressing the **Save** key will store the channel ID and group ID.

Verify that the "Complete" message is displayed.

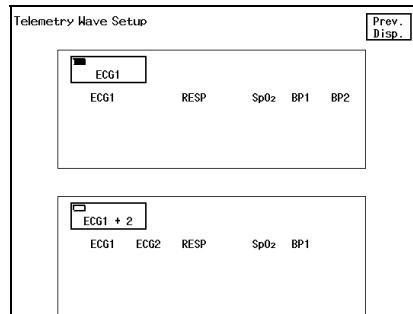
If an error is found on the password, channel ID, or group ID, the following message will be displayed.

- "Invalid password"** : The entered password is incorrect. Enter the password again and press the **Save** key.
- "Invalid data"** : The entered channel ID or group ID is outside the allowable range. Enter the ID again and press the **Save** key.

#### 7 Verify the stored channel ID and group ID.

Channel 1 0 0 2      Group 0

#### 8 Press the **Telemetry Wave** key to display the Telemetry Wave Setup menu.



Select the transmitting waveform from **ECG1** or **ECG1+2**.

**ECG1** will transmit ECG1, RESP, CO<sub>2</sub>, BP1, BP2, and SpO<sub>2</sub>. However, RESP waveform will not be transmitted if APNEA source is CO<sub>2</sub>.

**ECG1+2** will transmit ECG1, ECG2, RESP/CO<sub>2</sub>, BP1, and SpO<sub>2</sub>.

One of the waveform from CO<sub>2</sub> and RESP will be transmitted depending on the Apnea source selection.

<b>CAUTION</b>	<ul style="list-style-type: none"> <li>● 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.</li> <li>● BP waveform with a scale above the programmed scale cannot be properly transmitted. When transmitting BP waveform, check the displayed BP waveform scale.</li> <li>● On a wireless network system, O<sub>2</sub>, N<sub>2</sub>O, AGT alarm will not be transmitted to the central monitor.</li> </ul>
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<b>NOTE</b>	<p>When the monitor indicates that the measurement data is out of range ("× × ×" display), the minimum or maximum value of the range will be displayed at the central monitor.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th><th style="text-align: center;">【Out of Range】</th><th style="text-align: center;">【Central Monitor】</th></tr> </thead> <tbody> <tr> <td>HR</td><td style="text-align: center;">301bpm and above</td><td style="text-align: center;">Calculates based on ECG waveform.</td></tr> <tr> <td>RR</td><td style="text-align: center;">151Bpm and above</td><td style="text-align: center;">150Bpm</td></tr> <tr> <td>BP</td><td style="text-align: center;">–51mmHg and below 301mmHg and above</td><td style="text-align: center;">Calculates if impedance respiration. –50mmHg 300mmHg</td></tr> <tr> <td>TEMP</td><td style="text-align: center;">–0.1°C and below 50.1°C and above</td><td style="text-align: center;">0°C 46.1°C</td></tr> </tbody> </table> <p>*For temperature, the measurement range is up to 50.1°C. But at the central monitor, 46.1°C will be the maximum value displayed.</p>		【Out of Range】	【Central Monitor】	HR	301bpm and above	Calculates based on ECG waveform.	RR	151Bpm and above	150Bpm	BP	–51mmHg and below 301mmHg and above	Calculates if impedance respiration. –50mmHg 300mmHg	TEMP	–0.1°C and below 50.1°C and above	0°C 46.1°C
	【Out of Range】	【Central Monitor】														
HR	301bpm and above	Calculates based on ECG waveform.														
RR	151Bpm and above	150Bpm														
BP	–51mmHg and below 301mmHg and above	Calculates if impedance respiration. –50mmHg 300mmHg														
TEMP	–0.1°C and below 50.1°C and above	0°C 46.1°C														

# Wired Network Construction

This section describes the procedure on how to use this monitor on a wired system.  
There are following 2 types of DS-7000 system wired network composition.

## 1) DS-LANII Network Connection

The central monitor (DS-7600, DS-5700, etc.) with central ID “1” will function as the network administrator.

## 2) DS-LANIII Network Connection

The central monitor (DS-7600, etc.) with central ID “1” will function as the network administrator.



The setting for the wired network (DS-LANII/ DS-LANIII) can be performed on the “Initial Settings”.  
For procedure, refer to “9. Initial Settings DS-LAN Setup”.

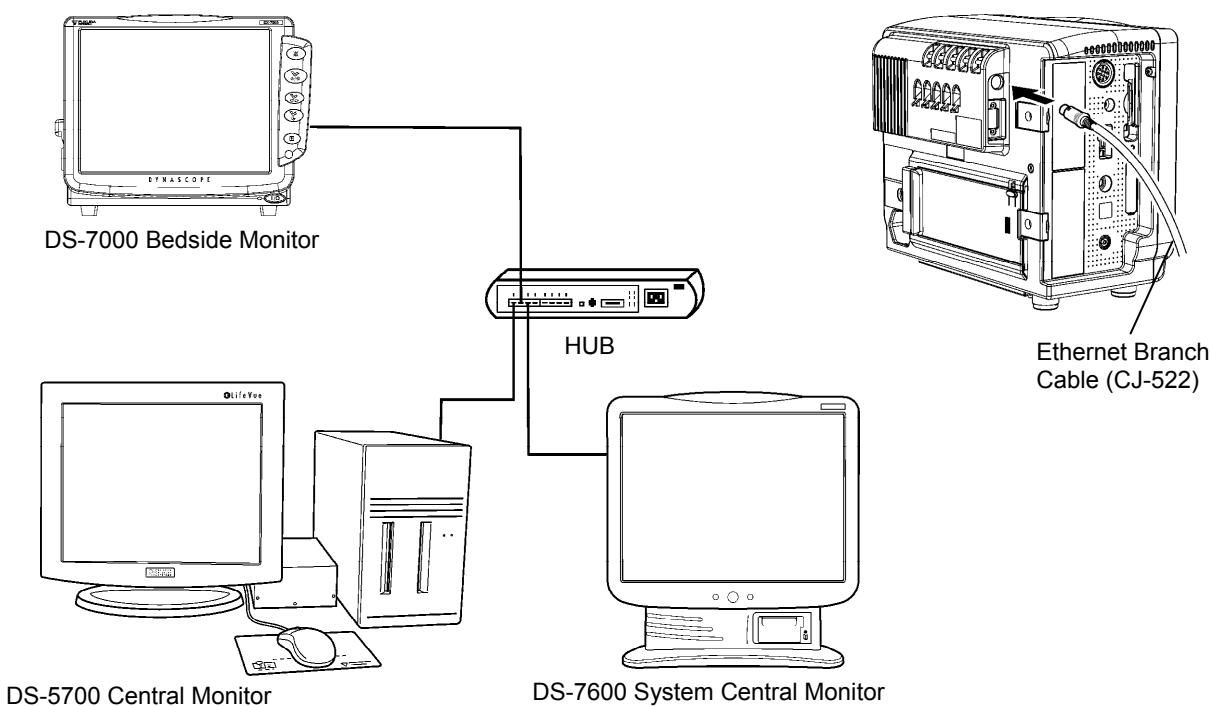


- Do not connect unspecified device to the wired network.
- Do not mix devices with DS-LANII and DS-LANIII setting in the same wired network. The network may cease and proper monitoring may not be possible.

## DS-LANII Connection

By connecting a LAN cable to the DS-LAN connector on the main unit (DSC-7000), a wired network can be constructed.

The DS-7600 system, DS-5700, and other central monitor with the central ID “1” will function as the network administrator.



Do not connect unspecified device to the wired network.

 CAUTION

- The OR ID is factory set to “000”. If connected to a wired network with the bed ID unchanged, monitoring on the central monitor will not be possible.
- When connecting to the DS-LAN II network, make sure that there are no other bedside monitors with the same BedID/OR ID. If there are more than one bedside monitors with the same OR ID, the duplicated bedside monitors cannot be monitored on the central monitor.
- When connecting to the DS-LAN II network, set the OR ID in the range from “001” to “048”.

NOTE

When the monitor indicates that the measurement data is out of range (“×××” display), the minimum or maximum value of the range will be displayed at the central monitor.

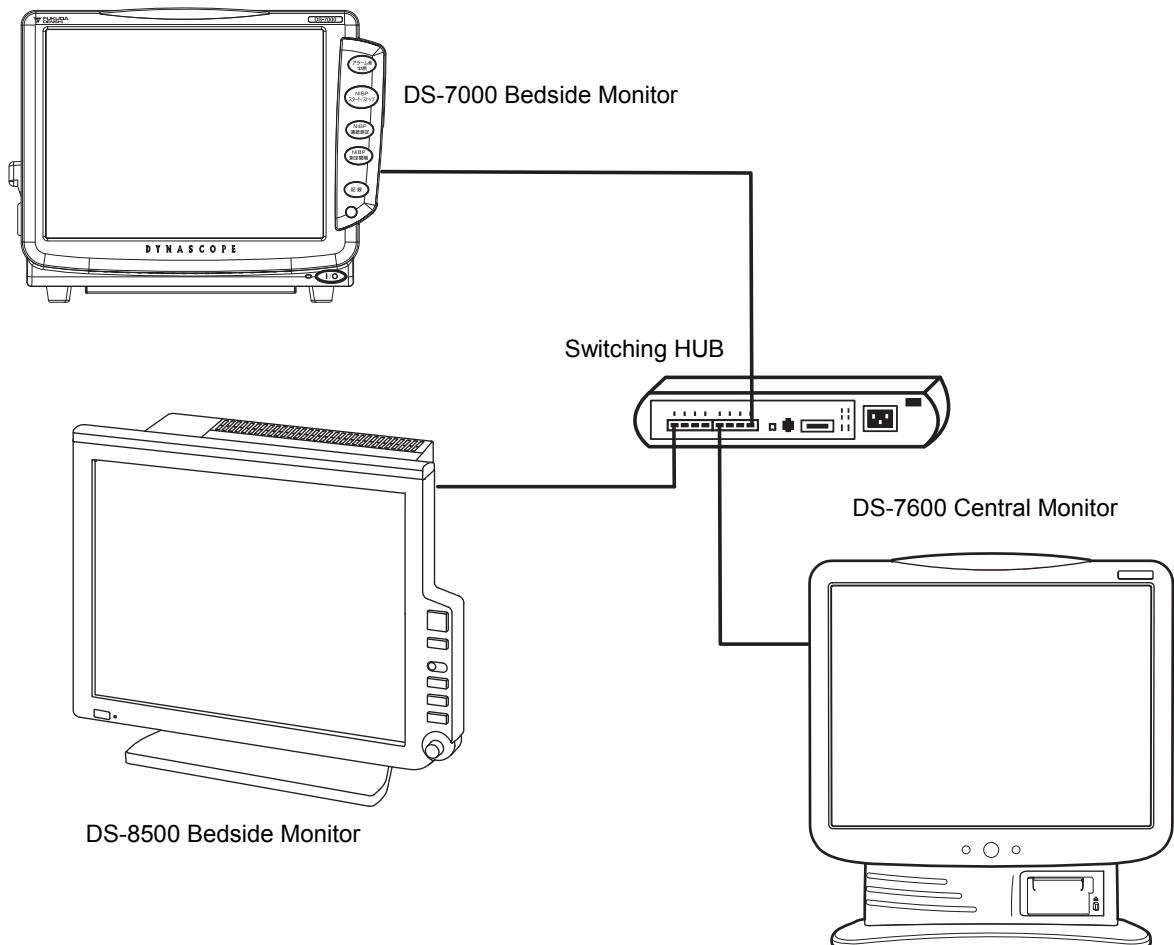
【Out of range】      【Central Monitor】

HR	301bpm or above	300bpm
RR	151Bpm or above	150Bpm
BP	–51mmHg or below 301mmhg or above	–50mmHg 300mmHg
TEMP	–0.1°C or below 50.1°C or above	0°C 50.0°C

## DS-LANIII Connection

By connecting a LAN cable to the DS-LAN connector on the DS-7000, a wired network can be constructed.

The DS-7600 system and other central monitor with the central ID “1” will function as the network administrator.

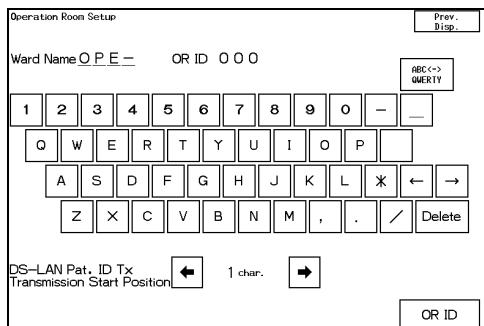


<b>CAUTION</b>	<ul style="list-style-type: none"><li>● In order to connect to the DS-LANIII network, the software version needs to be the version which supports the DS-LANIII. For details, refer to our service representative.</li><li>● Make sure that the “DS-LAN Setup” on all the bedside monitors and central monitors are set to <b>DS-LANIII</b> before connecting the monitors to the network.</li><li>● The two different network systems (DS-LANII and DS-LANIII) cannot exist in the same network.</li><li>● When connected to the DS-LANIII network, set the Bed ID in the range from “001” to “100”.</li><li>● If using a HUB for the DS-LANIII network construction, make sure to use a switching HUB recommended by Fukuda Denshi.</li></ul>
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## Ward Name /OR ID Setup

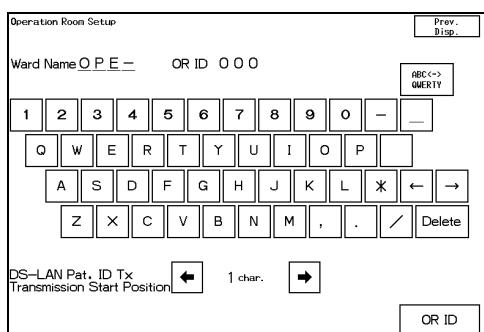
To connect to a wired network, it is necessary to set the ward name and the operating room ID.

- 1 Press the **Menu** → **Initial Settings** → **Operation Room** keys.



The Operation Room Setup menu will be displayed.

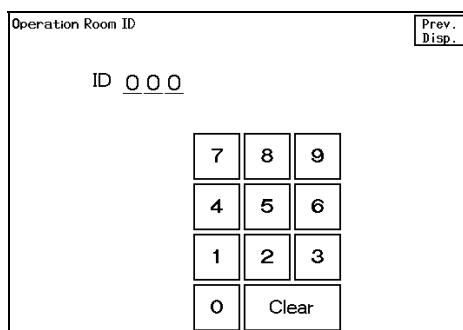
- 2 Set the "Ward Name".



Enter the Ward Name using the alphanumeric keypad.  
The entered ID will be displayed on the upper left of the screen.

Next, press the **OR ID** key to display the Operation Room ID menu.

- 3 Set the "Operation Room ID".



Enter the Operation Room ID using the numeric keypad.  
The entered ID will be displayed on the upper left of the screen.

When using on DS-LAN II network, set the ID in the range from 001 to 048.

- 4 Set the "DS-LAN Pat. ID Tx Transmission Start Position".

DS-LAN Pat. ID Tx Transmission Start Position 1 char.

On the DS-7000, patient ID of up to 20 digits can be set, but only 10 digits can be transmitted on a wired network (DS-LANII). This setup allows setting the starting digit of the 10 digits to be transmitted.

: The starting digit will shift to the left.

: The starting digit will shift to the right.

### NOTE

On the DS-7000, patient ID of up to 20 digits can be set, but only 10 digits can be transmitted on a wired network.

**⚠ CAUTION**

- When connecting to the DS-LAN network, perform “DS-LAN Setup” in the Initial Settings 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 Monitor 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/Monitor ID. If there are more than one bedside monitors with the same Bed ID/Monitor ID, the duplicated bedside monitors cannot be monitored on the central monitor.
- Make sure to set the Monitor ID in the following range.
  - For DS-LANII network: 001 to 048
  - For DS-LANIII network: 001 to 100
- On a wired network (DS-LANII/III) system, if the discharge procedure is performed on the central monitor, the alarm setting on the bedside monitor will be initialized to the value set on the “Admit Setup” of the central monitor.
- As the DS-7000 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-7000 system, it will be corrected to the time/date of the central monitor.
- On a wired network, the alarm generated on the bedside monitor 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.
- If the **[Alarm Silence]** key is pressed during generation of upper and lower NIBP alarm, the alarm sound and message will be suspended on the central monitor connected to the wired network.
- In case of DS-LANII network, if the “HR/PR Alarm Source” is PR, and “PR Source” is BP, ECG waveform will not be transmitted. On the central monitor, PR-IBP value will be displayed for HR. However, the HR value from ECG will be displayed on the NIBP list and ST measurement table. Refer also 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 Alarm Source” is other than **[Impedance]**, the RESP waveform will not be transmitted. If the “RR Alarm Source” is other than **[GAS]**, the CO<sub>2</sub> waveform will not be transmitted. 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-7000. Redrawing the ST display will return the display to normal.
- On the central monitor, the respiration waveform and RR value based on the RR/APNEA alarm source selected on the DS-7000 will be displayed. The RR and APNEA monitored on the central monitor and the DS-7000 will be the same.
- Precautions when connecting the DS-7000 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<sup>MB</sup> is used as a central monitor, recall, table/trend, data 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<sup>MB</sup> until 15 minutes elapses since the reference waveform is set on the DS-7000.
  - 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.
  - Arrhythmia alarm of TACHY, BRADY, COUPLET, PAUSE, TRIGEMINY will not be transmitted.

	<ul style="list-style-type: none"> <li>• Arrhythmia alarm of “SLOW VT” will be transmitted as “VT”.</li> <li>• 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.</li> <li>• If the DS-7600 system is used as the central monitor, O<sub>2</sub>, N<sub>2</sub>O, AGT alarm will not be generated on the central monitor.</li> <li>• For numeric data displayed as “xxx”, maximum or minimum value of measurable range will be transmitted.</li> <li>• The numeric data displayed as “---” will be treated as not measured data.</li> <li>• If the SpO<sub>2</sub> (PR_SpO<sub>2</sub>) lower alarm limit is set, and “---” is displayed for the SpO<sub>2</sub> (PR_SpO<sub>2</sub>) value due to a cause such as SpO<sub>2</sub> sensor off, etc. on the bedside monitor, it will be notified as SpO<sub>2</sub> (PR_SpO<sub>2</sub>) lower alarm on some central monitors even if the alarm is not generated on the bedside monitor.</li> <li>• If using a HUB for the DS-LANII network construction, make sure to use a repeater HUB recommended by Fukuda Denshi.</li> <li>● Precautions when connecting the DS-7000 to the DS-LANIII network. <ul style="list-style-type: none"> <li>• 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.</li> <li>• Make sure that the “DS-LAN Setup” on all the bedside monitors and central monitors are set to <b>DS-LANIII</b> before connecting the monitors to the network.</li> <li>• 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.</li> <li>• If using a HUB for the DS-LANIII network construction, make sure to use a switching HUB recommended by Fukuda Denshi.</li> <li>• The displayable waveform, numeric data, and alarm will differ depending on the central monitor model type. Refer to the operation manual for the respective central monitor.</li> </ul> </li> </ul>
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# Ventilator Connection

The DS-7000 system can be connected to a ventilator via serial connector. By connecting a ventilator, ventilator measurement data can be unified on the patient monitor. Also, ventilator alarm can be notified to the central monitor via telemetry or wired network.

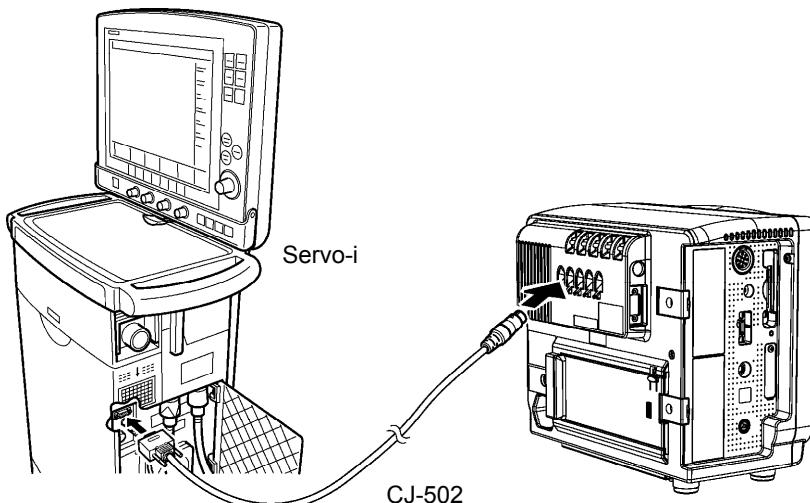
This section describes the procedure on how to connect the DS-7000 and a ventilator, and to input the ventilator measurement and alarm.

Ventilator	Ventilator Cable
Servo-i Ventilator	CJ-502

When connecting to a ventilator, check the corresponding software version of the ventilator.

Ventilator	Corresponding Version
Servo-i	v1.5 / v2.0 / v3.0

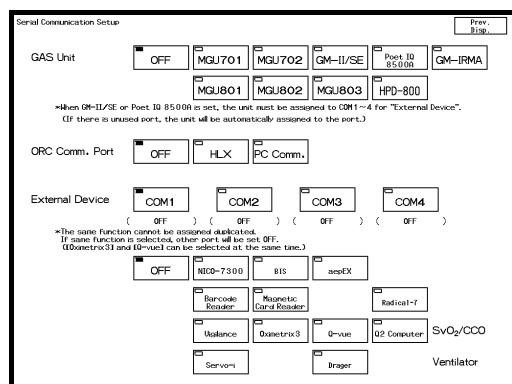
<b>CAUTION</b>	<ul style="list-style-type: none"><li>The ventilator operation should be performed by well-trained and authorized personnel.</li><li>For connecting the DS-7000 and a ventilator, use only the specified connection cable.</li><li>Verify that the DS-7000 and the ventilator are properly connected.</li><li>When connecting the cable, verify that the main power of the DS-7000 and the ventilator is OFF.</li></ul>
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## Ventilator Selection

To display the ventilator alarm, serial communication setup is required.

1 Press the **Menu** → **Initial Settings** → **Serial Comm.** keys.



The serial communication setup menu will be displayed. Select **Servo-i** for ventilator.

## Oximeter Connection

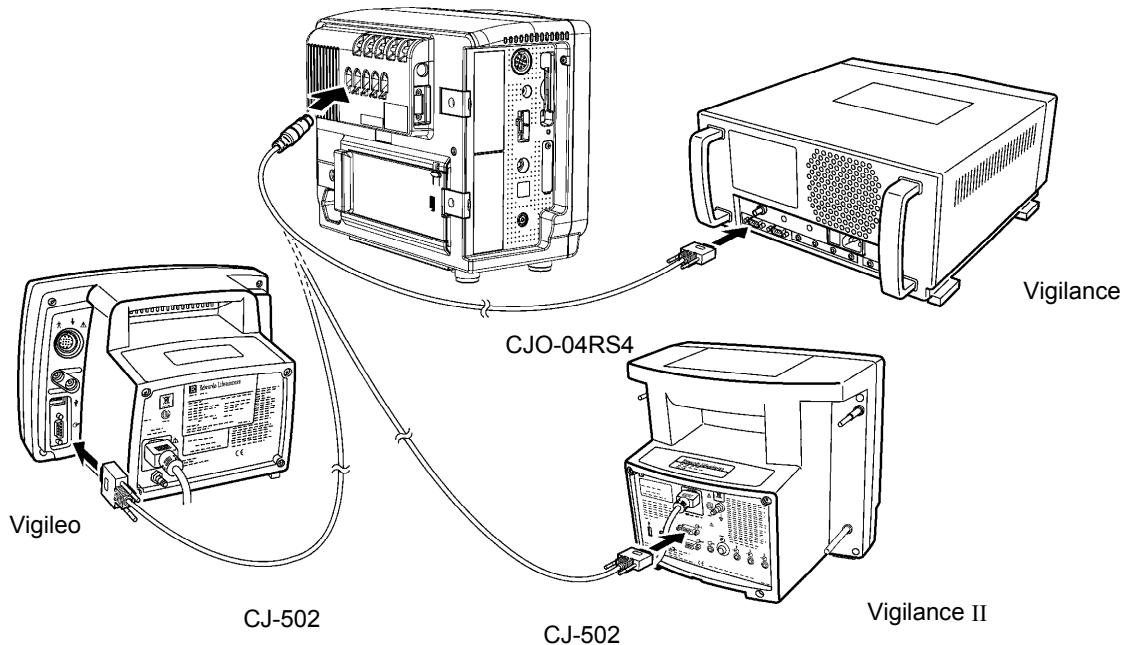
The DS-7000 can be connected to an oximeter and CCO measurement device via serial connector. By connecting an oximeter and CCO measurement device, oximeter data can be unified on the patient monitor. This section describes the procedure on how to connect the DS-7000 and an oximeter.

### Connecting the Oximeter

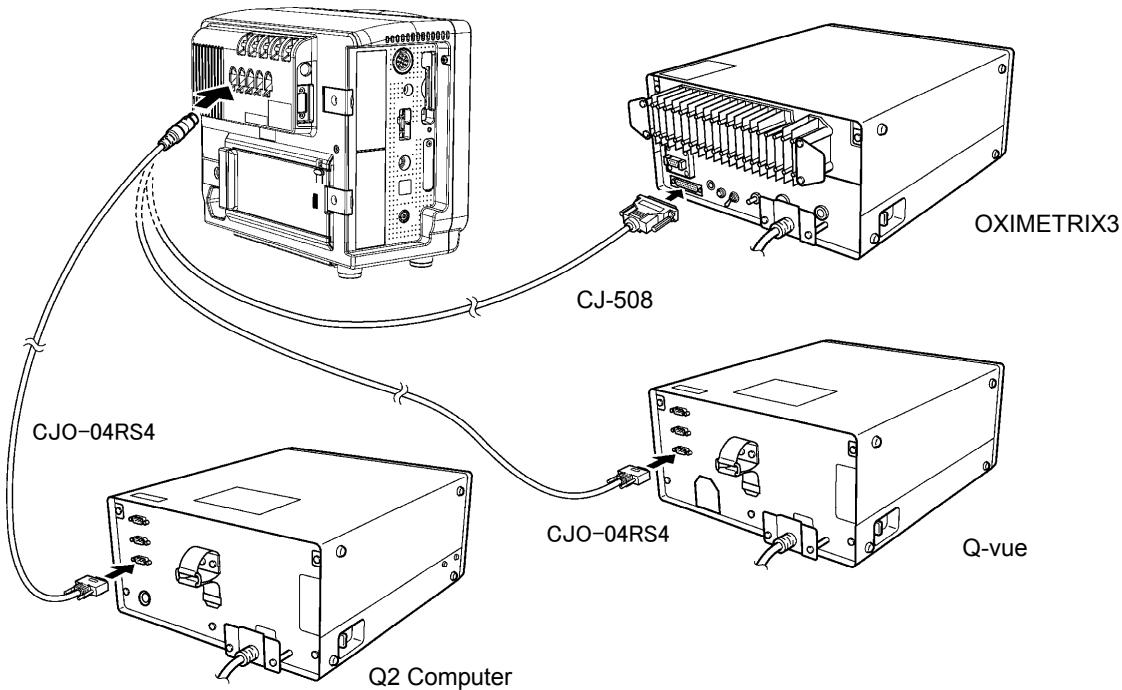
- 1 Connect the oximeter to the serial connector (COM1 to 4) on the DS-7000 using the following external output cable.

<i>Oximeter, CCO measurement Device</i>	<i>Oximeter Cable</i>
Vigilance	CJO-04RS4
Vigilance CEDV	CJO-04RS4
Vigilance II	CJ-502
Vigileo	CJ-502
OXIMETRIX3	CJ-508
Q-vue	CJO-04RS4
Q2 Computer	CJO-04RS4

#### 【Connection of Vigilance / Vigilance CEDV / Vigilance II / Vigileo】



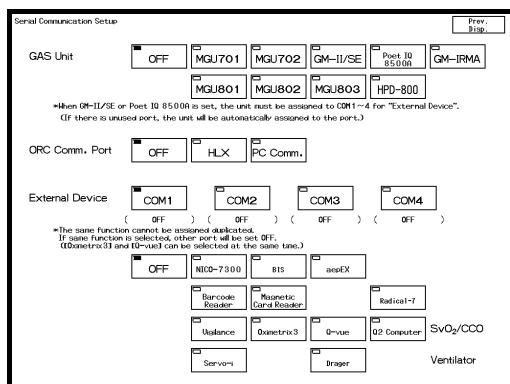
## 【Connection of OXIMETRIX3 / Q-vue / Q2 Computer】



## Oximeter Selection

To display the oximeter data, serial communication setup is required.

- 1 Press the **Menu** → **Initial Settings** → **Serial Comm.** keys.



First, select the port which the oximeter is connected from **COM1** to **COM4**, then select the connected device from **Vigilance** / **Oximetrix3** / **Q-vue** / **Q2 Computer**.

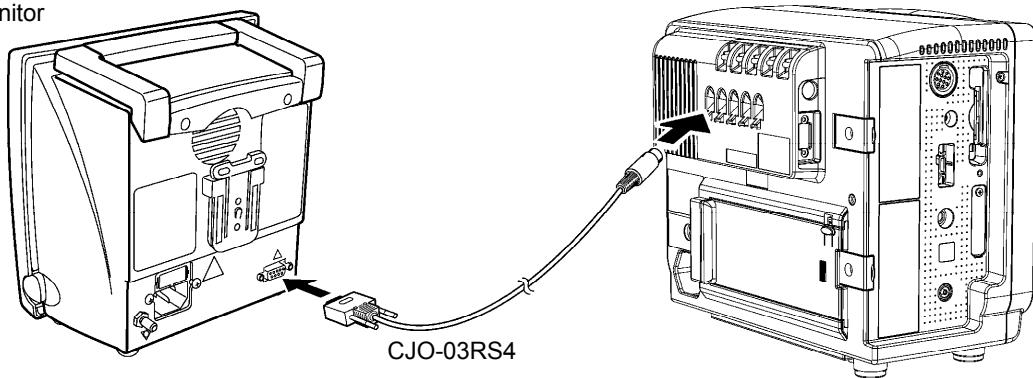
## BIS Monitor Connection

By connecting the A-2000 BIS Monitor (ASPECT® MEDICAL SYSTEMS), the patient's recovery condition from anesthesia can be monitored with numeric data.

## To Connect the BIS Monitor

- 1 Connect the serial connector (COM1 to 4) on the DSC-7000 and the serial port on the BIS monitor using the BIS connection cable (CJO-03RS4).

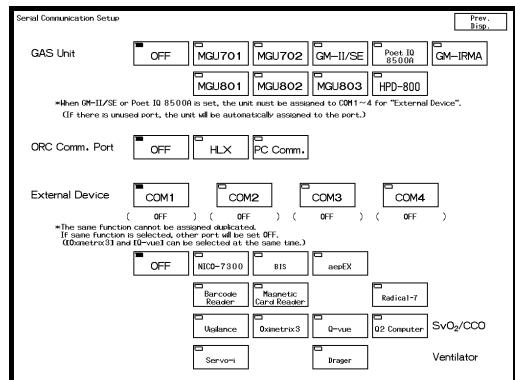
A-2000 BIS Monitor



## Serial Communication Setup

To display the BIS Monitor data, serial communication setup is required.

- 1 Press the **Menu** → **Initial Settings** → **Serial Comm. keys**.



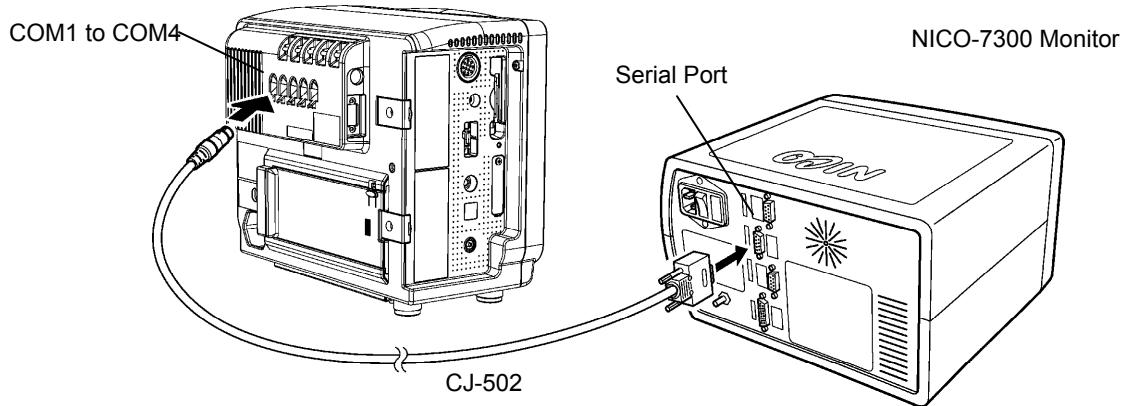
Select the port which the BIS Monitor is connected from **COM1** to **COM4**, then select **A-2000**.

## NICO Monitor Connection

By connecting the NICO-7300 (NOVAMETRIX<sup>®</sup>) Monitor, end-tidal CO<sub>2</sub> concentration, RR, arterial oxygen saturation, pulse rate, and other respiratory function can be monitored.

## Connecting the NICO Monitor

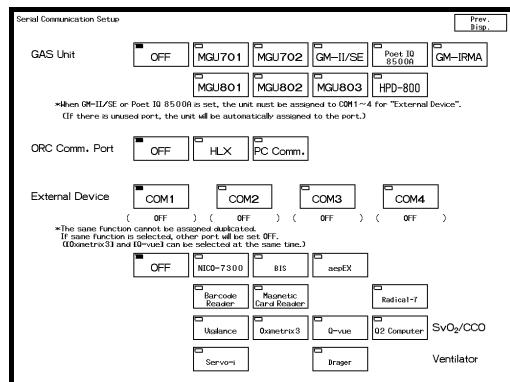
- 1 Connect the DSC-7000 and the NICO monitor using the CJ-502 cable.



## Serial Communication Setup

To display the NICO Monitor data, serial communication setup is required.

- 1 Press the **Menu** → **Initial Settings** → **Serial Comm.** keys.



Select the port which the NICO Monitor is connected from **COM1** to **COM4**, then select **NICO-7300**.

# Fabius GS Anesthesia System Connection

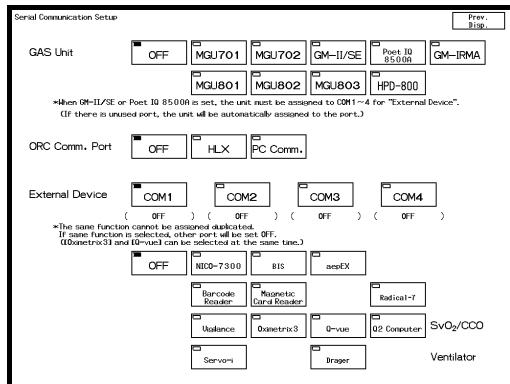
By connecting the Fabius GS anesthesia system (Dräger®), ventilator data can be monitored.

The Fabius GS anesthesia system can be connected to COM1 port at the rear of DS-7000 using the CJ-502 (or CJO-03RS4).

## Serial Communication Setup

To display the Fabius GS data, serial communication setup is required.

- 1 Press the **Menu** → **Initial Settings** → **Serial Comm.** keys.



Select **COM1**, then select **Dräger**.

# Radical-7 Pulse Oximeter Connection

By connecting the Radical-7 Pulse Oximeter (Masimo®), oxygen saturation, carboxyhemoglobin, methemoglobin can be monitored.

The Radical-7 can be connected to the serial connector (COM1 to COM4) at the rear of DS-7000 using the CJO-03RS4 connection cable.

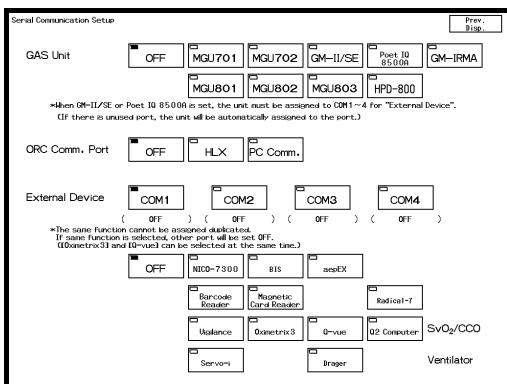
## NOTE

- When connecting the Radical-7, the serial interface setting on the Radical-7 should be set to ASCII 2. For setup procedure, refer to the operation manual of Radical-7.
- Depending on the software version of Radical-7 (Handheld or Docking Station), connection to the DS-7000 may not be possible. For details of the software version, refer to our service representative.

## Serial Communication Setup

To display the Radical-7 data, serial communication setup is required.

1 Press the [Menu] → [Initial Settings] → [Serial Comm.] keys.



Select the port which the Radical-7 is connected from [COM1] to [COM4], then select [Radical-7].



## Magnetic Card Reader Connection

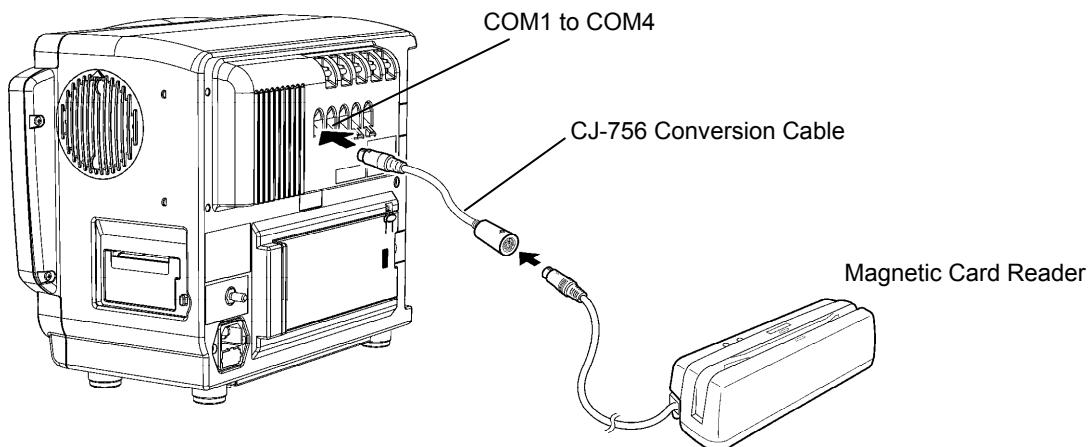
By using the magnetic card reader, patient information can be automatically entered from the magnetic card at patient admittance.

**NOTE**

The magnetic card reader and bar code reader cannot be used simultaneously.

## To Connect the Magnetic Card Reader

- 1 Connect the magnetic card reader to the serial connector (COM1 to COM4) on the rear side of the monitor via conversion cable (CJ-756).



# Magnetic Card Reader Setup

**1** Press the **Menu** → **Initial Settings** → **Serial Comm.** keys.

Serial Communication Setup		Free Bus	
GAS Unit	<input checked="" type="checkbox"/> OFF	<input type="checkbox"/> MGUJ0701	<input type="checkbox"/> MGUJ0702
		<input type="checkbox"/> GM-II/SE	<input type="checkbox"/> Port ID 85.00R
		<input type="checkbox"/> MGUJ0801	<input type="checkbox"/> GM-IRMA
		<input type="checkbox"/> MGUJ0802	<input type="checkbox"/> HDP-800
		<input type="checkbox"/> MGUJ0803	
			→ When GM-II/SE or Port ID 85.00R is set, the unit must be assigned to COM1-4 for "External Device". (If there is unused port, the unit will be automatically assigned to the port.)
ORC Comm. Port	<input checked="" type="checkbox"/> OFF	<input type="checkbox"/> HLX	<input type="checkbox"/> PC Comm.
External Device	<input type="checkbox"/> COM1	<input type="checkbox"/> COM2	<input type="checkbox"/> COM3
	(      OFF      )	(      OFF      )	(      OFF      )
	(      OFF      )	(      OFF      )	(      OFF      )
	*The same function cannot be assigned each other. If more than one function is selected, the port must be set OFF. (Dionex/31 and Q-valve can be selected at the same time.)		
	<input type="checkbox"/> OFF	<input type="checkbox"/> NDCO-7300	<input type="checkbox"/> 8IS
			<input type="checkbox"/> seqEX
		<input type="checkbox"/> Barcode Reader	<input type="checkbox"/> Biostat-Dual Reader
		<input type="checkbox"/> Valence	<input type="checkbox"/> Dionex/3
		<input type="checkbox"/> Server	<input type="checkbox"/> 0-mve
			<input type="checkbox"/> 02 Computer
			<input type="checkbox"/> Brager
			SvO2/CCO
			Ventilator

Select the port which the magnetic card reader is connected from **COM1** to **COM4**, then select **Magnetic Card Reader**.

**2** Press the **Prev. Disp.** key to return to the “Initial Settings” screen, and press the **Magnetic Card** key to display the magnetic card reader setup screen.

### **3 Perform setup on the first page of the magnetic card reader setup screen.**

On this screen, starting and ending position of each data such as **Pat. ID**, **DOB : Year** can be set.

From: Starting digit number of the data to be read from the magnetic card  
To: Ending digit number of the data to be read from the magnetic card

To analyze the data on the magnetic card, proceed to step 4.  
If not analyzing the data on the magnetic card, proceed to step 5.

#### **4 Analyze the starting and ending digit of the data read from the magnetic card.**

The analyzing procedure is explained using the example of patient data below.

Patient ID : 1234567890  
Patient Name : FUKUDA DENSHI  
Date of Birth : Jan. 1, 1950  
Sex : Male

- 1) Open the first page of the magnetic card reader setup screen, and scan the magnetic card.  
At the first and second row, the data read from the card will be displayed in hexadecimal.  
At the third row, the characters converted from the data will be displayed.

### Digit Number

Data read from  
the card  
(displayed in  
code)

2) From the displayed result, specify the data position.

[Patient ID]

The patient ID, “1234567890” is displayed at 1st to 10th digit.

1  
12345678901  
33333333334  
12345678906  
12345678907

[Patient Name]

The patient name, "(FUKUDA) (DENSHI)" is displayed at 11th to 23th digit. Depending on the length of patient name, up to 59th digit may be used. "( )" should be also included in the digit range.

2  
1234567890123456  
4545442444544222  
65B541045E389000  
EUKUDA DENSHI

3  
 78901234  
 33333333  
 19500101  
**19500101**

[Date of Birth]

The date of birth, "19500101" is displayed at 27th to 34th digit.

3  
 78901234567  
 33333333444  
 19500101D5E  
**19500101MEN**

[Sex]

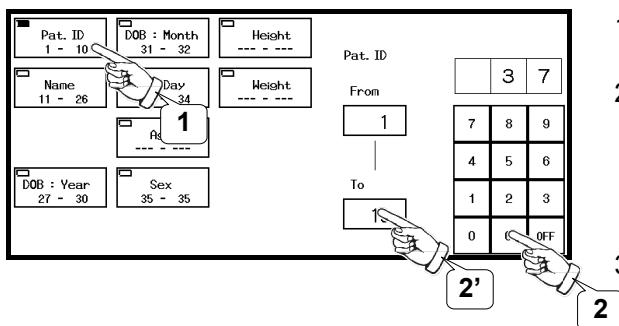
"MEN" which is displayed at the 35th to 37th digit can be estimated as the character string for male.

It will be more definite if compared with the data of female.

- 3) The setup will be performed with the analyzed result. Proceed to Step 6.

After the setup, check if the data of other patient's card can be correctly read.

## 5 Enter the starting digit and ending digit for each data.



- 1) Select the data from pressing the key displayed at the left.
- 2) Enter the starting digit or ending digit in the range of 0 to 999 using the numeric key pad, and press the corresponding key. If the data is not present on the magnetic card, enter **OFF** for both starting and ending digit.
- 3) Repeat step 1) and 2).

## 6 Press the **Page Down** key.

The second page of the magnetic card reader setup screen will be displayed.

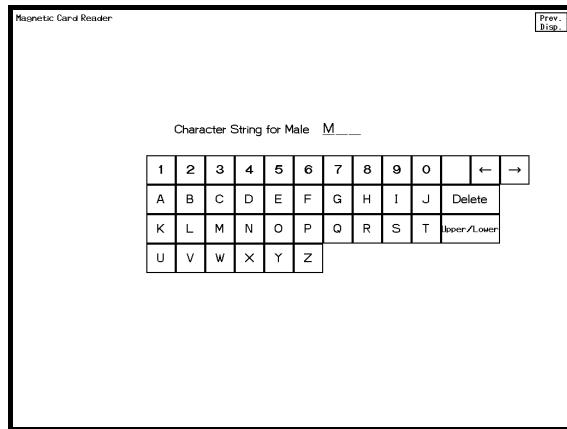
Magnetic Card Reader 2/2	<b>Page Up</b>	<b>Prev. Disp.</b>
Sex (Character String for Male)		
<b>MEN</b>		
Read ID Process		
<input type="checkbox"/> None	<input type="checkbox"/> Numeric	<input type="checkbox"/> Alphanumeric



Sex:

Specify the character string to indicate "Male". Pressing the key will display the alphanumeric key pad.

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



Read ID Process:

From the patient ID (code) read from the magnetic card, select which part of the code to be set as the patient ID.

**None** will set the whole range of the read patient ID code as the patient ID.

**Numeric** will set only the numeric part of the read patient ID code as the patient ID.

**Alphanumeric** will set only the alphanumeric part of the read patient ID code as the patient ID.

## To Read the Patient Data from Magnetic Card

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For procedure to admit the patient using the magnetic card, refer to "5 Admit/Discharge of a Patient Admitting a Patient To Enter the Patient Information from the Magnetic Card or Bar Code".

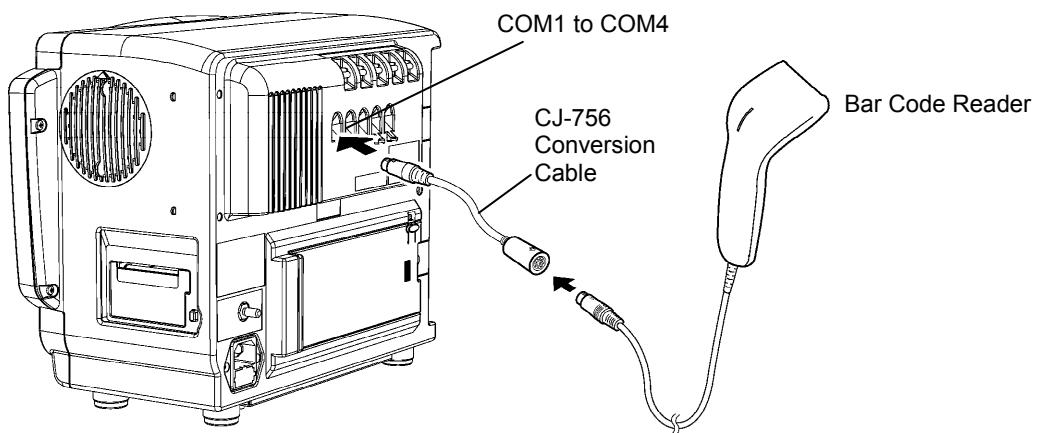
## Bar Code Reader Connection

By using the bar code reader, the patient information can be acquired from the bar code on the patient's registration card.

NOTE	The magnetic card reader and bar code reader cannot be used simultaneously.
------	---

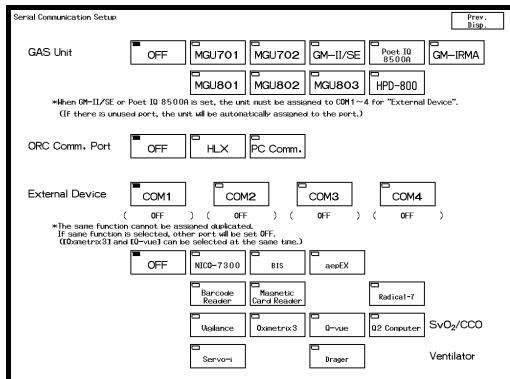
### To Connect the Bar Code Reader

- 1 Connect the bar code reader to the serial connector (COM1 to COM4) on the rear side of the monitor via conversion cable (CJ-756).



## Bar Code Reader Setup

- 1 Press the **Menu** → **Initial Settings** → **Serial Comm.** keys.



Select the port which the bar code reader is connected from **COM1** to **COM4**, then select **Bar Code Reader**.

- 2 The procedure to set the bar code reader is the same as magnetic card reader.



For procedure, refer to “Magnetic Card Reader Setup” in this chapter.

### [1st Page of Magnetic Card Reader Setup]

### [2nd Page of Magnetic Card Reader Setup]

## To Read the Patient Data from Bar Code



For procedure to admit the patient using the bar code, refer to “5 Admit/Discharge of a Patient Admitting a Patient To Enter the Patient Information from the Magnetic Card or Bar Code”.

## Chapter 9

# Initial Settings

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## About the Initial Settings Menu

The “Initial Settings” menu allows setting the items which should be set before monitoring a patient.

Initial Settings				Prev. Disp.
Serial Comm.	Alarm Mode	Display Mode	User Key	
Menu	Key Mask	BP User Label	TEMP User Label	
Unit	Telemeter	Telemetry Wave	Remote Control	
Alarm Indicator	Password	Operation Room	Discharge Mode	
Night Mode	F-Key Color	MAC Value	Arrhythmia Analysis	
Magnetic Card Reader	DS-LAN	Source Setup		

For the following items, refer to Chapter 8.



- **Telemeter**, **Telemetry Wave**  
→ “8. Installation –Wireless Network Construction– Channel ID/Transmitting Waveform Setup”
- **Operation Room**  
→ “8. Installation –Wired Network Construction– Hospital Name/OR ID Setup”

# Alarm Mode Setup

This section explains the procedure to program the alarm mode.

## About the Alarm Mode

On the DS-7000, 5 patterns of alarm mode for each patient classification can be programmed according to the monitoring purpose.

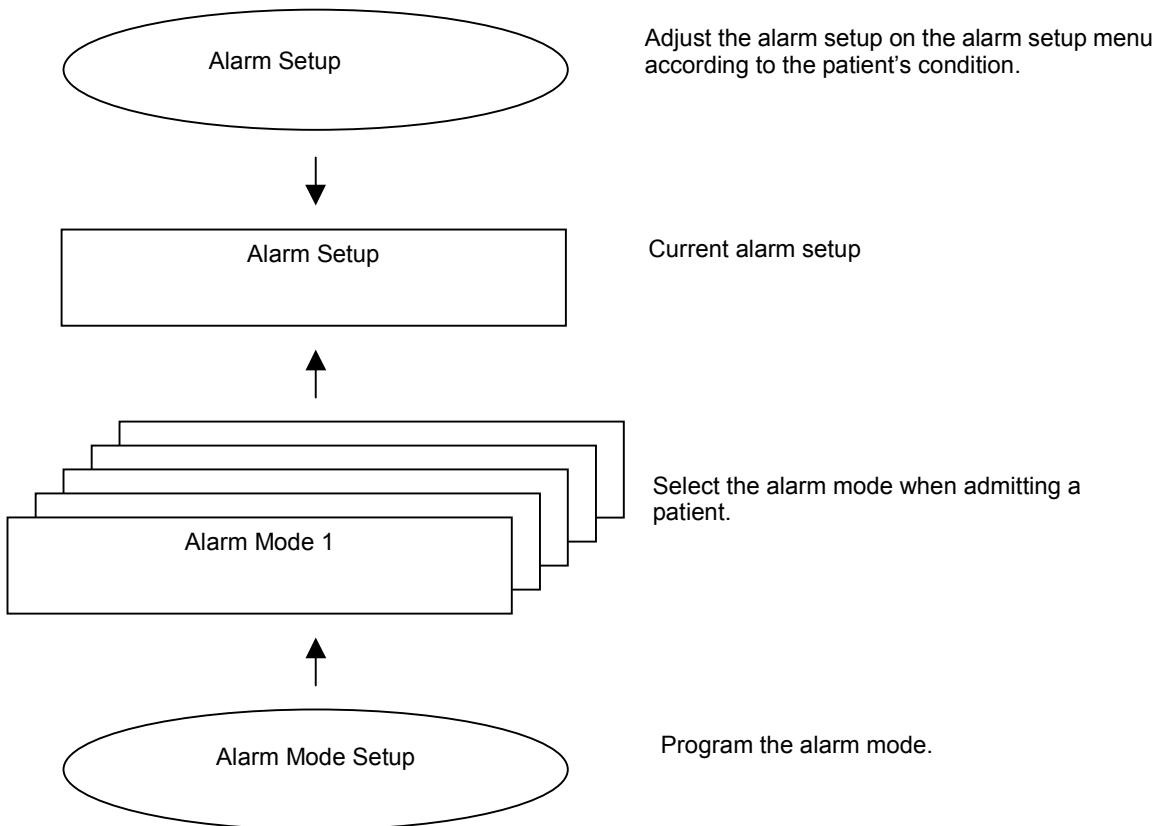
Setting all the alarm condition each time the patient is admitted may be troublesome.

To simplify this procedure, 5 patterns of alarm mode other than the default setting can be programmed according to the monitoring purpose.

The alarm mode can be programmed for each patient classification (adult, child, neonate) which will allow to easily change the alarm setting when the patient classification is changed.

By preprogramming the setups to each alarm mode, alarm setups at admitting procedure can be simplified by just selecting one alarm mode.

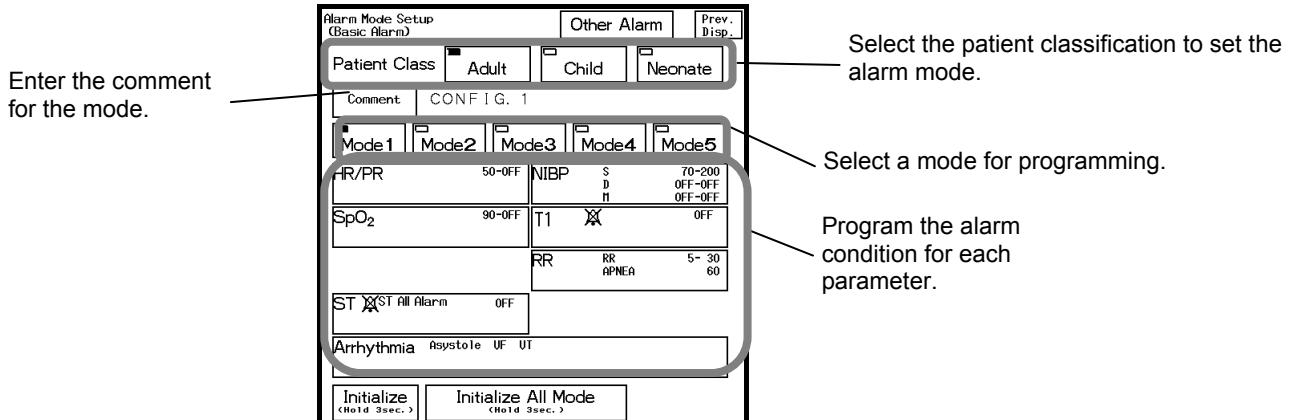
It is recommended to program the alarm mode in rough classification such as patient's age, monitoring purpose (ICU or surgery), and if necessary, perform a unique setup for each patient.



## 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** → **Initial Settings** → **Alarm Mode** keys.



If the setup data of V06-01 and prior on the CF card is written to the DS-7000 or V07-01 and newer, the alarm settings for child and neonate will be initialized. For adult, alarm settings on the CF card will be applied.

### NOTE

On the alarm mode setup menu, the setup for the 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.



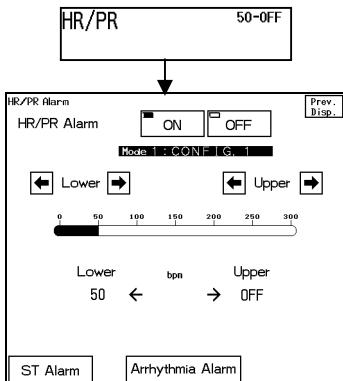
Select a mode to program the alarm condition.

- 3 Select the patient classification.



Select the patient classification to set the alarm mode.

- 4 Program the alarm condition.

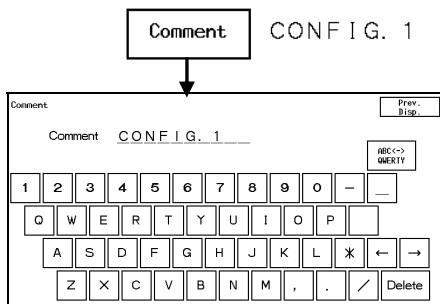


The programmed alarm condition will be displayed inside the numeric data key.

The programmed value and alarm OFF mark will be displayed simultaneously.

Pressing the numeric data key will display the alarm setup menu which allows changing the alarm condition.

## 5 Enter a comment.



Pressing the **Comment** key will display the keyboard display. Enter a comment using the keyboard.

## 6 The programmed alarm mode can be initialized to factory default setting.



The currently selected alarm mode will be initialized.



All alarm modes will be initialized.

# Display Mode Setup

This section describes the procedure to program a mode for display configuration.

## About the Display Mode

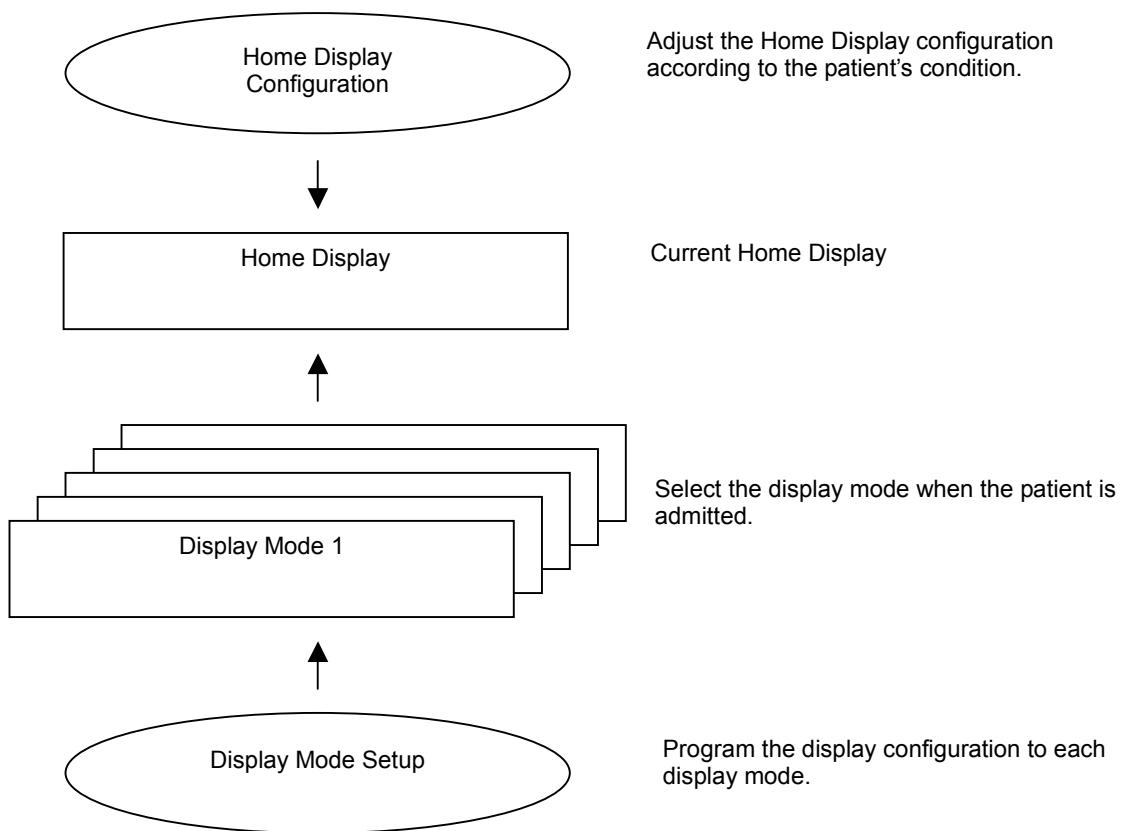
On the DS-7000 system, 5 patterns of display configuration can be programmed according to the monitoring purpose.

Setting the display configuration each time the patient is admitted or each time a parameter is added or deleted may be troublesome.

To simplify this procedure, 5 patterns of display configuration other than the 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 one display mode.

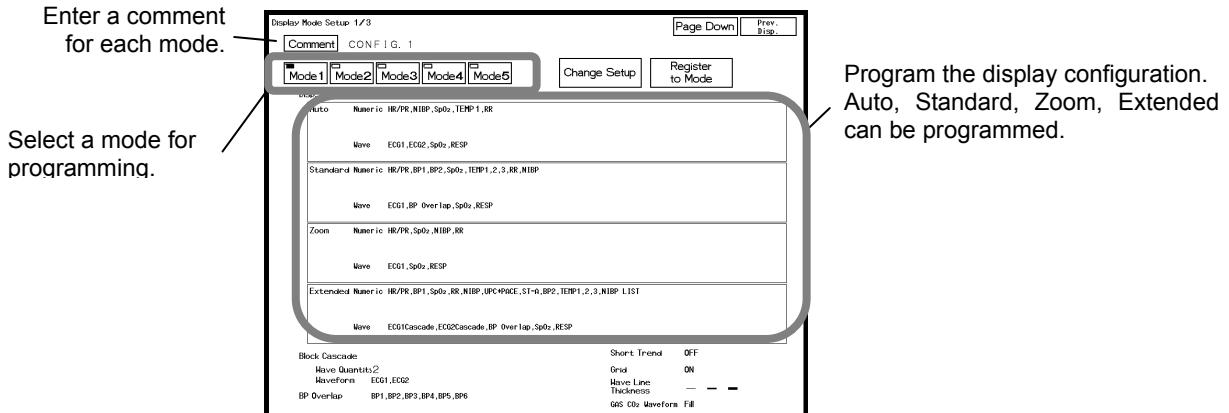
It is recommended to program the display mode in rough classification such as patient's condition, monitoring purpose (ICU or surgery), and if necessary, perform a unique setup for each patient.



## 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** → **Initial Settings** → **Display Mode** keys.



- 2 Select a mode for programming.



Select a mode to program the display configuration.

**NOTE**

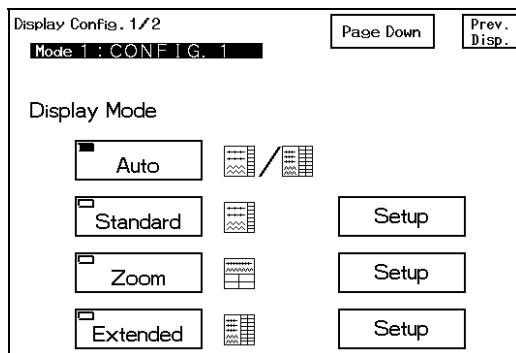
On the display mode setup menu, the setup for the currently selected mode will be displayed. Changing the mode and returning to the home display will set the display configuration to the setup of the last selected mode.

- 3 Set the home display configuration for the selected mode.

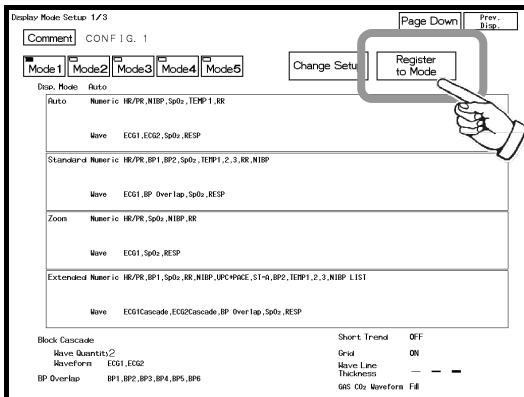
**Change Setup**

To change the setting, press the **Change Setup** key.

On the home display configuration setup menu, change the display configuration.

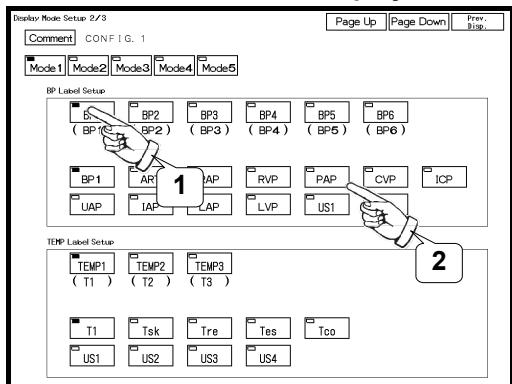


For display configuration setup procedure, refer to "4. Monitoring Setup –Display Configuration Setup–".



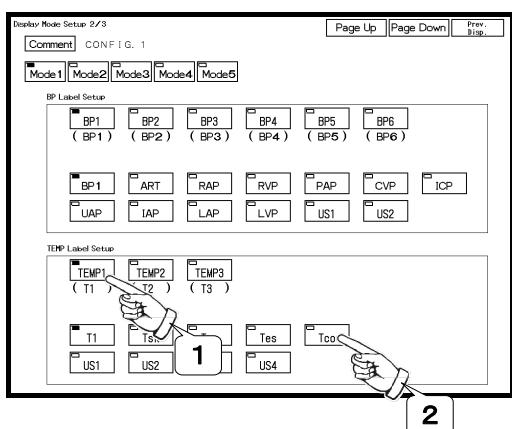
Pressing the **Register to Mode** key will register the current display configuration setup to the display mode (1 to 5) selected at procedure 2.

#### 4 Press the **Page Down** key to display the second page of the display mode setup menu. Set the BP label for each display mode.



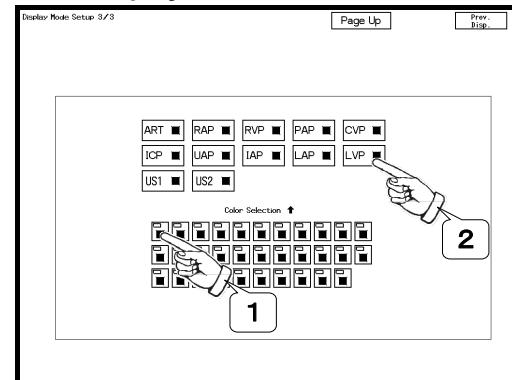
- 1) Select the BP channel to set the label.
- 2) Select the BP label for the channel selected on step 1).
- 3) Repeat step 1 and 2).

#### 5 Set the TEMP label for each display mode.



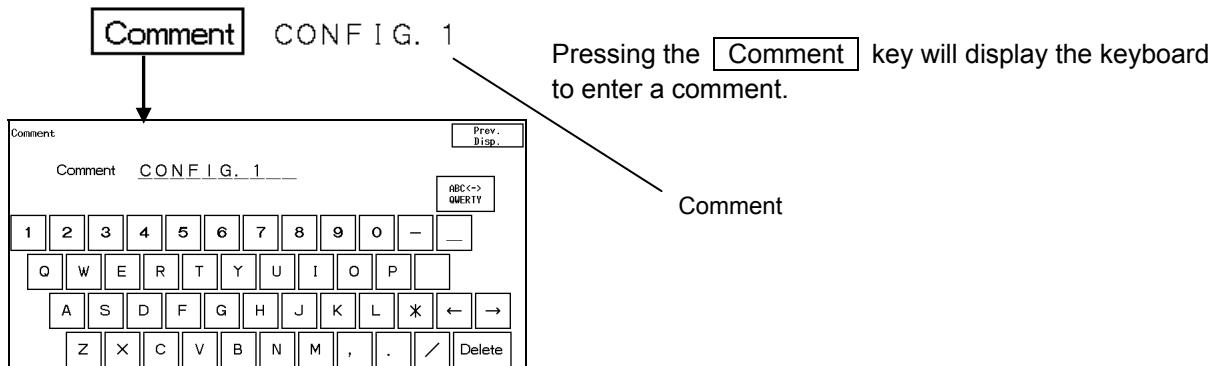
- 1) Select the TEMP channel to set the label.
- 2) Select the BP label for the channel selected on step 1).
- 3) Repeat step 1 and 2).

#### 6 Press the **Page Down** key to display the third page of the display mode setup menu. Set the display color for each BP label.



- 1) Select the BP label to set the color.
- 2) Select the color for the BP label selected on step 1)
- 3) Repeat step 1 and 2).

## 7 Enter a comment.



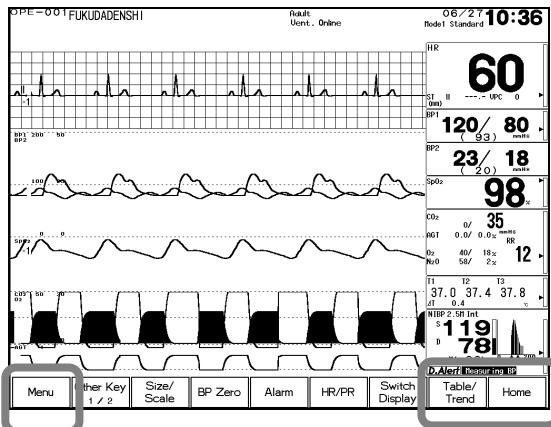
### NOTE

The BP label, TEMP label, and label color set on the display mode setup menu will be effective when [Disp. Mode] is set for “Label Setup at Discharge/Change of Disp. Mode” (“Initial Settings” → “Discharge Mode”).

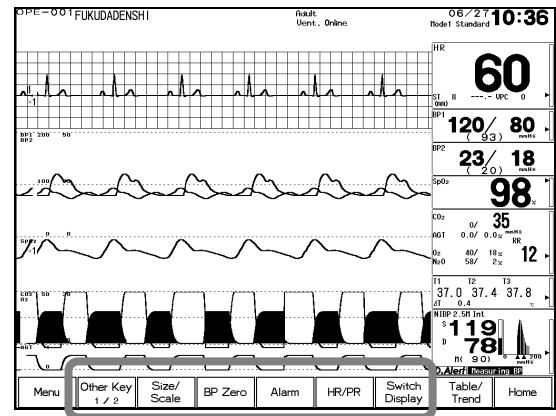
## User Keys

The DS-7000 is provided with user touch keys in addition to the fixed keys.

There are three (3) fixed user keys ([Menu], [Table/Trend], and [Home]), and six (6) user keys that can be programmed according to the user's monitoring purpose.



<Fixed User Keys>



<User Keys>

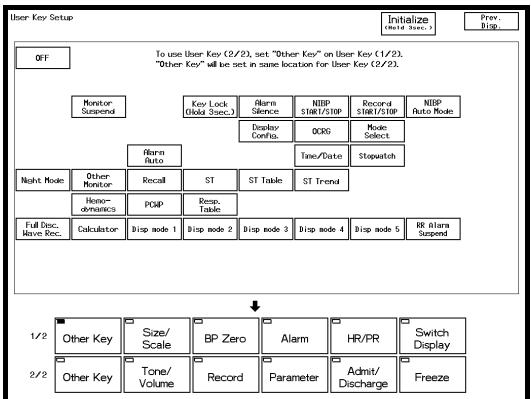


In addition to the user keys, the key layout on the Menu display can be changed (Menu Key Setup), or unnecessary keys on the Function menu, Initial Settings menu, and Maintenance menu can be blanked out (Key Mask Setup) for easier use.

## To Set the User Keys

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

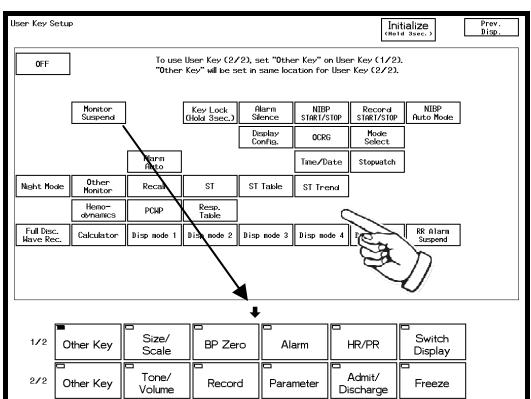
- 1 Press the **Menu** → **Initial Settings** → **User Key** keys.



The user key setup menu will be displayed.

<User Key Setup Menu>

- 2 Set the user keys.



Select a position to set the user key.  
Then, select the function for the user key.

<b>User Key</b>	<b>Function</b>
Admit/Discharge	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  (Record Start/Stop) key during freeze mode, the waveform in freeze mode can be recorded.
Key Lock	Turns ON/OFF the touch key operation. This function can be used when cleaning the touch screen.
Size/Scale	Displays the keys on the home display to set the size, scale, and position of the displayed waveform.
BP Zero	Displays the zero balance screen.
HR/PR	Switches HR and PR display. For PR display, "PR-IBP" or "PR-SpO <sub>2</sub> " will be displayed depending on the "PR Source" on the BP configuration menu or SpO <sub>2</sub> configuration menu.
Switch Display	Switches the display mode each time the key is pressed. (Auto→Standard→Zoom→Extended→Auto)
Display Config.	Waveforms and numeric data display configuration can be set for the home display.
OCRG	Displays the OCRG screen.
Mode Select	Displays the mode selection menu for alarm mode and display mode.
Parameter	Displays the parameter setup menu.
Alarm	Displays the alarm setup menu.
Alarm Auto	Automatically sets the alarm range based on the current measurement value.

User Key	Function
Record	Displays the recording setup menu.
Tone/Volume	Displays the tone/volume setup menu.
Time/Date	Displays the time/date setup menu.
Stopwatch	Displays the Stopwatch screen.
Night Mode	Sets ON/OFF of the Night Mode function.
Other Monitor Display	Displays the Other Monitor screen.
Recall	Displays the Recall screen.
ST	Displays the ST measurement screen.
ST Table	Displays the ST data in tabular format.
ST Trend	Displays the ST trend.
Cardiac Output	Displays the CO measurement screen.
Hemodynamics	Displays the hemodynamics screen.
PCWP	Displays the PCWP measurement screen.
Respiration Table	Displays the respiration data in tabular format.
Vigilance Table	Displays the vigilance data in tabular format when Vigilance (or Vigilance CEDV/VigilanceII/Vigileo) oximeter is used.
NICO Table	When the NICO monitor is connected, measurements can be displayed in tabular format.
BIS Table	When the BIS monitor is connected, measurements can be displayed in tabular format.
Ventilator	Displays the P-V, F-V loop.
Alarm Silence	Silences the alarm sound.
NIBP START/STOP	Starts/stops the NIBP measurement.
NIBP Auto Mode	Allows to select the NIBP periodic measurement interval.
Record START/STOP	Starts/stops the recording.
Full Disc. Wave Rec.	Displays the full disclosure waveform recording screen.
Calculator	Displays the calculator screen.
Disp mode 1	Switches display mode.
Disp mode 2	
Disp mode 3	
Disp mode 4	
Disp mode 5	
RR Alarm Suspend	Suspends RR/APNEA alarm.
Other Key	Displays other user keys.
OFF	User keys will not be displayed.

### 3 Initialize the user key setup.



Pressing the **Initialize** key for more than 3 seconds will initialize the user key setup to factory default setting.

The factory default setting is as follows.

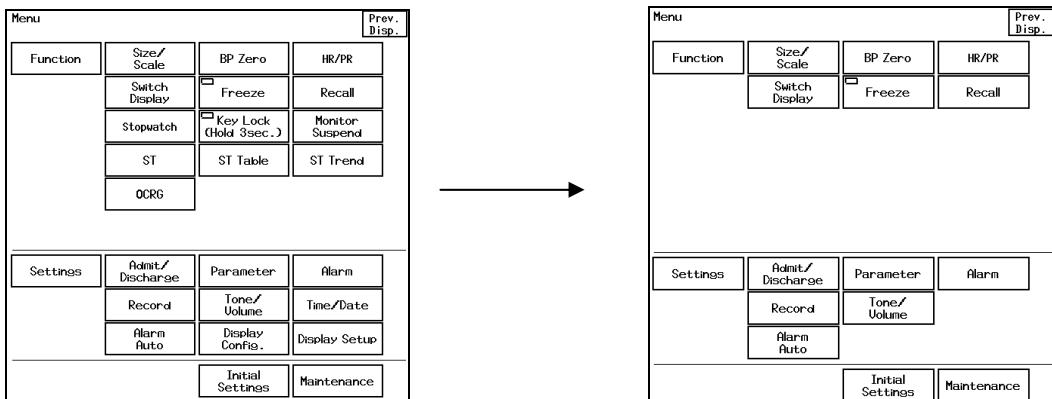
Without BP module (from left)

1/2  
 F2: Other Key  
 F3: Size/Scale  
 F4: Tone/Volume  
 F5: Alarm  
 F6: HR/PR  
 F7: Switch Display

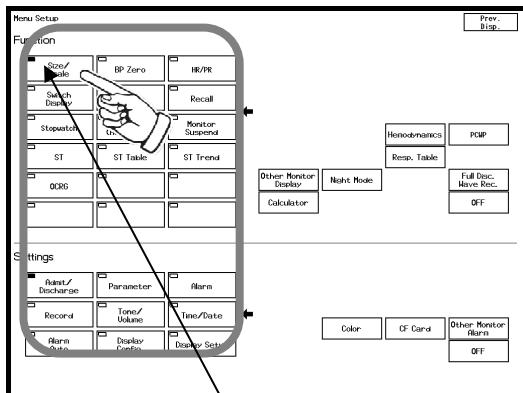
2/2  
 F2: Other Key  
 F3: Time/Date  
 F4: Record  
 F5: Parameter  
 F6: Admit/Discharge  
 F7: Freeze

# Menu Key Layout

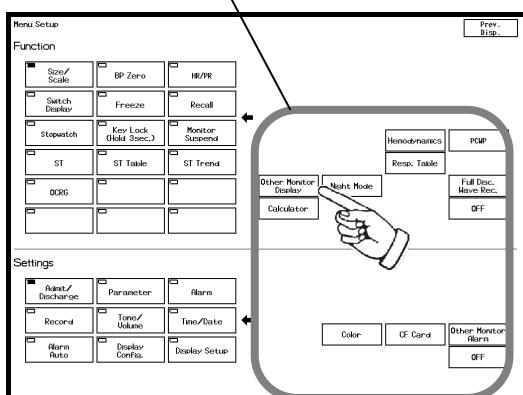
The menu display can be configured for easier use.



- 1 Press the **Menu** → **Initial Settings** → **Menu** keys.



Select the key location.



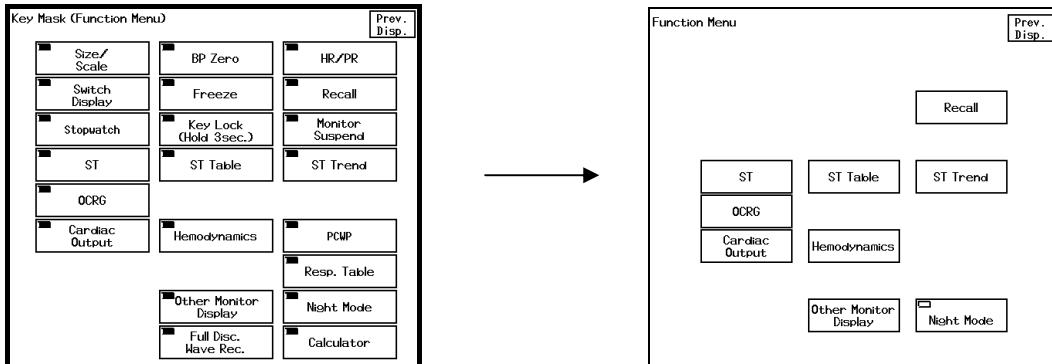
Assign the key for the selected location.  
Select a function key for the function key location, and a configuration key for the configuration key location.

## Key Mask Setup

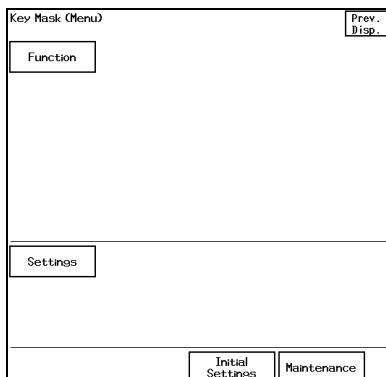
## Erasing the Unnecessary Keys

The unnecessary keys on the “Function” menu, “Settings” menu, “Initial Settings” menu, and “Maintenance” menu can be blanked out.

### <Function Menu>

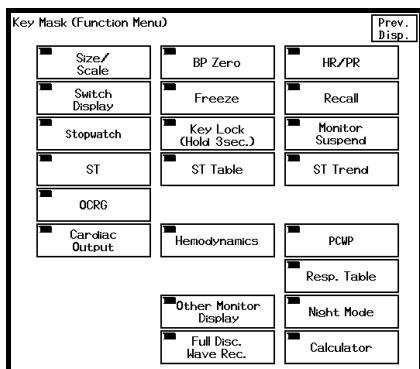


### 1 Press the **Menu** → **Initial Settings** → **Key Mask** keys.



To set the “Function” menu keys, press the **Function** key.  
To set the “Settings” menu keys, press the **Settings** key.  
To set the “Initial Settings” menu keys, press the **Initial Settings** key, and to set the maintenance menu keys, press the **Maintenance** key.

### 2 The following is an example for the “Function” menu.



**Size/  
Scale**  
**Switch  
Display**

The keys with the LED lit in green will be displayed.  
By pressing the key, the green LED will be turned off.  
The keys with the LED off will not be displayed.

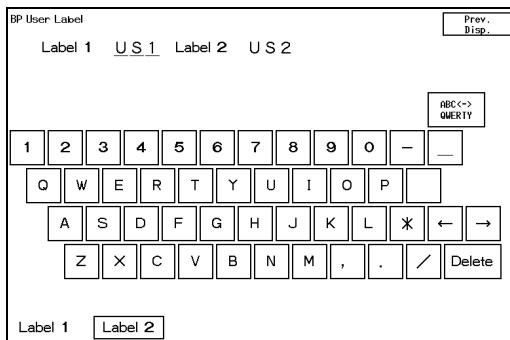
## BP User Label

This section describes the procedure to program the user label for BP.

### To Set the BP User Label

Any 3 characters can be programmed as a BP user label. The programmed user label will be displayed on the Home Display. Up to 2 BP user labels can be set.

- 1 Press the **Menu** → **Initial Settings** → **BP User Label** keys.



The BP User Label Setup menu will be displayed.

- 2 Set a label for User 1 or User 2.

Enter 3 characters using the alphanumeric keys.

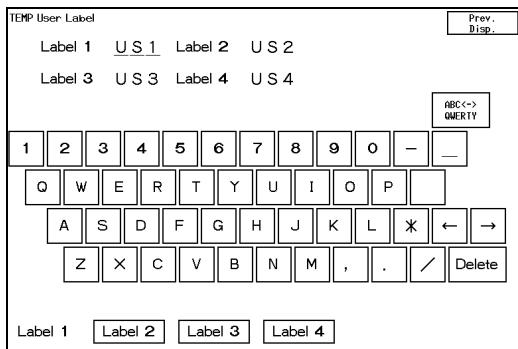
## TEMP User Label

This section describes the procedure to program the user label for TEMP.

### To Set the TEMP User Label

Any 3 characters can be programmed as a TEMP user label. The programmed user label will be displayed on the Home Display. Up to 4 TEMP user labels can be set.

- 1 Press the **Menu** → **Initial Settings** → **TEMP User Label** keys.



- 2 Select a label for Label 1/2/3/4.

Enter 3 characters using the alphanumeric keys.

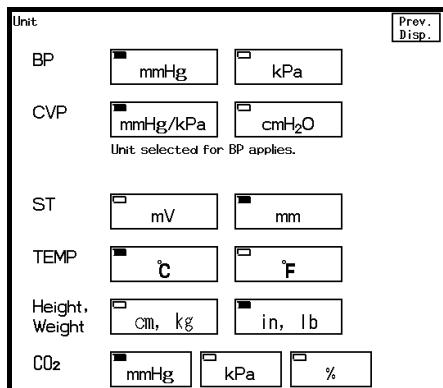
# Measurement Unit

The measurement unit can be changed for BP, CVP, ST, TEMP and CO<sub>2</sub>.

When the measurement unit is changed, tabular data and trend data from the previous measurement unit will be deleted.

When the measurement unit is changed, make sure to set the alarm for the corresponding measurement unit.

- 1 Press the **Menu** → **Initial Settings** → **Unit** keys.



The measurement unit setup menu will be displayed.

- 2 Set the measurement unit for “BP”, “CVP”, “ST”, “TEMP”, and “CO<sub>2</sub>”.

BP : Set the measurement unit for BP. (mmHg or kPa)

CVP : Set the measurement unit for CVP (Central Venous Pressure) when set as BP user label. (mmHg/kPa or cmH<sub>2</sub>O)

ST : Set the measurement unit for ST. (mV or mm)

TEMP : Set the measurement unit for TEMP. (°C or °F)

CO<sub>2</sub> : Set the measurement unit for CO<sub>2</sub>. (mmHg or kPa or %)

Height, Weight: Set the measurement unit for patient's height and weight. (“cm, kg” or “in, lb”)

**NOTE**

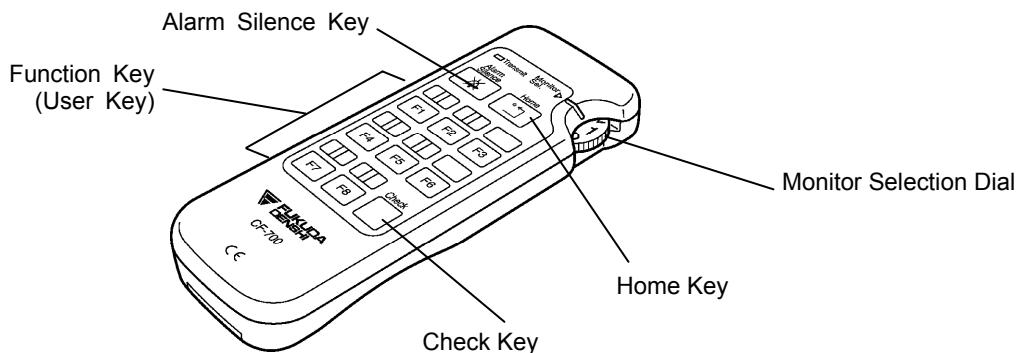
The measurement unit selection for “Height, Weight” will not be displayed if communication with the central monitor is established. The unit for height and weight will be fixed as “cm, kg”.

# Remote Control Setup

This section explains the setup procedure 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 monitor ID to control can be selected. The remote control monitor 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 monitor ID on the bedside monitor. Also, pressing one of the function keys (ex. NIBP Start/Stop key) will display a confirmation message on the monitor which will ask you to press this Check key.

### Alarm Silence Key

This key does not function on the DS-7000.

### Home Key

This key is the same as the **Home** key on the bedside monitor.

### Function 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. ×1/4→×1/2→×1→×2→×4→×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
F3	NIBP Start/Stop	Starts/stops the NIBP measurement. Pressing this key will display a confirmation message on the monitor. When the "Check" key is pressed, the measurement will start. To cancel the process, press the "Home" key. Pressing the "NIBP Start/Stop" key during measurement will stop the measurement.
F4	Record Start/Stop	Starts/stops the manual recording.
F5	Night Mode ON/OFF	Sets ON/OFF of the Night Mode.
F6	Table	Displays the data in tabular format.
F7	Trend	Displays the trend data.
F8	Switch Display	Switches the display mode.

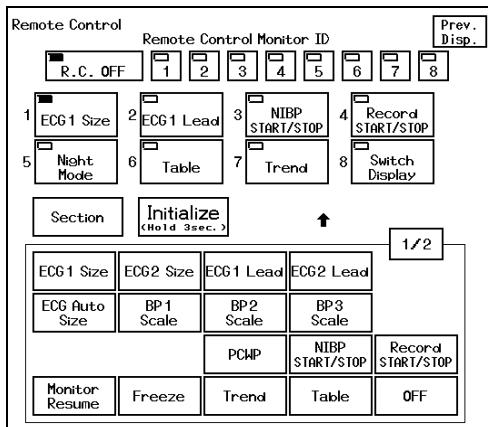
# Remote Control Setup

9

Remote Control Setup

Assign a function to the 8 user keys on the remote control unit.

- 1 Press the [Menu] → [Initial Settings] → [Remote Control] keys.**



The remote control unit setup menu will be displayed.

- 2 Set the remote control monitor ID.**

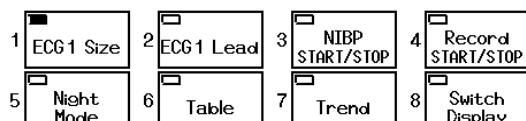
Select the bed ID which will respond to the monitor selection dial on the remote control unit.



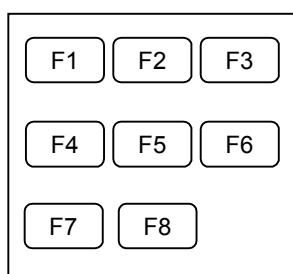
Select the monitor ID from [1] to [8].

Select [R.C. OFF] if not using the remote control function.

- 3 Select the key location.**



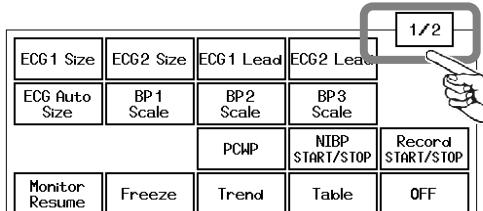
Select the key location of the remote control unit to change or assign a function.



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 a 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.

## Functions that can be assigned to the Function Keys

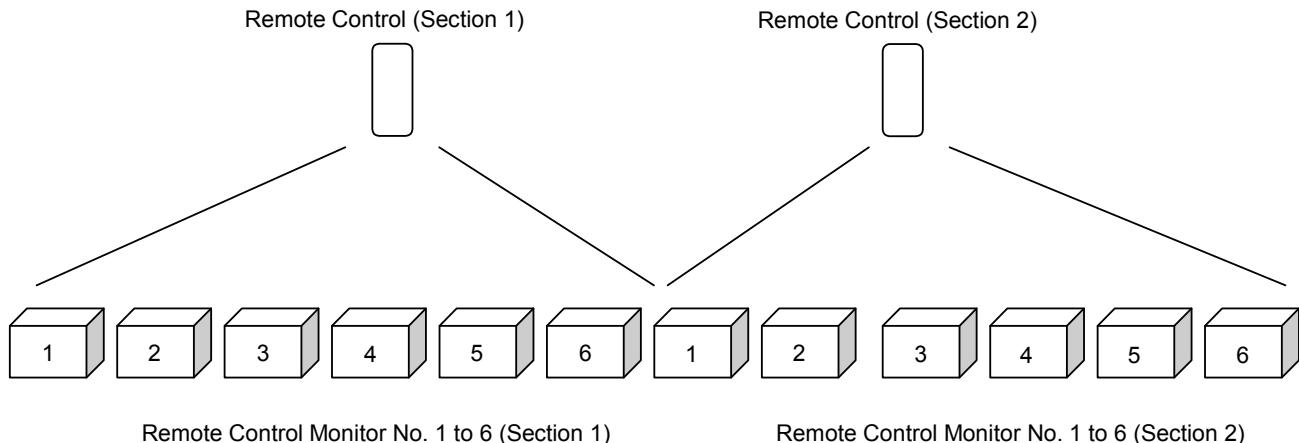
<b>Function</b>	<b>Description</b>
ECG1 Size ECG2 Size	Switches the ECG1 (ECG2) size each time the key is pressed. $\times 1/4 \rightarrow \times 1/2 \rightarrow \times 1 \rightarrow \times 2 \rightarrow \times 4 \rightarrow \times 1/4$
ECG1 Lead ECG2 Lead	Switches the ECG1 (ECG2) lead each time the 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
ECG Auto Size	Automatically adjusts the ECG waveform size to 10mm amplitude. This function is effective only when the key is pressed.
BP1 to 6 Scale	Switches the BP1 to 6 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 → 4 (kPa)
PCWP	When the BP label is set to PAP, PCWP input screen will be displayed.
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 the "NIBP Start/Stop" key during 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.
Resume	Resumes monitoring when the monitoring is suspended.
Freeze	Stops the waveform trace. Pressing this key again will resume the waveform trace.
Trend	Displays the trend data.
Table	Displays the data in tabular format.
OCRG	Displays the OCRG screen.
Recall	Displays the recall data.
ST	Displays the ST measurement screen.
ST Trend	Displays the ST trend.
ST Table	Displays the ST data in tabular format.
Cardiac Output	Displays the CO measurement screen. This key will not start the CO measurement.
Hemodynamics	Displays the hemodynamics screen.
Night Mode	Turns ON/OFF the Night Mode.
Switch Display	Switches the Home Display mode in the order of Auto → Standard → Zoom → Extended → Auto.
Respiration Table	Displays the respiration data in tabular format.
Vigilance Table	Displays the Vigilance data in tabular format.
NICO Table	Displays the NICO data in tabular format.
BIS Table	Displays the BIS data in tabular format.
VENT (P-V)	Displays the ventilator P-V loop.
VENT (F-V)	Displays the ventilator F-V loop.
VENT (Numeric)	Displays the ventilator numeric data.
OFF	Turns OFF the key operation.

## 5 Check the setting.

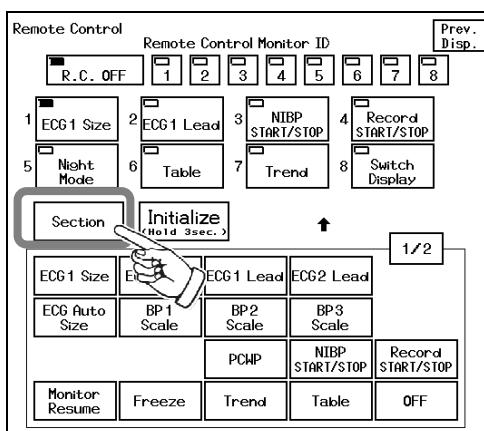
 CAUTION	<ul style="list-style-type: none"> <li>Do not set the same remote control bed ID to more than one monitors on the same floor. Otherwise, it may cause to remote control more than one monitors at the same time.</li> <li>After the remote control setup, check that the remote control unit properly operates.</li> </ul>
---	--

## 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.



- 1 Press the **Menu** → **Initial Settings** → **Remote Control** keys.  
Then, press the **Section** key.



Remote Control

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

Section

1	2	3	4
---	---	---	---



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

## Alarm Indicator

This section explains about the alarm indicator setup.

This device is provided with an alarm indicator.

When the alarm generates, the user can be notified from a distance by the flashing alarm indicator.

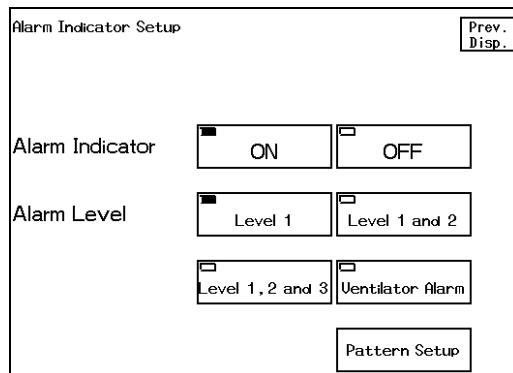
**NOTE**

**Ventilator Alarm** will be displayed only if **Servo-i** is selected on the serial communication setup menu.

## Alarm Level Setup

The alarm indicator can be set to flash according to the alarm level.

- 1** Press the **Menu** → **Initial Settings** → **Alarm Indicator** keys.



The alarm indicator setup menu will be displayed.

- 2** Select whether to use the alarm indicator or not.

Alarm Indicator

<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF
--	------------------------------

**ON** will flash the alarm indicator when an alarm generates.

**OFF** will not flash the alarm indicator when an alarm generates.

- 3** Select the alarm level.

Alarm Level

<input checked="" type="checkbox"/> Level 1	<input type="checkbox"/> Level 1 and 2
<input type="checkbox"/> Level 1, 2 and 3	<input type="checkbox"/> Ventilator Alarm

Select the alarm level to which the alarm indicator should flash.

Select from **Level 1**, **Level 1 and 2**,  
**Level 1, 2 and 3**.

Selecting **Ventilator Alarm** will flash the alarm indicator when the ventilator alarm generates.

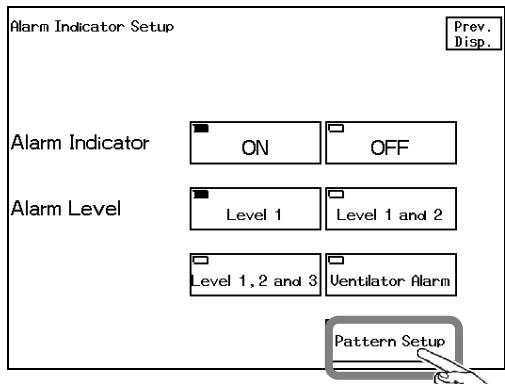
*Reference*

For details of the alarm level, refer to “4. Monitoring Setup –Alarm Setup–”.

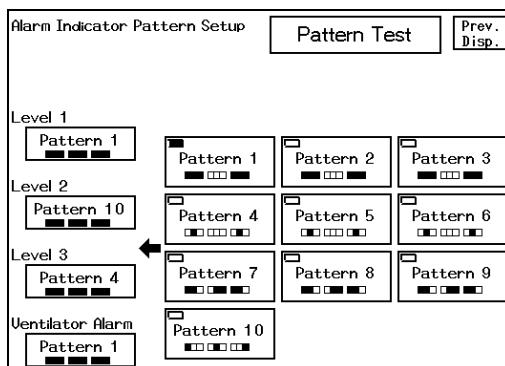
## Flash Pattern Setup

The flash pattern of the alarm indicator for each alarm generation can be set.

- 1 Press the **Pattern Setup** key on the “Alarm Indicator Setup” menu.



- 2 Set the flash pattern for each alarm level.



First, select the flash pattern from **Pattern 1** to **Pattern 10**.

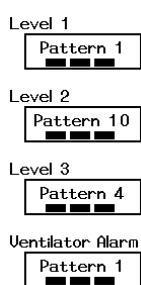
The alarm indicator consists of 3 blocks.  
(Left: Red, Center: Red/Orange/Green, Right: Red)  
For each pattern, these 3 blocks will flash differently.

By pressing the **Pattern Test** key, the actual flashing of the selected pattern can be verified.

### Alarm Indicator Flash Pattern

<b>Pattern</b>	<b>Flash</b>
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)

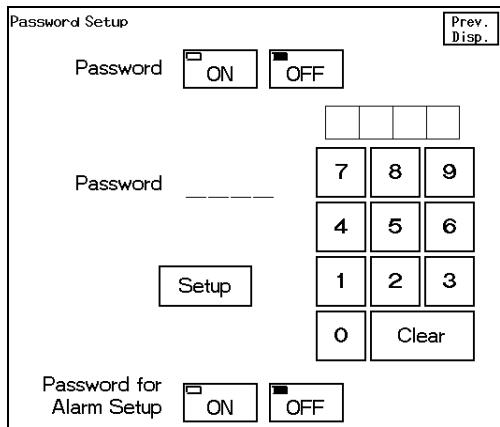
Next, press the alarm level key to assign the selected flash pattern.



## Password

Whether or not to enter a password to access the “Initial Settings” menu and “Maintenance” menu can be selected. When **ON** is selected, set a 4-digit password.

- 1 Press the **Menu** → **Initial Settings** → **Password** keys.



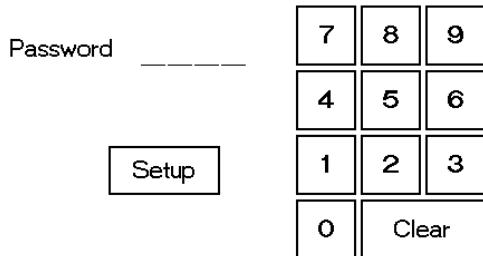
The password setup menu will be displayed.

- 2 Select ON/OFF for “Password”.

Password **ON** **OFF**

Selecting **ON** will require to enter a password to access the Initial Settings menu and Maintenance menu.

- 3 Set a password.

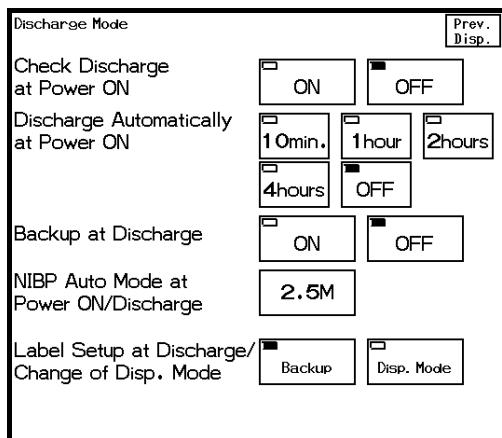


Enter the numbers using the numeric key pad and press the **Setup** key. “7000” is preset (default) for the maintenance password.

# Operation at Discharge

Monitoring condition after the patient has been discharged can be set.

- 1 Press the **Menu** → **Initial Settings** → **Discharge Mode** keys.



The discharge mode setup menu will be displayed.

- 2 Select whether or not to display discharge confirmation screen when the power is turned ON.

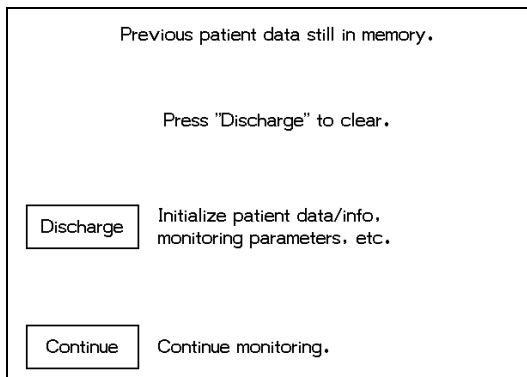
The trend data will be stored even when the power is turned OFF. To start monitoring a new patient, the data of the previous patient needs to be deleted by performing a discharge process on the patient admit/discharge menu. This setting will allow the selection of whether or not to display the discharge confirmation screen at power ON (if data is present from previous patient).

Check Discharge  
at Power ON

ON	OFF
----	-----

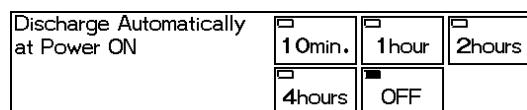
Selecting **OFF** will not display the discharge confirmation screen and will immediately start monitoring.

Selecting **ON** will display the discharge confirmation screen if data is present from previous patient when the power is turned ON.



<Discharge Confirmation Screen at Power ON>

- 3 Select the power OFF duration to automatically perform a discharge process when the power is turned ON.



When the power has been turned OFF for more than the preprogrammed duration (10min, 1hour, 2hours, 4hours), the discharge process will be performed automatically the next time the power is turned ON.

**4 Select whether or not to back up the setup data at discharge.**

Backup at Discharge

<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF
-----------------------------	---

Selecting **ON** will back up the alarm settings and display configuration settings when the discharge process is performed.

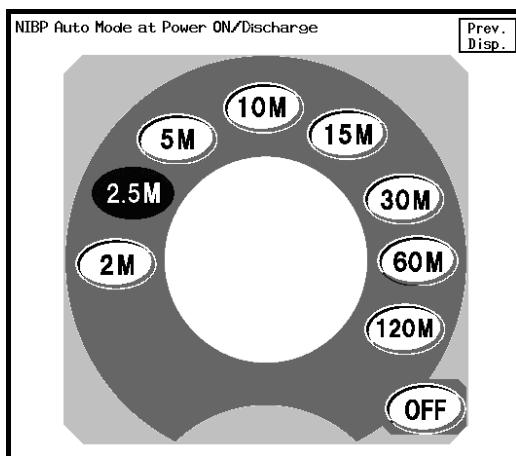
Selecting **OFF** will initialize the alarm settings and display configuration settings.

**5 Select the time interval for “NIBP Auto Mode at Power ON/Discharge”.**

NIBP Auto Mode at Power ON/Discharge

2.5M

Pressing the key will display the NIBP auto mode time interval selection window.



Select the time interval.

**6 Set the “Label Setup at Discharge/Change of Disp. Mode”.**

Label Setup at Discharge/  
Change of Disp. Mode

<input type="checkbox"/> Backup	<input checked="" type="checkbox"/> Disp. Mode
---------------------------------	--

**Backup**: At discharge and at change of display mode, current BP label, TEMP label setting will be applied regardless of the label setting made on the display mode setup menu.

**Disp. Mode**: At discharge and at change of display mode, BP label, TEMP label, color setting made on the display mode setup menu will be applied.

# Night Mode

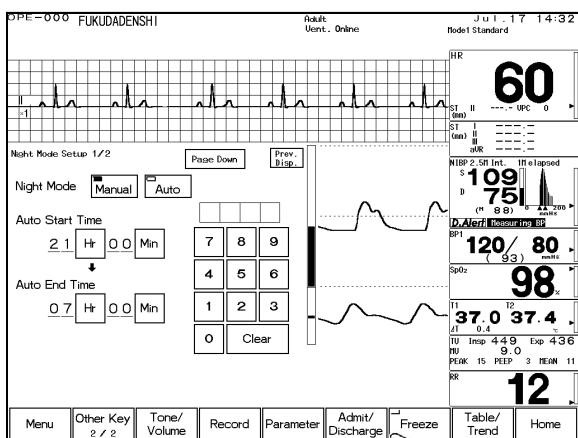
This section explains the procedure to set the night mode.

## About the Night Mode

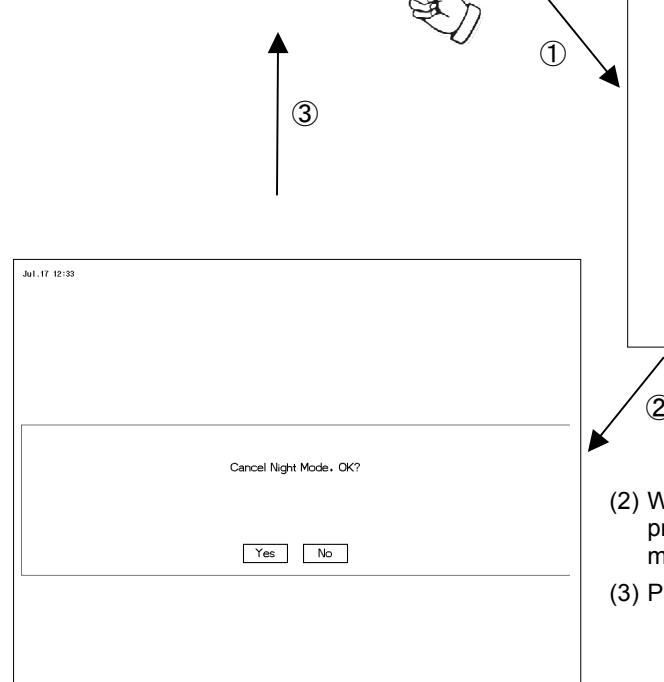
The display brightness and alarm volume can be set to night mode when turning off the light of the ward or when the patient is asleep.

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 Only”】



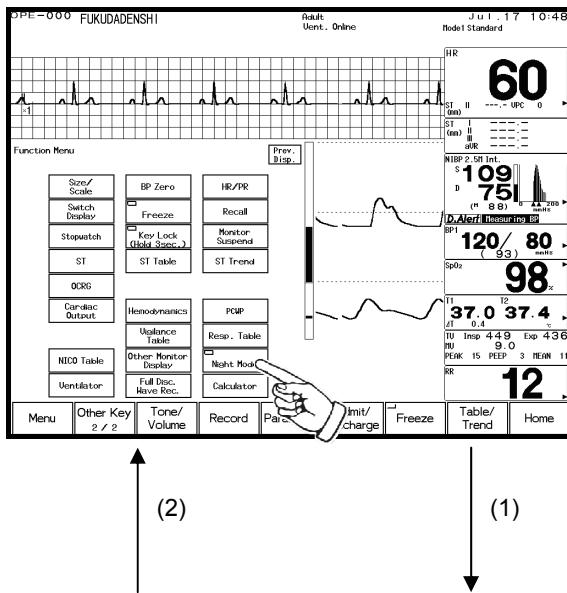
- (1) The night mode can be turned ON manually by pressing the **Night Mode** key on the function menu or the **Night Mode** key preprogrammed as user key. It can be also automatically turned ON at the preprogrammed time.



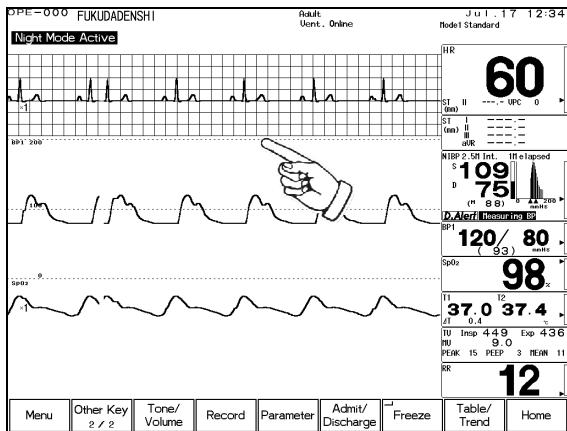
- (2) When "Any Key" is set for "Night Mode Cancel", pressing the screen will display the confirmation message to cancel the night mode.

- (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 function menu or the **Night Mode** key preprogrammed as a user key. It can be also automatically turned ON at the preprogrammed time.



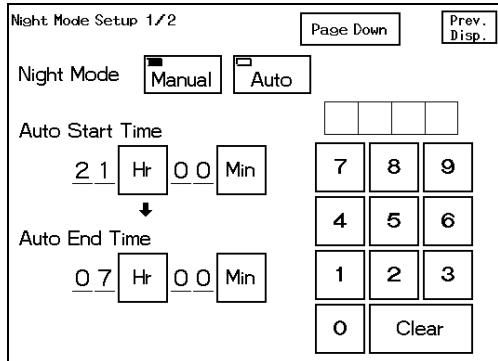
(2) During the night mode, a message, “Night Mode Active” will be displayed.

To cancel the night mode, select **Any Key** for “Night Mode Cancel” on the “Initial Settings” menu. Touching anywhere on the screen will cancel the night mode. Selecting **Night Mode Key** will only cancel the night mode by pressing again the **Night Mode** key on the function menu or the **Night Mode** key preprogrammed as a user key.

<b>NOTE</b>	<ul style="list-style-type: none"> <li>● Even when the night mode is in auto mode, it can be manually set to ON from the menu, user key, or remote controller. In such case, the night mode will automatically turn OFF at the preprogrammed time.</li> <li>● When “Vent. Offline” alarm is generated, the night mode function cannot be set.</li> </ul>
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## To Set the Night Mode

- 1** Press the **Menu** → **Initial Settings** → **Night Mode** keys.



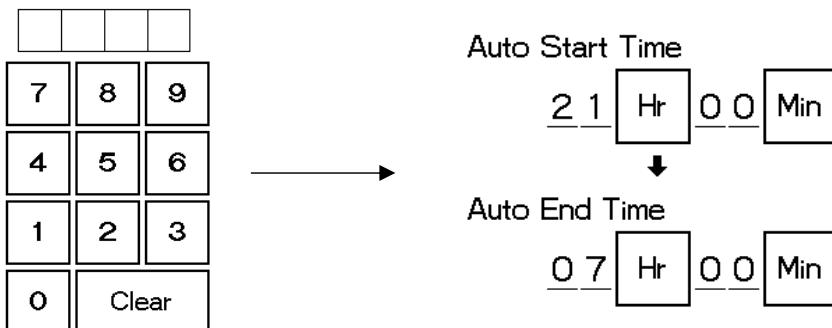
- 2** Select **Manual** or **Auto** to start the night mode.

Night Mode  **Manual**  **Auto**

**Manual** key will start the night mode manually by pressing the **Night Mode** key on the function menu or preprogrammed user key.

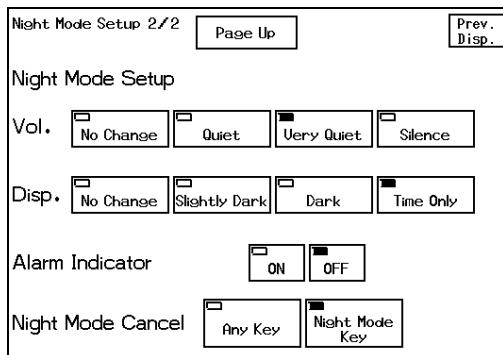
**Auto** will start the night mode automatically at the preprogrammed time. Even when automatic night mode is set, the night mode can be manually turned ON using the user key or the remote control.

- 3** Set the “Auto Start Time” and “Auto Complete Time” of the night mode. (Only for the automatic night mode)



Enter the hour and minute using the numeric keypad and press the **Hr** key, **Min** key for the start time and complete time.

- 4** Press the **Page Down** key to display the 2nd page of the “Night Mode Setup”.



## **5 Set the volume for the night mode.**

This volume setup will be effective for the sounds other than alarm sound such as pulse sound, key sound, other monitor alarm sound, and other sound (NIBP end tone, etc.).

Vol.	<input type="checkbox"/> No Change	<input checked="" type="checkbox"/> Quiet	<input type="checkbox"/> Very Quiet	<input type="checkbox"/> Silence
------	------------------------------------	---	-------------------------------------	----------------------------------

Selection	Actual Volume
No Change	Standard volume
Quiet	Third level from the minimum
Very Quiet	Minimum volume
Silence	No sound

## **6 Select the display brightness for the Night Mode.**

Disp.	<input type="checkbox"/> No Change	<input checked="" type="checkbox"/> Slightly Dark	<input type="checkbox"/> Dark	<input type="checkbox"/> Time Only
-------	------------------------------------	---	-------------------------------	------------------------------------

Selection	Actual Brightness
No Change	Standard display
Slightly Dark	80% of maximum brightness
Dark	50% of maximum brightness
Time Only	Only the time will be displayed. The message will disappear after 1 minute from starting the night mode.

## **7 Select ON/OFF for the alarm indicator during the night mode.**

Alarm Indicator	<input type="checkbox"/> ON	<input checked="" type="checkbox"/> OFF
-----------------	-----------------------------	---

Selection	Alarm Indicator
ON	The alarm indicator will light during the night mode.
OFF	The alarm indicator will not light during the night mode.

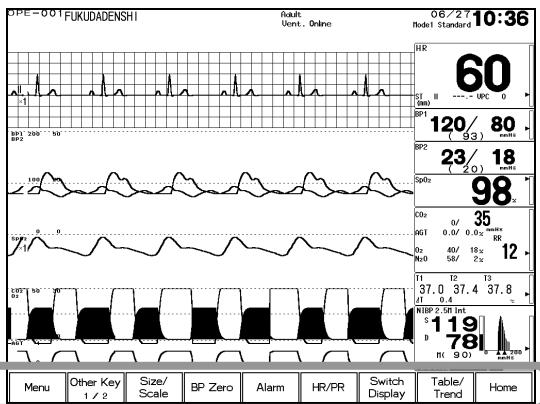
## **8 Select the procedure to cancel the night mode.**

When "No Change", "Slightly Dark" or "Dark" is set for the night mode display, the operation procedure to cancel the night mode can be selected.

Night Mode Cancel	<input type="checkbox"/> Any Key	<input checked="" type="checkbox"/> Night Mode Key	<input type="checkbox"/> Any Key will cancel the night mode by pressing anywhere on the screen.
			<input type="checkbox"/> Night Mode Key will cancel the night mode by pressing the <input type="checkbox"/> Night Mode key preprogrammed as user key or <input type="checkbox"/> Night Mode key on the function menu.

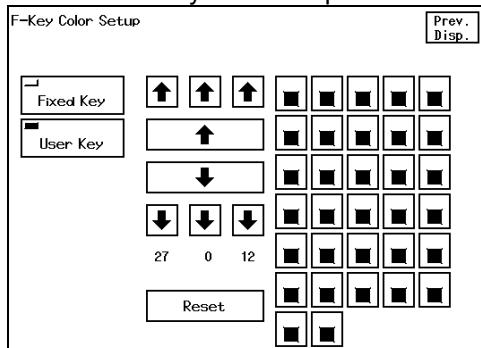
## Color of Function Keys

The colors for the fixed touch keys (Menu / Table/Trend / Home) and user keys can be set.



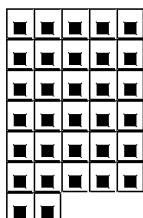
- 1 Press the **Menu** → **Initial Settings** → **F-Key Color Setup** keys.

The function key color setup menu will be displayed.

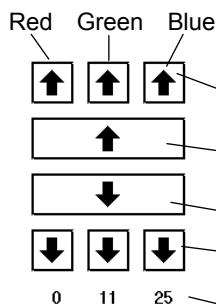


Select the keys to assign a color from **Fixed Key** or **User Key**.

- 2 Change the colors for the keys.



The color can be selected from 32 colors.



The color value can be adjusted using the arrow keys.

Color value will be individually increased for red, green, and blue.

Color value will be halved for all.

Color value will be doubled for all.

Color value will be individually decreased for red, green, and blue.

- 3 Press the **Reset** key to initialize the color setting.

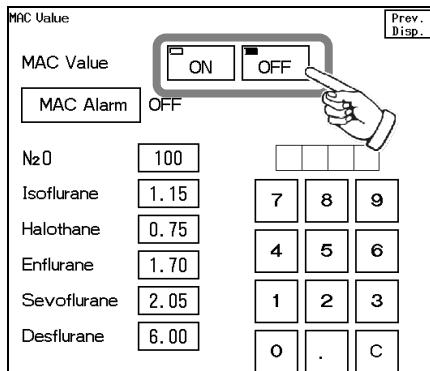
**Reset**

# MAC Value Setup

The MAC value can be displayed inside the numeric data display area if necessary.

**1** Press the **Menu** → **Initial Settings** → **MAC Value** keys.

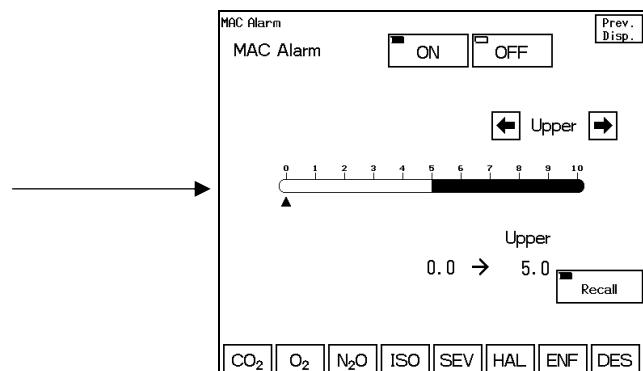
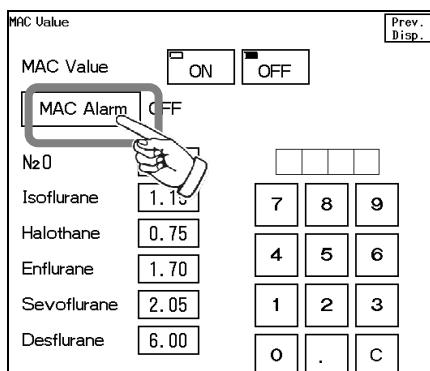
**2** Select whether or not to display the MAC value.



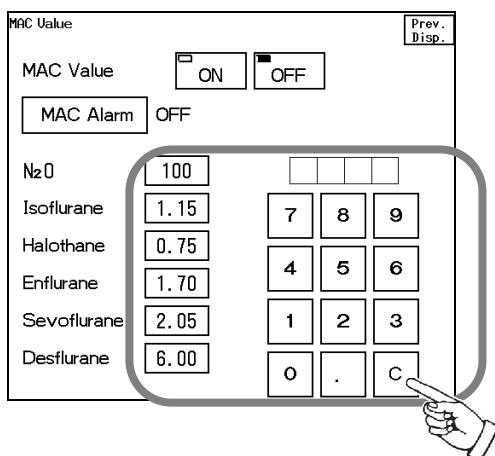
**ON** will display the MAC value inside the numeric data display area.

**OFF** will not display the MAC value.

**3** Set the MAC alarm.



**4** Set the calculation constant for the MAC value.

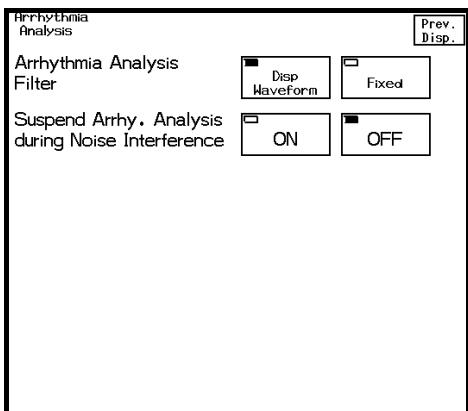


Enter the value using the numeric keypad, and press the key for the corresponding parameter.

# Arrhythmia Analysis Setup

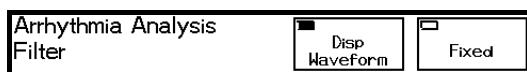
This section explains about the arrhythmia analysis setup.

- 1 Press the **Menu** → **Initial Settings** → **Arrhythmia Analysis** keys.



The arrhythmia analysis setup screen will be displayed.

- 2 Set the “Arrhythmia Analysis Filter”.



The ECG filter for the arrhythmia analysis can be set.  
**Disp. Waveform** will set the filter mode selected on admit menu or ECG setup menu.

**Fixed** will set the filter to 1.0 to 30Hz regardless of the filter mode selection.

- 3 Set the “Suspend Arrhy. Analysis during Noise Interference”.



Whether or not to suspend the arrhythmia analysis during noise interference can be selected.

**ON** will suspend arrhythmia analysis for 5 seconds when a noise is interfering.

**OFF** will not suspend arrhythmia analysis even when a noise is interfering.

# Magnetic Card Reader Setup

The setup for the magnetic card reader/bar code reader can be performed.

- 1 Press the **Menu** → **Initial Settings** → **Magnetic Card** keys.

The "Magnetic Card Reader Setup" screen will be displayed.

**Magnetic Card Reader 1/2**

Pat. ID  
1 ~ 10

DOB : Month  
01 ~ 02

Height  
160 ~ 180

Name  
11 ~ 26

DOB : Day  
01 ~ 31

Weight  
50 ~ 100

Sex  
35 ~ 36

Pat. ID  
From  
1

To  
10

**Magnetic Card Reader 2/2**

Sex  
(Character String for Male)  
M

Read ID Process

None  Numeric  Alphanumeric



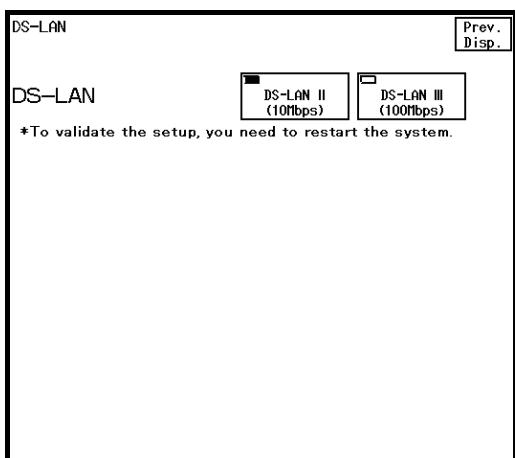
For details, refer to "8. Installation Magnetic Card Reader Connection".

## DS-LAN Setup

The DS-LAN network type can be selected.

- 1 Press the **Menu** → **Initial Settings** → **DS-LAN** keys.

The “DS-LAN Setup” screen will be displayed.



### NOTE

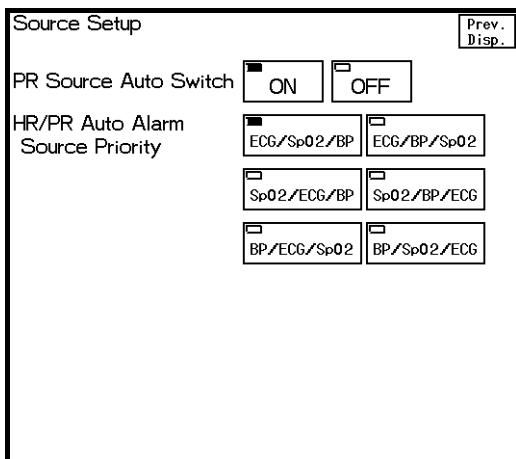
- When the “DS-LAN Setup” is changed, make sure that the same setting is made on the central monitor. If the setting is different, proper communication cannot be performed.
- The following central monitors can connect to DS-LANII network only. When connecting these central monitors, make sure all monitors in the same wired network is set to **DS-LANII**.  
DS-5700, DS-5800N/NX/NX<sup>MB</sup>, 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”.

## Source Setup

On the “Source Setup” screen, whether or not to automatically switch the PR source, and the priority of HR/PR alarm source can be set.

- 1 Press the **Menu** → **Initial Settings** → **Source Setup** keys.

The “Source Setup” screen will be displayed.



- 2 Select ON/OFF for “PR Source Auto Switch”.



When **PR** is selected for “Sync. Mark/Tone”, “Alarm Source”, whether or not to automatically switch the PR source can be set.

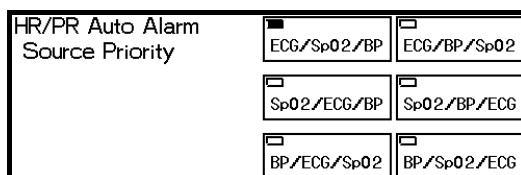
**ON** will automatically switch the PR source to measurable parameter.

**OFF** will not automatically switch the PR source. The PR source will be fixed according to the priority set on the “PR Source Setup”.



In case of DS-LANII network, if the “PR Source” is BP, the ECG waveform will not be transmitted. On the central monitor, PR-IBP value will be displayed for HR. However, the HR value from ECG will be displayed on the NIBP list and ST measurement table.

- 3 Set the “HR/PR Auto Alarm Source Priority”.



When the HR/PR alarm source is set to **Auto**, the priority of the alarm source parameter can be selected. The parameters inside the key are displayed in the order of priority which is high from the left. Select the priority order from the 6 selections.

For example, if [ECG/SpO<sub>2</sub>/BP] is selected, the HR/PR source will be set in the priority of HR, PR from SpO<sub>2</sub> waveform, and PR from BP waveform.



When the HR/PR alarm source is set to **Auto**, HR may not be displayed inside the HR/PR numeric data box depending on the “HR/PR Auto Alarm Source Priority” selection.

# Chapter 10

## Maintenance

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## Handling

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This section describes precautions for handling the equipment.



If you accidentally wet the device, dry it completely and verify it operates safely before usage.

## Handling After Use

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- Do not apply excessive force when disconnecting the cables. Always pull on the connector housing and not on the cable.
- Clean the unit, accessories, and cables, and keep them together in one place for next use.
- Always check for adequate supply of disposable accessories such as ECG electrodes. If any shortage, contact our service representative to supply as necessary.

## Handling the Touch Panel

---

- The touch panel utilizes exclusive fluorescent light for its backlight. As this fluorescent light tube has a product life cycle, it needs to be replaced periodically. If the display becomes dark, flickers, or does not light, contact your nearest service representative.
- Although the LCD utilizes highly accurate picture elements, occasionally, there may be a few pixels which do not light or constantly lights. Please note that this is not an equipment failure, and will not affect monitoring operation.
- Due to its material characteristic, the touch panel expands/contracts depending on the temperature/humidity. When the touch panel is left unused for a while, or when the ambient temperature is low, the surface film of the touch panel may expand, but this is not an abnormal condition. This expansion will be reduced in few hours or half a day after the power is turned ON.

This section describes about the storage of the device and recording paper.

## **Storing the Device**

- Store in a place where the device will not be exposed to splashing water.
- Store in a place where the device will not be adversely affected by atmospheric pressure, temperature, humidity, ventilation, sunlight, dust or atmosphere containing salt or sulfur.
- Store in a level area where the device is not exposed to vibration and shock (including during transportation).
- The following environmental conditions should be observed when storing the device.

Storage Temperature : -10 to 60°C (with MGU-801P/802/803)

-5 to 50°C (with MGU-701/702)

Storage Humidity : 10 to 90% at 40°C (non-condensing) (with MGU-801P/802/803)

15 to 90% at 40°C (non-condensing) (with MGU-701/702)

## **Storing the Recording Paper**

This device utilizes heat sensitive recording paper. If placed in a high temperature for a long period of time, the print may become indistinct, and unable to read. When storing, follow the precautions below.

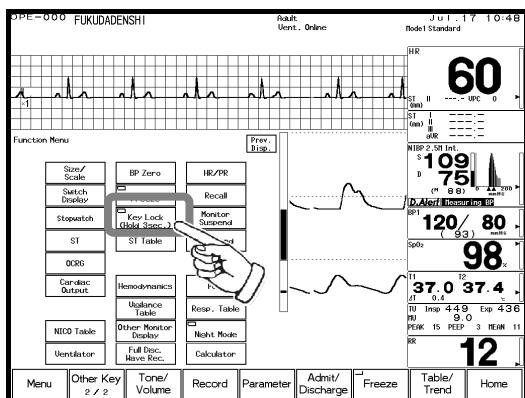
- Store in a place where light is shut off and avoid direct sunlight.
- Do not leave the paper in high temperature (50°C/122°F or above).
- Do not store the paper in a polyvinyl chloride bag.
- Do not expose the paper to alcohol, hydrochloric acid, or ester ketone.
- Avoid using adhesive agents other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

This chapter explains about the cleaning of the device and sensors.

## Cleaning the Touch Panel

Since this device incorporates a touch panel, fingerprints and other stains are likely to appear on the touch panel. Follow the procedure below to clean the touch panel.

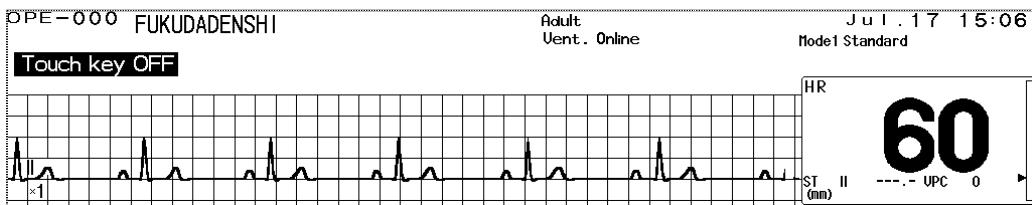
- 1 Press the **Menu** → **Function** keys and press the **Key Lock** for more than 3 seconds.



The **Key Lock** key can be preprogrammed as user key.

Refer to "4. Monitoring Setup –Key Setup– User Key Function" for user key setup.

- 2 Clean the touch panel.



While the "Touch key OFF" message is displayed, the touch panel key will be deactivated. If "Lead OFF" or other message is displayed, the key lock message will not be displayed.

- 3 Wipe the touch panel using a cleaning cloth.

- 4 Press again the **Key Lock** key for more than 3 seconds.

The message will disappear and the keys will be active again.



- 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 the soft cleaning cloth provided as optional accessory or with an eyeglass cleaning cloth.

## Cleaning the Housing

Clean the housing using tightly squeezed gauze or an absorbent cotton cloth dampened with alcohol or a neutral cleanser.

### ⚠ CAUTION

- 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 or cleaning solution to enter the monitor or connectors.
- Do not use organic solvents, thinner, toluene or 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 monitor or connectors.
- Use only neutral detergent to clean the housing. Do not use a chemical cloth, scrub brush, abrasive, polishing powder, hot water, volatile solvent or chemicals (cleanser, thinner, benzine, benzol, and synthetic detergent for house and furniture), or sharp-edged tools. The surface resin coating may be damaged, resulting in discoloration, scratches, or other problems.

## Cleaning the NIBP Cuff and Air Hose

Take out the bladder from the cuff cloth bag, and wash the cloth bag with neutral detergent. After drying it, put the bladder back in.

## Disinfecting the Blood Pressure Transducers

Disinfect the blood pressure transducers according to the manufacturer's guidelines.

## Cleaning and Disinfecting the SpO<sub>2</sub> Sensor

### [NELLCOR® Sensor]

- Do not soak the sensor in water or antiseptic solution.
- Wipe the DURASENSOR with disinfectant such as 70% alcohol. Do not disinfect by applying radioactive rays, steam, or ethylene oxide.
- OXISENSOR is a disposable sensor. Do not reuse or resterilize.

### [MASIMO® Sensor]

- Do not immerse the sensor or patient cable in water or cleaning solution. (Sensor and connector are not waterproof.)
- Do not disinfect the sensor and cable by irradiation, steam, or ethylene oxide.
- Clean the Masimo reusable sensor (LNOP® DCI) and patient cable using the following procedure.
  - (1) Remove the sensor from the patient. Disconnect the patient cable from the sensor.
  - (2) Disconnect the sensor from the DS-7000M.
  - (3) Wipe the sensor and cable using 70% isopropyl alcohol cotton.
  - (4) Before reusing, dry it completely with air.
- The Masimo disposable sensor can be reused on the same patient if the light emitting and receiving part is clean, and if it is still adhesive to the skin.  
The adhesiveness will return by completely drying the sensor after cleaning with alcohol.

## Cleaning, Disinfecting, and Sterilizing the Temperature Probe

Clean/Disinfect/Sterilize the temperature probe according to the guidelines provided with the probe product.

## Cleaning the Cardiac Output Relay Cable

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- Disinfect the cardiac output relay cable according to the guidelines provided with the product.
- When cleaning, follow the procedure below.
  - (1) Wipe the cable using 70% isopropyl alcohol cotton.
  - (2) Dry it completely with air before reusing.

## Cleaning and Sterilizing the Airway Adapter

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- Wash in lukewarm soapy water. Then dip it in antiseptic solution (ex. glutaraldehyde) for low-temperature sterilization. Desiccate after rinsing in aseptic water.
- Use EOG (Ethylene Oxide Gas) to sterilize. Proper ventilation must be performed.
- Before re-using an airway adapter, make sure the window is desiccated and no residue is left. Check if the adapter is not damaged by the operation or cleaning / sterilization.



- Do not sterilize the airway adapter using autoclave methods.
- Do not reuse / re-sterilize the disposable airway adapter.

## Replacing the Water Trap (MGU-701/MGU-702)

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- The water trap collects fluids from the sampling tube connected to the patient.
- Replace the water trap if the filter becomes dark or occluded, or when the water trap is full with water.
- When the sampling tube or water trap is fully occluded with water, the alarm message, "Occlusion" will be displayed.
- The water trap life at 100% humidity is 8 hours.



Water traps are single use only. Do not attempt to drain the water trap when full.

## Cleaning the DRYLINE™ Water Trap (MGU-801P/MGU-802/MGU-803)

---

- When connecting to a new patient, empty the water trap container and it shall be hand washed and disinfected. Suitable disinfectants are:
  - Ethanol 70%, Methanol 70% or Isopropanol 70%
  - Glutaraldehyde (e.g. Cidex™)
  - Chlorhexidine/ethanol (e.g. Hibitane™)
  - Hypochlorite solution (e.g. Clorox™)
- If disinfectants and/or detergents are used, make sure that the container is thoroughly rinsed with water. Dry the container before use.



- Do not use other cleaning methods.
- Do not clean or wash the filter housing of the water trap.
- Never allow alcohol to enter the filter housing.
- Never force air through the water trap.

## Replacing the DRYLINE™ Water Trap (MGU-801P/MGU-802/MGU-803)

---

- The DRYLINE™ Water Trap collects fluids from the sampling tube connected to the patient.
- Replace the DRYLINE™ Water Trap once a month or if the "Replace Water Trap" message appears.

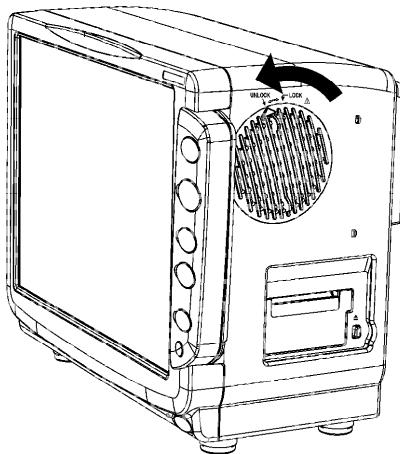
## Replacing the Air Filter

The cooling fan air filter on the DS-7000 and Multigas Unit is a consumable product. Continuous operation of the fan will cause the air filter to inhale unclean air inside the equipment, reduce the cooling effect, and may damage the inner parts. Clean the air filter, or replace it with a new air filter every 3 months.

<b>WARNING</b>	<ul style="list-style-type: none"><li>After washing the air filter with neutral detergent, dry it completely before reattaching. If moisture remains on the air filter, it may damage the equipment.</li><li>The air filter must be attached after cleaning / replacing. If the equipment is used without it, the equipment will get damaged.</li></ul>
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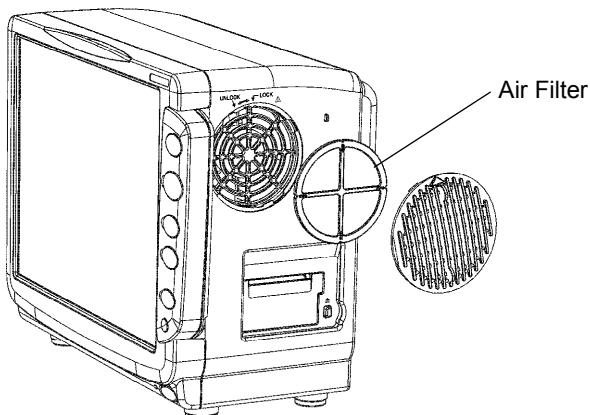
### ● Cleaning and Replacing the Air Filter of the DS-7000 Main Unit

- 1 Turn the cooling fan cover to the “UNLOCK” direction, and take it off when the  $\triangle$  mark matches the arrow mark on the monitor.



- 2 Take out the air filter and clean it, or replace it if necessary.

To clean the air filter, beat the dust off, or wash it off with neutral detergent.

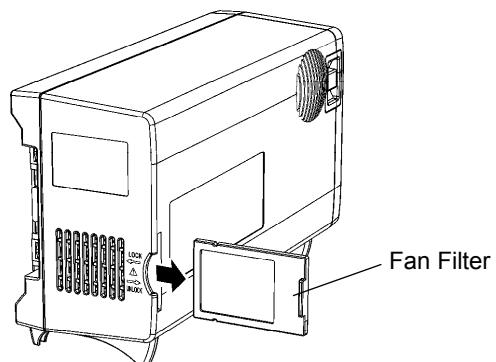


- 3 Reattach the cooling fan cover.

Turn to the “LOCK” direction and attach it so that the  $\triangle$  mark and the arrow mark aligns.

## ●Cleaning and Replacing the Fan Filter of the MGU-701/MGU-702 Multigas Unit

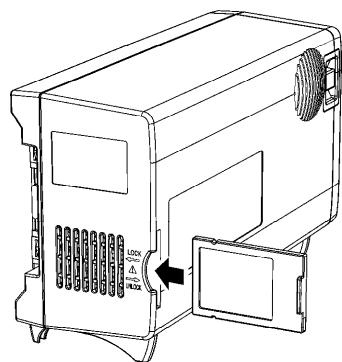
- 1 Take off the fan filter from the Multigas Unit by sliding it to the right.



- 2 Clean or replace the fan filter.

To clean the fan filter, beat the dust off, or wash it off with neutral detergent.

- 3 Re-insert the fan filter.



## Maintenance Check

## Daily and Periodic Check

This section explains the daily check and periodic check items for the device.

### About the Maintenance Check

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

To ensure safety, reliability, and high performance, a “Daily Check” and “Periodic Inspection” must be performed. We are not liable for any accident arising from lack of maintenance.



- Do not open the housing of this device.
- Avoid alcohol or other liquids from getting into the device.

#### ● Daily Check

Perform daily inspection using the “Daily Check List” on the next page.

#### ● Periodic Check

The safety check conformed to IEC 60601-1 must be performed at least once every 2 years. Periodic inspection of medical electronic equipment is mandatory to prevent failures and accidents and to ensure safety and reliability.

Periodic maintenance may be performed by each medical institution or by a third party by concluding a “Maintenance Contract”.

For more details, contact your nearest service representative.

## Periodic Replacement Parts

To ensure reliability of safety, function, and performance for this device, the following components must be replaced periodically. When replacing, contact our service representative.

<b>Short Term Backup Battery</b>	Periodic Replacement Period: 3 years
<b>NIBP Unit</b>	Periodic Replacement Period: 100,000 times of measurement
<b>Recorder Unit</b>	Periodic Replacement Period: 350 hours (Rec. accumulated time)
<b>CO<sub>2</sub> Absorber (MGU-701/702)</b>	Periodic Replacement Period: 1 year
<b>O<sub>2</sub> Cell (MGU-701):</b>	Periodic Replacement Period: 1 year
<b>DRYLINE™ Water Trap (MGU-801P/802/803)</b>	Periodic Replacement Period: 1 month
<b>DRYLINE™ Receptacle (MGU-801P/802/803)</b>	Periodic Replacement Period: 1 year

<b>NOTE</b>	The display panel utilizes exclusive fluorescent light for its backlight. As this fluorescent light tube has a product life cycle, it needs to be replaced periodically. If the display becomes dark, flickers, or does not light, contact your nearest service representative.
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The service life of the cooling fan used for this equipment is 40,000 hours. However, if it is used with extremely high frequency for long duration, a message such as “FAN Error” or “DS-7000 Hardware Error” may be displayed or unusual sound may be generated from the cooling fan. In such case, contact your nearest service representative.



The periodic replacement parts must be replaced at specified period.

## ●To Check the Periodic Replacement Period

The usage duration for each periodic replacement part will be displayed.  
Use this information as an indication for the replacement period for each part.

- 1 Press the **Menu** → **Maintenance** → **Parts Usage Time** keys.

Parts Usage Time		Prev. Disp.
Short-Term Backup Battery	Period * Replace within 36 months.	90 months <input type="button" value="Reset"/>
NIBP Meas. Frequency	0 times *NIBP: Replace within 100,000 times.	<input type="button" value="Reset"/>
Recorder Operating Hours	25mm/sec 50mm/sec *Recorder: Replace within 350 hours.	0 h <input type="button" value="Reset"/>
FAN Filter	0 months *Replace within 12 months.	<input type="button" value="Reset"/>
CSI	O <sub>2</sub> Cell CO <sub>2</sub> Absorber	0 months <input type="button" value="Reset"/> 0 months <input type="button" value="Reset"/>

The usage hours, months, years, or number of measurements will be displayed for the respective parts.

- 2 After replacing the parts, press the **Reset** key to reset the usage duration.

## ●About the Maintenance of MGU-701/MGU-702

The periodic maintenance of MGU-701/MGU-702 should be performed as follows.

- Each Patient** : There should be no damage to the accessories and cables and should be properly connected.  
Replace the sampling device and sampling tube.
- Every 3 months** : Check the accuracy of O<sub>2</sub> sensor using the 80% O<sub>2</sub> mixture calibration gas.
- Every 3 months** : Clean the housing of the multigas unit if necessary.
- Every year** : Perform the safety test. Verify the agent gas auto calibration, and calibrate if necessary. Replace the O<sub>2</sub> cell. Check the gas flow rate and adjust if necessary. Check the CO<sub>2</sub> absorber, and replace if necessary.

**NOTE**

If any damage is found on the multigas unit, contact Fukuda Denshi service representative.

## ●About the Maintenance of MGU-801P/MGU-802/MGU-803

The periodic maintenance of MGU-801P/MGU-802/MGU-803 should be performed as follows.

- Every year** : Perform the leakage test and replace the DRYLINE™ Receptacle if necessary. Check the gas measurement accuracy using the calibration gas.

# Daily Check List (including the MGU-701/702)

No. \_\_\_\_\_

Inspected Date _____	Inspected by _____	Location _____
Device Type (Main Unit) _____	Serial No. _____	_____
Device Type (Option Unit) _____	Serial No. _____	_____
Device Type (Multigas Unit) _____	Serial No. _____	_____

<b>Item</b>	<b>Details</b>	<b>Criteria</b>	<b>Judgment</b>
<b>Appearance</b>	Visually check the exterior for scratches, cracks, deformation, and rust.	No abnormality should be found.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>Installation</b>	Check whether the unit is installed on a level surface.	The installation area must be level and free from vibration and shock.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
	Check whether the unit is installed in a place susceptible to adverse environment.	The environmental condition (ex. temperature, humidity) of the installed place should be as specified. The unit should not be subjected to splashing water.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>Functions</b>	Turn ON the monitor, and check whether it operates normally.	The home display appears, and the LED located on the right side of the display panel lights.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
	Check the control switch and touch key operation.	The date and time should be correct.  It should function properly. Key sound and alarm sound should generate.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>Cables</b>	Visually check all cables for any damage.	No damage should be found.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>Periodic Inspection</b>	Check the date of the previous periodic inspection.	Should be within 1 year.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>Air Filter</b> (DS-7000)	Check the date, which the air filter was first used (cleaned, replaced). Used from: Day _____ Month _____ Year _____	Should be within 3 months.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>Fan Filter</b> (MGU-701/702)	Check the date, which the fan filter was first used (cleaned, replaced). Used from: Day _____ Month _____ Year _____	Should be within 3 months.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>Water Trap</b> (MGU-701/702)	Visually check	The water trap filter should not become dark or occluded, or the water trap should not be full with water.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>CO<sub>2</sub> Absorber</b> (MGU-701/702)	Check the date, which it was first used (replaced). Used from: Day _____ Month _____ Year _____	Should be within 1 year from usage (replacement).	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>O<sub>2</sub> Cell</b> (MGU-701)	Check the date, which it was first used (replaced). Used from: Day _____ Month _____ Year _____	Should be within 1 year from usage (replacement).	<input type="checkbox"/> OK / <input type="checkbox"/> NG

Comment

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# Daily Check List (including the MGU-801P/802/803)

No. \_\_\_\_\_

Inspected Date _____	Inspected by _____	Location _____
Device Type (Main Unit) _____	Serial No. _____	_____
Device Type (Option Unit) _____	Serial No. _____	_____
Device Type (Multigas Unit) _____	Serial No. _____	_____

<b>Item</b>	<b>Details</b>	<b>Criteria</b>	<b>Judgment</b>
<b>Appearance</b>	Visually check the exterior for scratches, cracks, deformation, and rust.	No abnormality should be found.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>Installation</b>	Check whether the unit is installed on a level surface.	The installation area must be level and free from vibration and shock.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
	Check whether the unit is installed in a place susceptible to adverse environment.	The environmental condition (ex. temperature, humidity) of the installed place should be as specified. The unit should not be subjected to splashing water.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>Functions</b>	Turn ON the monitor, and check whether it operates normally.	The home display appears, and the LED located on the right side of the display panel lights.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
	Check the control switch and touch key operation.	The date and time should be correct.  It should function properly. Key sound and alarm sound should generate.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>Cables</b>	Visually check all cables for any damage.	No damage should be found.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>Periodic Inspection</b>	Check the date of the previous periodic inspection.	Should be within 1 year.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>Air Filter</b> (DS-7000)	Check the date, which the air filter was first used (cleaned, replaced). Used from: Day _____ Month _____ Year _____	Should be within 3 months.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>Water Trap</b> (MGU-801P/ 802/803)	Visually check	The water trap container should not be half full, or "Replace Water Trap" message should not appear.	<input type="checkbox"/> OK / <input type="checkbox"/> NG
<b>Gas Calibration</b> (MGU-801P/ 802/803 )	Check the date of the previous gas calibration. Previous calibrated date: Day _____ Month _____ Year _____	Should be within 1 year.	<input type="checkbox"/> OK / <input type="checkbox"/> NG

Comment

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## To Check the Software Version



Software Upgrade will be performed by our service representative. The users should not attempt it.

The current software version can be verified on the following display.

- 1 Press the **Menu** → **Maintenance** → **Program Version** keys.

Program Version		Prev. Disp.
<b>DS-7000</b>		
MAIN-CPU	Version	V01-01 (#0048)
Date		2007/08/09
Comment		DYNASCOPE DS-7000
Boot Version	U01-01	
SUB-CPU	Version	V01-00 (#0035)
Date		2007/07/26
Comment		MEASUREMENT CPU
<b>NIBP Module</b>		
MAIN-CPU	Version	V01-02 (#0017)
SUB-CPU	Version	V01-01 (#0002)

The DS-7000 software version will be displayed.

- MAIN-CPU
- SUB-CPU
- NIBP Module

The boot version will be also displayed.

## Troubleshooting

This section explains the troubleshooting for each case.

### ECG

#### The “Check Electrodes” message is displayed.

- Cause : The electrode is detached, or is not making good electrical contact with the skin.  
Solution : • Check if the electrodes are properly attached.  
              • Replace the electrode, or check the lead cable.

#### The “ECG Failed” message is displayed.

- Cause 1 : The ECG amplitude is 0.25mV or below for the waveform size of  $\times 1$ ,  $\times 1/2$ ,  $\times 1/4$ , and 0.150mV or below for the waveform size of  $\times 2$ ,  $\times 4$ .  
Solution : Change the electrode attachment site, or select the lead with higher QRS amplitude.  
Note : Using 4-electrode or 5-electrode instead of 3-electrode allows more accurate QRS detection.
- Cause 2 : The electrode contact is poor.  
              Electrical blanket or other noise source is near the patient.  
Solution : Electrical blanket or other noise source is near the patient.  
              • Replace the lead cable if defective.  
              • If any noise source is near the patient, locate it away from the patient as much as possible.

#### ECG waveform contains noise.

#### The “Artifact” message is displayed.

- Cause 1 : The electrode contact is poor.  
              Electrical blanket or other noise source is near the patient.  
Solution : Attach the electrodes firmly.  
              • Replace the lead cable if defective.  
              • If any noise source is near the patient, locate it away from the patient as much as possible.
- Cause 2 : EMG is interfering.  
Solution : • Change the electrode site to a location where EMG will less likely to interfere.  
              • Select ESIS for the filter mode.  
Note : Selecting ESIS for the filter mode will decrease the QRS amplitude and may result in not counting the heart rate.

#### The “ECG Unit Error” message is displayed.

- Cause : A communication error with the ECG measuring unit exists.  
Solution : A broken wire or failure of the ECG unit can be considered.  
              Contact our service representative.

#### The measured data is displayed as “xxx”.

- Cause : The heart rate is outside the measurement range.  
Solution : • Check the electrode application.  
              • Replace the electrode, or check the lead cable.

**Heart rate is not counted. Heart rate is low.**

- Cause : The ECG waveform amplitude is below the QRS detection level (0.3mV).
- Solution 1 : Change the electrode site, or select a lead with higher QRS amplitude.
- Note : Using 4-electrode or 5-electrode/10-electrode instead of 3-electrode allows more accurate QRS detection.  
Also, if large amount of noise is interfering, the noise may be erroneously detected as QRS. It is recommended to change the electrode site and increase the ECG amplitude.
- Solution 2 : Increase the waveform size. By increasing the waveform size, small QRS wave will become detectable. However, noise may be also detected.

**Heart rate is not counted, and “Lead OFF” message is displayed.**

- Cause 1 : The electrode of the displayed lead type is detached, or is not making good electrical contact with the skin.
- Solution : • Check the electrode application.  
• Replace the electrode, or check the lead cable.

**Artificial pacemaker pulse is not displayed.**

- Cause 1 : On the ECG setup menu, **Not used** is selected for the pacemaker use.
- Solution : Select **Used** for the pacemaker use.
- Cause 2 : On the ECG setup menu, “Pacemaker Pulse” is set to **OFF**.
- Solution : Select **ON** for “Pacemaker Pulse”.

**The “Pacemaker Error” message is displayed.**

- Cause : The pacemaker pulse is detected for 16 pulses or more per second.
- Solution 1 : Attach the electrodes firmly.  
• Replace the lead cable if defective.  
• If any noise source is near the patient, locate it away from the patient as much as possible.
- Solution 2 : If the patient is not wearing a pacemaker, select **Not used** for the pacemaker use in the ECG setup menu.

**The “ECG not connected” message is displayed.**

- Cause : When the ECG relay cable is disconnected during ECG monitoring, this message will be displayed.
- Solution 1 : To silence the alarm, press the  (Alarm Silence) key.
- Solution 2 : To continue monitoring, plug in the ECG relay cable. This will clear the message and silence the alarm.

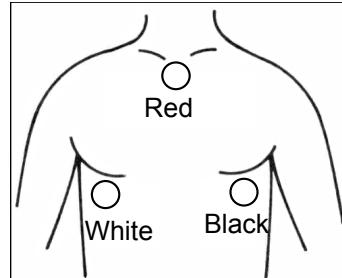
## Respiration

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### The “CVA Detected” message is displayed.

Cause : Heartbeat is interfering and superimposed on the respiration waveform.

Solution : Place the electrode as shown below where the heartbeat will be less likely to interfere.



### “0” is displayed for respiration rate, or apnea alarm is generated.

Cause : The respiration waveform amplitude is below the detection level ( $0.2\Omega$ ).

Solution 1 : Change the electrode site.

Solution 2 : Increase the waveform size.

### The respiration waveform and respiration rate is not displayed.

Cause 1 : The ECG relay cable designed for electrosurgical knife is used.

Solution : The impedance respiration can not be measured if the cable designed for electrosurgical knife is used. Use the standard ECG relay cable if not using the electrosurgical knife.

Cause 2 : The impedance respiration measurement ceased.

Solution : Turn ON the impedance respiration measurement on the ECG setup menu.

Note : If the pacemaker with the minute ventilation measuring function is used, turn OFF the impedance respiration measurement. Otherwise, both the pacemaker and the monitor will not be able to perform accurate measurement.

### The measured data is displayed as “xxx”.

Cause : The respiration rate is outside the measurement range.

Solution : • Check the electrode application.  
• Replace the electrode, or check the lead cable.

## Invasive Blood Pressure

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### The “BP\* Transducer OFF” message is displayed.

Cause : The BP transducer is not connected.

Solution : Connect the transducer.

### The “BP\* Zero Required” message is displayed.

Cause : The BP zero balance has not been performed since the power was turned ON.

Solution : Open the three-way cock on the transducer to air and perform a zero balance.

### BP value and waveform are not displayed properly.

Cause : Blood pressure line has not been zero balanced.

Solution : Open the three-way valve on the transducer to air and perform a zero balance.

### The measured data is displayed as “xxx”.

Cause : The BP value is outside the measurement range.

Solution : Perform a zero balance again.

**SpO<sub>2</sub>****(Nellcor® Model; DS-7000)****The “BP Disconnect” message is displayed.**

- Cause : When the BP interface cable is disconnected during BP monitoring, this message will be displayed.
- Solution 1 : To silence the alarm, press the  (Alarm Silence) key.
- Solution 2 : To continue monitoring, plug in the BP interface cable. This will clear the message and silence the alarm.

**The “Check SpO<sub>2</sub> Sensor” message is displayed.**

- Cause : The sensor is detached from the patient.
- Solution 1 : Check if the sensor is properly attached to the patient.
- Solution 2 : Check if the light emitting part and light receiving part of the sensor LED is aligned.

**The “Pulse Search” message is displayed.**

- Cause : The amplitude of the pulse waveform is too low, or the sensor is not positioned correctly.
- Solution : Check if the light emitting part and light receiving part of the sensor LED is aligned.

**The “No Pulse Detect” message is displayed.**

- Cause : The amplitude of the pulse waveform is too low, or the sensor is not positioned correctly.
- Solution : Check if the light emitting part and light receiving part of the sensor LED is aligned.

**The “Motion Artifact” message is displayed.**

- Cause : There is excessive body motion from the patient.
- Solution : Change the sensor position where the body motion will have less effect.

**The pulse waveform is not displayed, or interrupted.**

- Situation : The “Check SpO<sub>2</sub> sensor” is displayed.
- Cause 1 : The amplitude of the pulse waveform is too low, or the sensor is not positioned correctly.
- Solution : Check if the light emitting part and light receiving part of the sensor LED is aligned.
- Cause 2 : Sensor is defective.
- Solution : Replace the sensor.
- Cause 3 : SpO<sub>2</sub> sensor is not firmly connected to the SpO<sub>2</sub> input connector.
- Solution : Make sure the SpO<sub>2</sub> sensor is securely connected.
- Cause 4 : Sensor is exposed to light.
- Solution : Place a black or dark cloth over the sensor to avoid direct sunlight. Also when not used, avoid placing the sensor in light or unplug the sensor from the connector.

**The SpO<sub>2</sub> measurement is unstable.**

- Cause : There is excessive body motion from the patient which prevents correct measurement.
- Solution : 1. Have the patient lie still as much as possible.  
2. Relocate the sensor, or change the sensor position where body motion will have less influence.

**The “SpO<sub>2</sub> Unit Error” message is displayed.**

- Cause 1 : There is a communication failure with the SpO<sub>2</sub> measurement unit.
- Solution : A defective cable or SpO<sub>2</sub> unit failure can be considered.  
Contact our service representative.
- Cause 2 : Sensor is defective.
- Solution : Replace the sensor.

**The “SpO<sub>2</sub> Sensor Defective” message is displayed.**

Cause : Sensor is defective.  
Solution : Replace the sensor.

**The “Disconnect” message is displayed.**

Cause : When the SpO<sub>2</sub> relay cable is disconnected during SpO<sub>2</sub> monitoring, this message will be displayed.  
Solution 1 : To silence the alarm, press the  (Alarm Silence) key.  
Solution 2 : To continue monitoring, plug in the SpO<sub>2</sub> relay cable. This will clear the message and silence the alarm.

## **SpO<sub>2</sub>**

## **(Masimo® Model; DS-7000M)**

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**The “SpO<sub>2</sub> Sensor Defective” message is displayed.**

Cause : Sensor is defective.  
Solution : Replace the sensor.

**The “Check SpO<sub>2</sub> Sensor” message is displayed.**

Cause : The sensor is detached from the patient.  
Solution 1 : Check if the sensor is properly attached to the patient.  
Solution 2 : Check if the light emitting part and light receiving part of the sensor LED is aligned.

**The “SpO<sub>2</sub> Low Perfusion” message is displayed.**

Cause : The amplitude of the pulse waveform is too low, or the sensor is not positioned correctly.  
Solution : Check if the light emitting part and light receiving part of the sensor LED is aligned.

**The “Pulse Search” message is displayed.**

Cause : The amplitude of the pulse waveform is too low, or the sensor is not positioned correctly.  
Solution : Check if the light emitting part and light receiving part of the sensor LED is aligned.

**The “Check SpO<sub>2</sub> Sensor” message is displayed.**

Cause : The sensor is exposed to too much ambient light. The detecting part of the sensor is not covered appropriately.  
Solution 1 : Turn down or turn off the light.  
Solution 2 : Avoid the sensor from exposure to ambient light.  
Solution 3 : Relocate the sensor position.

**The “SpO<sub>2</sub> Noise” message is displayed.**

Cause : External signal or energy is interfering with the measurement.  
Solution : Remove the external interference if possible.

**The “Unknown SpO<sub>2</sub> sensor” message is displayed.**

Cause : Unrecognizable sensor is connected.  
Solution : Replace the sensor.

**The “SpO<sub>2</sub> Low Signal IQ” message is displayed.**

Cause : There is excessive body motion or the sensor position is not appropriate.  
Solution 1 : Check if the light emitting part and light receiving part of the sensor LED is aligned.  
Solution 2 : Change the sensor position where the body motion will have less effect.

**The “SpO<sub>2</sub> Unit Error” message is displayed.**

Cause : There is a communication failure with the SpO<sub>2</sub> measurement unit.  
 Solution : A defective cable or SpO<sub>2</sub> unit failure can be considered.  
                  Contact our service representative.

**The “Disconnect” message is displayed.**

Cause : When the SpO<sub>2</sub> relay cable is disconnected during SpO<sub>2</sub> monitoring, this message will be displayed.  
 Solution 1 : To silence the alarm, press the  (Alarm Silence) key.  
 Solution 2 : To continue monitoring, plug in the SpO<sub>2</sub> relay cable. This will clear the message and silence the alarm.

**Non-Invasive Blood Pressure****The cuff does not inflate although the pump is operating.**

Cause 1 : The air hose is not firmly connected, and the air is leaking.  
 Solution : Check if the air hose is properly connected.  
  
 Cause 2 : The cuff size does not correspond with the selected patient type.  
 Solution : Check if the cuff size is corresponded with the selected patient type.

**The monitor repeats the measurement, or “- - -” is displayed for the numeric data.**

Cause 1 : The measurement accuracy is not reliable due to body motion artifact.  
 Solution : Have the patient stay still as much as possible during the measurement.  
  
 Cause 2 : The pulse is too small to acquire reliable measurement accuracy.  
 Solution : Check if the cuff application is done properly, and if the cuff size corresponds with the selected patient type.

**The time of measurement disappears and the numeric data is displayed as “- - -”.**

Cause : The NIBP data will be deleted when the preprogrammed NIBP erase time has elapsed.  
 Solution : Select the appropriate time for NIBP data erase time from 60min or 120min which best fits the monitoring purpose.

**The NIBP related keys are ineffective.**

Cause : “Neonate” is selected for patient classification on the admit/discharge menu.  
 Solution : NIBP measurement of neonate is not supported on this equipment.

**Temperature****The numeric data is displayed as “xxx”.**

Cause : The temperature measurement is outside the measurement range.  
 Solution : Check if the temperature probe is properly attached.

**The “TEMP not connected” message is displayed.**

Cause : When the temperature sensor is disconnected during temperature monitoring, this message will be displayed.  
 Solution 1 : To silence the alarm, press the  (Alarm Silence) key.  
 Solution 2 : To continue monitoring, plug in the temperature sensor. This will clear the message and silence the alarm.

**“TEMP Unit Error” message is displayed.**

Cause : A failure in the temperature unit is detected.  
 Solution : A unit failure can be considered. Cease the measurement and contact our service representative.

### **“Noise Interference” message is displayed.**

- Cause : The electrosurgical noise interference has been detected for 30 seconds and more.  
Solution : The temperature monitoring will resume when the electrosurgery completes. If the message remains to be displayed even after the electrosurgery, a failure of the equipment can be considered. Cease the measurement and contact our service representative.

## **Cardiac Output**

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### **The CO value varies more than $\pm 10\%$ for consecutive measurements.**

- Cause 1 : The injection method is not appropriate.  
Solution : Inject within 1 to 3 seconds.
- Cause 2 : Injection temperature is not appropriate.  
Solution : If iced injectate is used, pay attention not to warm the injector with hands.
- Cause 3 : The thermistor location is not appropriate.  
Solution : Reposition the thermistor by moving the catheter.
- Cause 4 : Arrhythmia event has occurred during the measurement.  
Solution : Wait until the patient has stable heart rhythm.
- Cause 5 : There was patient body movement during measurement.  
Solution : Have the patient stay still during the measurement.
- Cause 6 : The patient's hemodynamics has changed during measurement.  
Solution : Wait until the patient has stable hemodynamics.

### **Abnormal measurement value is displayed.**

- Cause : The catheter size, injectate volume, catheter constant (CC) are not correct.  
Solution : Set the proper condition, CC value for the used catheter.

### **The blood temperature (T<sub>b</sub>), injectate temperature (T<sub>i</sub>) are not displayed on the monitor.**

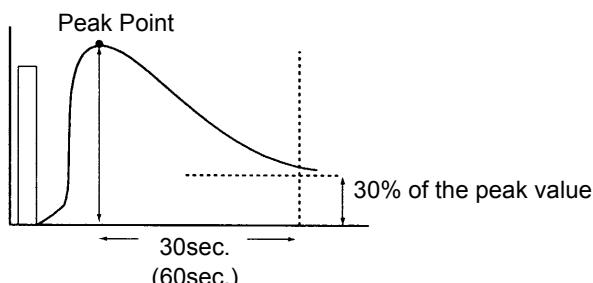
- Cause : The catheter is not properly connected.  
Solution : Securely connect the catheter.

### **The thermodilution curve is deformed.**

- Cause : The injection is not smooth, steady motion.  
Solution : Injection should be performed within 1 to 3 seconds.

### **The baseline of the thermodilution curve is displaced to the minus side. The “Lower Fault” message is displayed on the monitor.**

- Cause : The blood temperature has not returned to a stable condition after measurement.

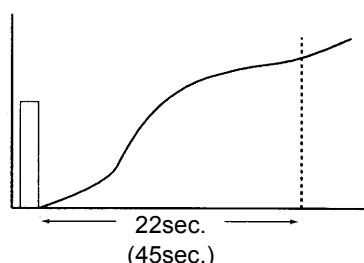


The thermodilution curve did not return to the cut off point soon enough. The temperature must return to a point that is 30% of the peak value within 30 seconds (or 60 seconds depending on the setup).

**Solution :** If performing continuous measurement, wait for 30 to 60 seconds and check that "Ready" is displayed before performing the next measurement.

#### The thermodilution curve is low. The "Peak Fault" message is displayed on the monitor.

**Cause :** The peak of the thermodilution curve can not be detected.

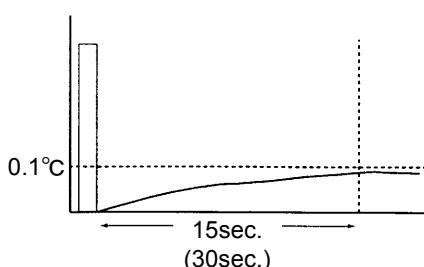


After injection, the peak of the thermodilution curve was not determined within 22 seconds (when the time scale is "30 sec") or 45 seconds (when the time scale is "60 sec").

**Solution :** The thermistor may be in contact with the pulmonary artery wall. Reposition the thermistor and measure again.

#### The "Upper Fault" message is displayed on the monitor.

**Cause :** After the injection, the blood temperature is out of the measurement range.



After injection, the blood temperature is out of the measurement range.

The thermodilution curve did not rise above 0.1°C within 15 seconds (when the time scale is "30 sec") or 30 seconds (when the time scale is "60 sec").

**Solution :** Use the iced injectate, and measure again.

#### The "Over Range" message is displayed on the monitor.

**Cause :** The CO value is out of the calculation range.

**Solution :** The area of the thermodilution curve is too large to calculate. Perform the measurement again.

#### The measurement is interrupted, and the error message, "Upper Fault", "Peak Fault", "Lower Fault", "Sensor Error" is displayed on the monitor.

**Cause 1 :** The thermistor connector and relay cable are not securely connected.

**Solution :** Correct measurement cannot be performed unless the thermistor connector and relay cable are securely connected. Check the connection and perform the measurement again.

**Cause 2 :** The sensor or relay cable is defective.

**Solution :** If the sensor or cable is defective, measurement can not be performed. Replace the sensor or cable and perform the measurement again.

#### The "CO disconnect" message is displayed on the monitor.

**Cause :** This message will be displayed when the catheter relay cable is disconnected during monitoring the cardiac output.

**Solution 1 :** To silence the alarm, press the (Alarm Silence) key.

**Solution 2 :** To continue monitoring, plug in the catheter relay cable. The message display and alarm sound will be cleared.

## Recorder

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### No recording is performed.

- Situation : The “Paper Out” message is displayed.  
Cause : There is no recording paper in the built-in recorder paper cassette.  
Solution : Install a new pad of paper into the paper cassette.
- Situation : The “Check Paper Cassette” message is displayed.  
Cause : The cassette of the built-in recorder is open.  
Solution : Close the cassette firmly.
- Situation : The “Paper Out (Central)” message is displayed.  
Cause : There is no recording paper in the central recorder cassette.  
Or, the central recorder (DS-5700) cassette is open.  
Solution : Install a new pad of paper into the central recorder cassette.  
If the cassette is open, close it firmly.
- Situation : The “Check Paper Cassette (Central)” message is displayed.  
Cause : The central recorder (DS-7600) cassette is open.  
Solution : Close the central recorder (DS-7600) cassette firmly.
- Situation : The “Paper Out (8ch)” message is displayed.  
Cause : There is no recording paper in the 8ch recorder cassette.  
Solution : Install a new pad of paper into the cassette.
- Situation : The “Check Paper Cassette (8ch)” message is displayed.  
Cause 1 : The 8ch recorder cassette is open.  
Solution : Close the 8ch recorder cassette firmly.
- Cause 2 : The paper is jammed inside the 8ch Recorder.  
Solution : Open the cassette and set the recording paper properly.
- Situation : No message is displayed, but recording can not be performed.  
Cause : The recording paper is not correctly installed. The front and backside of the paper is set oppositely.  
Solution : The “END” printed side of the paper should be facing down in the paper cassette.

### The second waveform and third waveform are not recorded.

- Situation : The second waveform and third waveform are not recorded for manual recording or alarm recording.  
Cause : The second waveform and third waveform are not set on the recording setup menu.  
Solution : Set the second waveform and the third waveform on the respective recording setup menu.

### The “Recorder Error” message is displayed.

- Cause 1 : The paper is jammed inside the built-in recorder.  
Solution : Open the cassette, and install the paper properly.  
Cause 2 : The thermal printhead temperature increase or other failure of the built-in recorder has occurred.  
Solution : Damage to the thermal printhead or other failure can be considered. Contact our service representative.

### The “Recorder Error (Central)” message is displayed.

- Cause : The thermal printhead temperature increase or other failure of the central recorder has occurred.  
Solution : Damage to the thermal printhead or other failure can be considered. Contact our service representative.

### The “Recorder Error (8ch.)” message is displayed.

- Cause : The thermal printhead temperature increase or other failure of the 8ch recorder has occurred.  
 Solution : Damage to the thermal printhead or other failure can be considered. Contact our service representative.

## Wired Network (DS-LANII/DS-LANIII)

---

### The data cannot be displayed on the central monitor.

- Cause 1 : The DS-LAN setup is not correct.  
 Solution : Make sure that the DS-LAN Setup (DS-LANII/DS-LANIII) for all bedside monitors and central monitors in the same network are the same. If the DS-LAN setting is changed, make sure to restart the system.
- Cause 2 : A central monitor which is not compatible with the DS-LANIII network is used.  
 Solution : The following central monitors can not be used with the DS-LANIII network.  
   • DS-5700  
   • DS-5800N/NX/NX<sup>MB</sup>  
   • DS-7600/7600W with software version V05 and prior  
 When using these central monitors, all monitors in the same network should be set to DS-LANII.
- Cause 3 : Inappropriate HUB is used.  
 Solution : Use a repeater HUB recommended by Fukuda Denshi for DS-LANII network and a switching HUB recommended by Fukuda Denshi for DS-LANIII network.
- Cause 4 : The bed ID is duplicated in the same network.  
 Solution : If bedside monitors with the same bed ID exist in the same network, communication is not possible. Make sure to set a unique bed ID for each bedside monitor.
- Cause 5 : An equipment not specified by Fukuda Denshi is connected to the network.  
 Solution : Do not connect PC, printer, or other unspecified equipment to the network.
- Cause 6 : The DS-LAN cable is not properly connected.  
 Solution : The DS-LAN connection will be performed by our service representative. Contact our service representative.

### The ECG waveform is not displayed on the central monitor although other waveforms are displayed.

- Cause :  PR is set for “HR/PR”, and  BP is set for “PR Source”.  
 Solution : Set  HR for “HR/PR”, or set  SpO<sub>2</sub> for “PR Source”.  
 However, if SpO<sub>2</sub> is not measured while  SpO<sub>2</sub> is set for “PR Source”, the setting will change to  BP.

### The CO<sub>2</sub> waveform is not displayed on the central monitor although the CO<sub>2</sub> numeric data is displayed.

- Cause 1 : “RR Alarm Source” on the RESP setup menu is set to  Impedance.  
 Cause 2 : “RR Alarm Source” is set to  Ventilator.  
 Solution : Set the “RR Alarm Source” to  GAS.

### The impedance respiration waveform is not displayed on the central monitor although the RR numeric data is displayed.

- Cause 1 : “RR Alarm Source” on the RESP setup menu is set to  Gas.  
 Cause 2 : “RR Alarm Source” is set to  Ventilator.  
 Solution : Set the “RR Alarm Source” to  Impedance.

<b>NOTE</b>	<ul style="list-style-type: none"> <li>● The impedance respiration waveform will not be displayed if <b>GAS</b> is set for the “RR Alarm Source”. AWF, AWP waveform will be displayed.</li> <li>● The CO<sub>2</sub> respiration waveform will not be displayed if <b>Impedance</b> is set for “RR Alarm Source”. AWF, AWP waveform will be displayed.</li> <li>● Both the CO<sub>2</sub> and impedance respiration waveform will not be displayed if <b>Ventilator</b> is set for “RR Alarm Source”.</li> </ul>
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**Although the PR alarm is set on the central monitor, it returns to the previous setting after a short time.**

Cause 1 : **HR** is set for “HR/PR”.

Cause 2 : **PR** is set for “HR/PR”, but **BP** is set for “PR Source”.

Solution : Set **PR** for “HR/PR”, and set **SpO<sub>2</sub>** for “PR Source”

**Although the HR alarm is set on the central monitor, it returns to the previous setting after a short time.**

Cause : **PR** is set for “HR/PR”.

Solution : Set **HR** for “HR/PR”.



**CAUTION** On the DS-7000, HR and PR alarm cannot be set to ON simultaneously.

**Search Patient ID** key does not function.

Cause 1 : The DS-LAN setup is set to “DS-LAN II”.

Solution : Set “DS-LANIII” for all bedside monitors and central monitors in the same network.  
When the setting is changed, restart the system.

Cause 2 : The communication with the central monitor is not established.

Solution : Check the communication with the central monitor.

Cause 3 : The communication between the central monitor and the patient data server is not established.

Solution : Check the communication between the central monitor and the patient data server.

Cause 4 : The connected central monitor do not have the patient ID search function.

Solution : Check if the model type and software version of the central monitor supports the patient ID search function.

**The patient ID search process fails.**

Cause 1 : The searched patient is not registered.

Solution : Check if the entered patient ID is correct.

Cause 2 : More than one bedside monitors are searching the same patient at the same time.

Solution : Try the search process again after a while.

## Telemetry

---

### **There is no reception at the Central Monitor.**

- Cause : The channel ID or group ID do not correspond with the telemetry receiver.  
Solution : Set the correct channel ID and group ID on the DS-7000.

### **The impedance respiration waveform is not shown at the Central Monitor.**

- Cause 1 : On the respiration setup, "RR Alarm Source" is set to **GAS**.  
Cause 2 : On the respiration setup, "RR Alarm Source" is set to **Ventilator**.  
Solution : Set the "RR Alarm Source" to **Impedance**.

### **The BP waveform of 100mmHg or above cannot be properly transmitted.**

- Cause : The BP waveform and scale do not correspond.  
Solution : When the BP waveform is above 100mmHg, set the BP scale above 100mmHg on the DS-7000.

## Remote Control Unit

---

### **The remote control unit does not operate.**

- Cause 1 : The Remote Control Monitor ID does not correspond with the remote control unit.  
Solution : Set the correct Remote Control Bed ID.

- Cause 2 : The section does not correspond with the remote control unit.  
Solution : Set the correct section.

### **Proper operation cannot be performed using the remote control unit.**

- Cause 1 : The user key on the remote control unit and remote control setup on the monitor do not correspond.  
Solution : Set the remote control setup on the monitor so that it corresponds to the remote control user key.

## General

---

### **Nothing is displayed but the main power indicator is lighted in red.**

- Cause : A system error has occurred.  
Solution : Turn off the power, unplug the power cable, and contact our service representative.

### **The "Adjusting" message is displayed. Numbers are displayed large on the screen.**

- Cause : This is the test mode. Stop using the device immediately.  
Solution : Restart the system. The test mode will be cancelled.  
If the same situation is observed again, contact our service representative and turn off the DIP switch No. 6.

### **The data is initialized each time the power is turned ON.**

- Cause 1 : The internal switch is set to initialize.  
Solution : The internal switch setting needs to be changed. Contact our service representative and set the rotary switch to 0.
- Cause 2 : The battery for backup memory is depleted.  
Solution : The battery needs to be replaced. Contact our service representative.

### **The display is not clear.**

Cause 1 : The display brightness is not adjusted.  
Solution : Due to the LCD display characteristic, the visible range is limited. Adjust to the appropriate brightness.

Cause 2 : The monitor is set to night mode.  
Solution : Cancel the night mode.

### **The system does not start although the power switch is turned ON.**

Cause 1 : The power cable is not connected.  
Solution : Turn off the power and connect the power cable.

Cause 2 : Incorrect CF card is inserted.  
Solution : Remove the CF card, and turn OFF the power. Turn OFF the DIP switch No. 8 and turn ON the power again.

### **The clock is often delayed.**

Cause : The battery for the backup memory is depleted. Check if the time is delayed when the power is turned off.  
Solution : The battery needs to be replaced. Contact our service representative.

### **The “Set DS-7000 Rotary SW0” message is displayed.**

Cause : The rotary switch is not set to “0 (zero)”.  
Solution : If the rotary switch is not set to “0”, the device will not function properly. Immediately turn OFF the power and cease the operation. Contact our service representative.

## **Ventilator**

---

### **The “Vent. Alarm” message is displayed.**

Cause : The following alarm has generated on the ventilator.

- Parameter alarm such as AWP, MV, FiO<sub>2</sub>
- Technical alarm of the ventilator such as oxygen cell replacement

Solution : Check the alarm cause of the ventilator, and take appropriate action.

### **The “Vent. Data Unavailable” or “Vent. Offline” message is displayed. And the ventilator screen is also displayed.**

Cause 1 : The cable connecting the ventilator and DS-7000 is disconnected, or not securely connected.  
Solution : Check and make sure the cable between the ventilator and DS-7000 is connected and secured.

Cause 2 : The power of the ventilator is turned OFF.  
Solution : Turn the power of the ventilator ON.

Cause 3 : The ventilator is in standby mode.  
Solution : Check if the ventilator is in ventilation mode, and take appropriate actions.

When normal communication is recovered, the communication status will be displayed as “Vent.Online”.

## Multigas Measurement (MGU-701/MGU-702)

### The “Identification Error” message is displayed.

- Cause : The primary agent selected by the user does not match the highest concentration agent detected by the gas unit.  
Solution : Check the primary agent setting and the agent delivery system immediately. This alarm does not function if the automatic detection of primary agent is selected.

### The “Mixed Agents” message is displayed.

- Cause : More than one halogenated agent is present.  
Solution 1 : Check if only one anesthetic agent is used. Check if the anesthetic gas carburetor setting is correct.  
Solution 2 : If the trouble persists, contact our service representative.

### The “Occlusion” message is displayed.

- Cause : The sampling line or the water trap of the gas unit is occluded. The gas unit is attempting to clear the blockage by drawing the occlusion to the water trap.  
Solution : Replace the sampling line if necessary.

### The “Insert Water Trap” message is displayed.

- Cause : The water trap of the gas unit is not inserted. The water trap is partly blocked.  
The water trap type is wrong or defective.  
Solution : Replace the water trap.

### The “Exhaust Blocked” message is displayed.

- Cause : The scavenging line of the gas unit is blocked, or the scavenging system is defective.  
Solution : Remove the blockage, or correct the gas scavenging system.

### The “Gas Unit Failure 1” message is displayed.

- Cause 1 : The gas unit detected a hardware failure.  
Solution : Contact our service representative.  
  
Cause 2 : The storage and usage environment of the gas unit is out of the specification range.  
The gas unit is condensing.  
Solution : If the message persists, contact our service representative.

### The “Gas Unit Failure 3” message is displayed.

- Cause 1 : The gas unit detected a hardware failure.  
Solution : Contact our service representative.  
  
Cause 2 : The storage and usage environment of the gas unit is out of the specification range.  
The gas unit is condensing.  
Solution : If the message persists, contact our service representative.

### The “Gas Unit Failure 4” message is displayed.

- Cause : The supply voltage to the gas unit is too low.  
Solution : Contact our service representative.

### The “Sensor Cal. Error” message is displayed.

- Cause : The gas unit failed to calibrate the anesthetic agent detector.  
Solution : Contact our service representative.

### **The “Warming Up” message is displayed.**

- Cause : The gas unit has not reached the full accuracy for anesthetic agent concentration detection.
- Solution : Wait until the warm up completes.  
If the warm up does not complete within 30 minutes, check all the connected cables, sampling tubes, nasal cannula, and turn OFF and ON the power again.  
If the trouble persists, contact our service representative.

### **The “O<sub>2</sub> Sensor Failure” message is displayed.**

- Cause 1 : The failure of the O<sub>2</sub> sensor inside the gas unit has been detected.
- Solution : Contact our service representative.
- Cause 2 : The storage and usage environment of the gas unit is out of the specification range.  
The gas unit is condensing.
- Solution : If the message persists, contact our service representative.

### **The “O<sub>2</sub> Module Failure” message is displayed.**

- Cause 1 : The gas unit selected on the serial communication setup menu does not correspond to the connected gas unit.
- Solution : Select the correct gas unit on the serial communication setup menu.
- Cause 2 : The failure of the O<sub>2</sub> module inside the gas unit has been detected.
- Solution : Contact our service representative.
- Cause 3 : The storage and usage environment of the gas unit is out of the specification range.  
The gas unit is condensing.
- Solution : If the message persists, contact our service representative.

## **Multigas Measurement (MGU-801P/MGU-802/MGU-803)**

---

### **The “Gas Unit Failure” message is displayed.**

- Cause 1 : The gas unit detected a hardware failure.
- Solution : Contact our service representative.

### **The “O<sub>2</sub> Sensor Failure” message is displayed.**

- Cause 1 : The gas unit detected a hardware failure.
- Solution : Contact our service representative.

### **The “Occlusion” message is displayed.**

- Cause : The sampling line or the water trap of the gas unit is occluded. The gas unit is attempting to clear the blockage by drawing the occlusion to the water trap.
- Solution : Replace the sampling line if necessary.

### **The “Insert Water Trap” message is displayed.**

- Cause : The water trap of the gas unit is not inserted. The water trap is partly blocked.  
The water trap type is wrong or defective.
- Solution 1 : Insert the water trap.
- Solution 2 : Replace the water trap.

### **The “Mixed Agents” message is displayed.**

- Cause : More than one halogenated agent is present.
- Solution 1 : Check if only one anesthetic agent is used. Check if the anesthetic gas carburetor setting is correct.
- Solution 2 : If the trouble persists, contact our service representative.

## Multigas Measurement (HPD-800: Capnostat5)

### The “CO<sub>2</sub> Unit Error” message is displayed.

- Cause : There is a failure in the CO<sub>2</sub> unit.  
Solution : Stop using the unit and contact our service representative.

### The “CO<sub>2</sub> Sensor Failure” message is displayed.

- Cause 1 : The CO<sub>2</sub> sensor temperature is higher than 50°C.  
Solution : Remove any heat generating source around the sensor.
- Cause 2 : The CO<sub>2</sub> sensor is defective.  
Solution : Replace the CO<sub>2</sub> sensor.
- Solution : If error persists, the CO<sub>2</sub> unit may be damaged. Stop using the unit and contact our service representative.

### The “Zero CO<sub>2</sub> Adapter” or “Check CO<sub>2</sub> Adapter” message is displayed.

- Cause : The CO<sub>2</sub> sensor is not zero balanced.  
Solution : Perform the airway adapter calibration.

### The “Check CO<sub>2</sub> Adapter” message is displayed.

- Cause 1 : The airway adapter is unclean.  
Solution : A clean airway adapter must be used. If reusing an airway adapter, clean and air-dry it. Then, wipe the window with swab, and sterilize (EOG, etc.) before use.
- Cause 2 : The airway adapter is disconnected from the sensor.  
Solution : Securely connect the airway adapter to the sensor.
- Note : If the error persists, calibrate the airway adapter.

### The “Unknown CO<sub>2</sub> Sensor” message is displayed.

- Cause : The connected CO<sub>2</sub> sensor is not applicable.  
Solution : Connect the applicable CO<sub>2</sub> sensor (Capnostat 5).

## Oximeter

### The measurement data is not displayed.

- Cause 1 : The cable is not properly connected.  
Solution : Securely connect the following cable to the serial connector and the corresponded device.

Oximeter Continuous Cardiac Output Measurement Device	External Output Cable
Vigilance	CJO-04RS4
Vigilance CEDV	CJO-04RS4
VigilanceII	CJ-502
Vigileo	CJ-502
OXIMETRIX3	CJ-508
Q-vue	CJO-04RS4
Q2 Computer	CJO-04RS4

- Cause 2 : The serial communication setup is not properly set.  
Solution : Set the connected port function to Vigilance, Oximetrix3, Q-vue or Q2Computer on the serial communication setup.

- Cause 3 : The measurement data is not displayed on the oximeter display.
- Solution : The measurement data of  $SvO_2$ , CO, etc. will not be displayed on the monitor unless the data is displayed on the used oximeter. Check if the data is displayed on the used oximeter.
- Cause 4 : The CCO is not measured.
- Solution : The monitor will display CCO/CCI data only during the process of CCO measurement on the oximeter.
- Cause 5 : The BSA is not input.
- Solution : To display the CCI data on the monitor, it is necessary to input the BSA to the Q-vue/Q2 Computer. To display the CI AVG data, it is necessary to input the CO AVG and BSA to the Q-vue/Q2 Computer. For procedures, refer to the operation manual of the Q-vue/Q2 Computer. For OXIMETRIX3, CI AVG, BSA cannot be displayed on the monitor as BSA cannot be received from the OXIMETRIX3.
- Cause 6 : The communication setup of the DS-7000 and the oximeter is not corresponded.
- Solution : The communication setup of the DS-7000 is fixed to the default setting for each oximeter and cannot be changed. Check if the communication setup of the connecting oximeter is in default setting.
- In case of Vigilance/Vigileo, check if the communication is set as follows.
    - Device: IFM Out
    - Baud Rate: 19200bps
    - Parity Bit: None
    - Stop Bit: 1
    - Data Bit: 8
    - Flow Control: 2 sec.
 For procedure to check the Vigilance/Vigileo communication setup, refer to the operation manual for the Vigilance/Vigileo.
  - In case of Q2 Computer, check if the communication is set as follows.
    - Baud Rate: 9600bps
    - Parity Bit: ODD
    - Stop Bit: 1
    - Data Bit: 7
 For procedure to check the Q2 Computer communication setup, refer to the operation manual for the Q2 Computer.
- Cause 7 : The software version of Vigilance does not correspond.
- Solution : If the Vigilance without the STAT function is connected, the STAT data will not be displayed. Check the software version of the Vigilance.

#### **An error is caused between the data of Q2 Computer and bedside monitor.**

- Cause : Due to difference such as number of significant digit, an error may be caused between the displayed data and transmitted data of the Q2 Computer. Also, updating of the monitor data may be delayed due to transmission delay which causes the difference of value between the Q2 Computer and the DS-7000.

#### **The CO average value is displayed although not measured.**

- Cause : The past CO data is stored in OXIMETRIX3, Q-vue, Q2 Computer.
- Solution : Clear the stored CO data in the OXIMETRIX3, Q-vue, Q2 Computer before connecting to an external output cable.

## BIS Monitor

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### The numeric data is not displayed.

Cause 1 : If SQI value is lower than 15, BIS data and SR data will not be displayed.  
Solution : Refer to the BIS operation manual and set the SQI value above 15.

Cause 2 : The communication setup of the BIS monitor is incorrect.

Solution : ASCII should be set to communicate with the DS-7000.  
Check the communication setup and verify that it is set to ASCII.  
Refer to the BIS operation manual for procedures.

## Magnetic Card Reader / Bar Code Reader

---

### The magnetic card reader or bar code reader does not function.

Cause 1 : The conversion cable (CJ-756) is not connected.  
Solution : If the magnetic card reader or bar code reader is connected directly to the serial port on this equipment without the conversion cable, it will not function. Make sure to use the conversion cable.

## Radical-7

---

### The numeric data is not displayed.

Cause 1 : The serial output setting on the Radical-7 is not set to ASCII 2.  
Solution : Refer to the operation manual of Radical-7, and set the serial output to ASCII 2.

Cause 2 : The software version of the Radical-7 Handheld or Docking Station is not compatible with the DS-7000.

Solution : For the compatible software version, refer to our service representative.

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## Chapter 11

# Technical Information

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# Specification / Performance

This section states the specification and performance of this DS-7000.

## Specification

### Size/Weight

#### DS-7000/DS-7000M

Size 324(W) × 179(D) × 260(H) mm (not including the protrusion)  
Weight 9.0 kg

#### HU-71/HU-72/HU-73 (Option Unit)

Size 37(W) × 99(D) × 90(H) mm (not including the protrusion)  
Weight 180 g

#### MGU-701/MGU-702 (Optional Multigas Unit)

Size 248(W) × 138(D) × 82(H) mm (not including the protrusion)  
Weight 1.8 kg

#### MGU-801P/MGU-802/MGU-803 (Optional Multigas Unit)

Size 125 (W) × 200 (D) × 109 (H) mm (not including the protrusion)  
Weight 1.8 kg

### Environmental Condition

Operating Temperature : 10 to 40°C

15 to 35°C (with MGU-701/702)

10 to 35°C (with MGU-801P/802/803)

Operating Humidity : 30 to 85% (non-condensing)

(Inside airway: 0 to 100%, condensing)

Transport / Storage Temperature : -10 to 60°C (with MGU-801P/802/803)

-5 to 50°C (with MGU-701/702)

Transport / Storage Humidity : 10 to 90% at 40°C (non-condensing) (with MGU-801P/802/803)

15 to 90% at 40°C (non-condensing) (with MGU-701/702)

### Safety

General Standard : UL 60601-1:2006

IEC 60601-1:1988

(Medical electrical equipment – Part 1: General requirements for safety)

Amendment A1 to IEC 60601-1:1991

Amendment A2 to IEC 60601-1:1995

EMC Standard : IEC 60601-1-2: 2007

(Medical electrical equipment – Part 1: General requirements for safety –  
2. Collateral standard: Electromagnetic compatibility – Requirements and tests)

The class of protection

against electric shock : Class I

The type of protection

against electric shock : ECG/RESP (Impedance) : Type CF Applied Part

SpO<sub>2</sub> : Type CF Applied Part

TEMP : Type CF Applied Part

BP : Type CF Applied Part

Cardiac Output : Type CF Applied Part

NIBP : Type BF Applied Part

Respiration Gas : Type BF Applied Part

Protection against

Defibrillation Discharge : Provided

Operation Mode : Continuous Operating Equipment

Waterproof Level : IPX0 (no protection)

Protection against Ignition

of Flammable Anesthetic : Not provided

## Power Requirements

Voltage : AC 100 to 240V  
 Frequency : 50Hz or 60Hz  
 Power Consumption : 110VA

## Usable Life

6 years : According to self-certification  
 Refer to "10. Maintenance Periodic Replacement Parts" for parts requiring periodic replacement.

## Performance

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### Display

Display Device : 12.1 inch TFT Color LCD  
 Resolution : 1024×768 pixel  
 Function Control : Fixed Keys (5) + Touch Keys  
 Waveform Trace : Stationary Trace  
 Sweep Speed : ECG/SpO<sub>2</sub>/BP (6.25mm/s, 12.5mm/s, 25mm/s, 50mm/s)  
                   RESP/CO<sub>2</sub>/O<sub>2</sub>/AGENT/AWP/AWF (6.25mm/s, 12.5mm/s, 25mm/s)  
 Parameter : ECG, HR, RESP, TEMP, SpO<sub>2</sub> (Arterial Oxygen Saturation), PR, BP, NIBP,  
                   CO<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub>O, Anesthetic Agent, Cardiac Output, Blood Temperature

### Operation

Touch Panel : Eight-Wire Resistive Analog Touch Screen

### ECG

**(IEC 60601-2-27 Ed. 2.0:2005 (b) Medical electrical equipment - Part 2-27: Particular requirements for the safety, including essential performance, of electrocardiographic monitoring equipment)**

Lead Type : Wired 3-electrode, 4-electrode, 5-electrode  
 Frequency Characteristic : 100Hz / 40Hz / 15Hz (High-cut filter can be changed.)  
 Input Impedance : 5MΩ or above  
 Max. Input Voltage : ±10mV  
 Polarization Voltage : ±825mV or above  
 Common Mode Rejection Ratio : 90dB or above  
 Lead-off Sensing : Less than 0.1μA  
 DC Current : Adult 0, 12 to 300bpm  
                   Neonate 0, 30 to 300bpm  
 HR Meas. Range : Adult/Child: average of 6 sec., Neonate: average of 3 sec.  
 Instant HR      Latest RR interval is used to calculate HR of every second  
 HR Meas. Accuracy : ±3bpm  
 HR Display : Response Time  
 Response Time : Average HR      Adult/Child: average of 6 sec., Neonate: average of 3 sec.  
                   Instant HR      Latest RR interval is used to calculate HR of every second  
 Waveform Size Selection : ×1/4 (2.5mm/mV)  
                           ×1/2 (5mm/mV)  
                           × 1 (10mm/mV)  
                           × 2 (20mm/mV)  
                           × 4 (40mm/mV)  
 Waveform Display Accuracy : Less than ±10%  
 Defibrillation Proof : Provided  
 Transient Characteristic : 3.2 sec, 0.3 sec, 0.1 sec (time constant can be changed)  
 Tall T-wave Rejection Capability : When tested according to IEC 60601-2-27: 2005 6.8.2 bb) 2), 1.2mV T-wave can be removed.

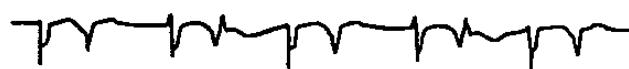
Heart rate meter accuracy and response to irregular rhythm (IEC 60601-2-27: 2005 6.8.2 bb) 4))  
80bpm Ventricular Bigeminy : 80bpm



60bpm Slow Alternating Ventricular Bigeminy : 60bpm



120bpm Rapid Alternating Ventricular Bigeminy : 120bpm



90bpm Bidirectional Systoles : 90bpm



Response time of heart rate meter to change in heart rate (IEC 60601-2-27: 2005 6.8.2 bb) 5))

HR change from 80bpm to 120bpm : Range 4.8 to 6.1 sec. Average 5.4 sec.

HR change from 80bpm to 40bpm : Range 5.1 to 5.7 sec. Average 5.4 sec.

Time to ALARM for tachycardia (IEC 60601-2-27: 2005 6.8.2 bb) 6))

Ventricular Tachycardia 1mVpp, 206bpm : Range 8.1 to 8.9 sec. Average 8.4 sec.



Ventricular Tachycardia 2mVpp, 206bpm : Range 8.0 to 8.5 sec. Average 8.3 sec.

Ventricular Tachycardia 0.5mVpp, 206bpm : Range 9.8 to 10.6 sec. Average 10.2 sec. (at  $\times 2$ )

Ventricular Tachycardia 2mVpp, 195bpm : Range 8.1 to 8.2 sec. Average 8.1sec.



Ventricular Tachycardia 4mVpp, 195bpm : Range 7.8 to 8.9 sec. Average 8.4 sec.

Ventricular Tachycardia 1mVpp, 195bpm : Range 8.6 to 10.2 sec. Average 9.3 sec.

Pacemaker Pulse Display Capability (IEC 60601-2-27: 2005 50.102.12)

3-electrodes : Detects with the selected lead.

4, 5-electrodes : If lead I, II, III is selected for ECG1, pulse is detected with the selected lead.  
If a lead other than lead I, II, III is selected, pulse is detected with lead II.

Capable to detect pulses of pulse width 0.1 to 2ms, amplitude  $\pm 2$  to  $\pm 700$ mV

Rejection of

Pacemaker Pulse : a) Pacemaker Pulse without Over/Uncross: Full pacemaker pulse amplitude range:  $\pm 2$ mV to  $\pm 700$ mV

Full duration range: 0.1ms to 2ms

b) Pacemaker Pulse with Over/Uncross:

Full pacemaker pulse amplitude range:  $\pm 2$ mV to  $\pm 700$ mV

Full duration range: 0.1ms to 2ms

Full uncross range: 4ms to 100ms

## Respiration

Method : Impedance Method

Frequency Characteristic : 1.5Hz (adult, child) / 2.5Hz (neonate)

Transient Characteristic : Time Constant 1.5 sec.

Current :  $100\mu A$  or lower

Measurement Range : 0, 4 to 150Bpm

Accuracy :  $\pm 3$  Bpm

Base Impedance :  $500\Omega$  to  $2k\Omega$

Delta Impedance :  $0.2\Omega$  to  $3.0\Omega$  or above

Frequency : 65kHz

Waveform Size Selection	: $\times 1/4$ (2.5mm/ $\Omega$ ) $\times 1/2$ (5mm/ $\Omega$ ) $\times 1$ (10mm/ $\Omega$ ) $\times 2$ (20mm/ $\Omega$ ) $\times 4$ (40mm/ $\Omega$ )
Waveform Display Accuracy	: Less than $\pm 20\%$
<b>Temperature</b>	
Method	: Thermistor Method
Probe	: only YSI-400 series
Measurement Range	: 0 to 50°C/32.0 to 122.0°F
Accuracy	: $\pm 0.2^\circ\text{C}$ ( $25^\circ\text{C}$ or above, below $45^\circ\text{C}$ ) $\pm 0.4^\circ\text{C}$ (below $25^\circ\text{C}$ , above $45^\circ\text{C}$ ) $\pm 0.1^\circ\text{F}$ ( $77^\circ\text{F}$ or above, below $113^\circ\text{F}$ ) $\pm 0.2^\circ\text{F}$ (below $77^\circ\text{F}$ , above $113^\circ\text{F}$ )
No. of Channels	: Max. 3 channels
Measurement	
Response Time	: Less than 150 sec.

### SpO<sub>2</sub> (Arterial Oxygen Saturation)

#### Nellcor® Model

Method	: 2 Wavelength Pulse Wave Method
Measurement Range	: 1 to 100%
Resolution	: 1%
Accuracy	: Adult      70 to 100% $\pm 2\%$ Neonate    70 to 100% $\pm 2\%$ The accuracy depends on the used sensor. Refer to the operation manual of the used sensor for details.
PR Measurement Range	: 20 to 250bpm
PR Accuracy	: $\pm 3\text{bpm}$
SpO <sub>2</sub> Display	: Functional SpO <sub>2</sub> is displayed. (Measures oxygenated hemoglobin and deoxygenated hemoglobin)

#### Masimo® Model

Method	: 2 Wavelength Pulse Wave Method
Measurement Range	: 1 to 100%
Resolution	: 1%
Accuracy	: Adult      70 to 100% $\pm 2\%$ Neonate    70 to 100% $\pm 3\%$
PR Measurement Range	: 25 to 240bpm
PR Accuracy	: $\pm 3\text{bpm}$
Perfusion Index	: 0.02 to 20%
SpO <sub>2</sub> Display	: Functional SpO <sub>2</sub> is displayed. (Measures oxygenated hemoglobin and deoxygenated hemoglobin)

### Blood Pressure

Transducer Sensitivity	: $5\mu\text{V} / \text{V} / \text{mmHg}$
Measurement Range	: -50 to 300 mmHg/-6.6 to 40.0kPa
Frequency Characteristic	: DC to 6Hz / 8Hz / 12Hz / 40Hz
Accuracy	: $\pm 2\%$ of full scale or within $\pm 1\text{mmHg}/0.1\text{kPa}$
Zero Balance Range	: Less than $\pm 150\text{mmHg}$
Measurement Range	: Adult      20 to 300bpm Neonate    30 to 300bpm
Accuracy	: The larger of $\pm 3\%$ or 1bpm
No. of Channels	: Max. 6 channels

**NIBP (Non-Invasive Blood Pressure)****(IEC 60601-2-30: 1999 Medical electrical equipment- Part 2: Particular requirements for the safety of automatic cycling indirect blood pressure monitoring equipment)****(EN 60601-2-30: 2000 Medical electrical equipment- Part 2: Particular requirements for the safety of automatic cycling indirect blood pressure monitoring equipment)****(AAMI SP10: 2002 + A1: 2003 + A2: 2006 Manual, electronic or automated sphygmomanometers)**

Method	:	Oscillometric Method
Measurement Range	: Adult	10 to 280mmHg/1.3 to 37.3kPa
	: Child	10 to 180mmHg/1.3 to 24.0kPa
	: Neonate	10 to 130mmHg/1.3 to 17.3kPa
Resolution	:	1mmHg
Static Pressure Accuracy	:	$\pm 3\text{mmHg}/0.4\text{kPa}$
Accuracy		
	Maximum Standard Deviation	: 8mmHg/1.0kPa
	Maximum Average Error	: $\pm 5\text{mmHg}/0.6\text{kPa}$
PR Measurement Range	:	40 to 240bpm $\pm 2\%$ or $\pm 2\text{bpm}$ (whichever greater)
Deflation Speed	:	$5 \pm 1\text{mmHg/sec}$ (Quick Measurement OFF) $10 \pm 2\text{mmHg/sec}$ (Quick Measurement ON)
Safety Mechanism	: Adult	300mmHg or above
	: Child	210mmHg or above
	: Neonate	150mmHg or above

**Gas Concentration (Multigas Unit: MGU-701/MGU-702, optional)**

The performance is according to the Criticare Systems Inc. OEM HIGH IQ™ AGENT MODULE specification.

Method	:	Sidestream; Non-dispersive infrared (NDIR)
Identified Gases	:	CO <sub>2</sub> , N <sub>2</sub> O, O <sub>2</sub> , Halothane, Enflurane, Isoflurane, Desflurane, and Sevoflurane
Flow Rates	:	100mL/min, 150mL/min, 200mL/min
Measurement Range	:	CO <sub>2</sub> 0 to 12.5% (0 to 99mmHg, 0 to 12kPa) N <sub>2</sub> O 0 to 99% O <sub>2</sub> 0 to 100% Halothane: 0 to 10% Enflurane: 0 to 10% Isoflurane: 0 to 10% Sevoflurane: 0 to 10% Desflurane: 0 to 20% RR 1 to 60 Bpm
Accuracy	:	CO <sub>2</sub> : $\pm 0.2\%$ abs. or 4% of reading N <sub>2</sub> O: $\pm(1.5\% \text{ abs.} + 4\% \text{ of reading})$ O <sub>2</sub> : $\pm 3 \text{ vol. \%}$ (0 to 90%) $\pm 4 \text{ vol. \%}$ (91 to 100%) Agents: $\pm(0.1\% \text{ abs.} + 4\% \text{ of reading})$ RR: $\pm 2 \text{ Bpm}$ or 2% of reading
Time to Detect Agent		<15 second@200mL/min
Agent Detection		
Resolution	:	0.1 Volume Percent
Detection Threshold	:	Halothane 0.2 vol. % Enflurane 0.3 vol. % Isoflurane 0.3 vol. % Sevoflurane 0.3 vol. % Desflurane 0.3 vol. %
Mixed Gas Threshold	:	0.2 vol. % + 10 % of total concentrations
Rise Time	:	CO <sub>2</sub> : 350msec N <sub>2</sub> O: 400msec O <sub>2</sub> : 600msec Agents: 450msec
Occlusion Clearing	:	Automatic
Auto Zeroing	:	Occurs 30 to 60 minutes Duration: 3.0 to 7.0 seconds Manual user calibration not required

Warm-up Time	: 1 minute to first waveforms <20 minutes to full accuracy
Operating Temperature	: 15 to 35°C
Operating Humidity	: 30 to 85% (non-condensing)
Storage Temperature	: -5 to 50°C
Storage Humidity	: 15% to 90% (non-condensing)
Altitude	: -1,000 to 10,000ft. (-300 to 3000m)

### Interfering Gases for Anesthetic Agents

The monitor will report small changes in agent concentrations when anesthetic agents and other gases are used. Expected agent changes are provided here for the purpose of comparison.

#### For Gas Mixtures of 5% CO<sub>2</sub>

Agents	Agent Volume	Change of CO <sub>2</sub>
N <sub>2</sub> O	60%	+0.2
Halothane	4%	+0.1
Enflurane	5%	+0.1
Isoflurane	5%	+0.1
Sevoflurane	5%	+0.2
Desflurane*	5%	0.0
Helium	50%	0.0
Ethanol	1%	+0.1
Isopropanol	1%	0.0
Acetone	1%	+0.1
Methane	1%	0.0
Metered dose inhaler propellant	1%	0.0
80% Xenon	Not intended for use with Xenon	N/A

#### For Gas Mixtures of 30% O<sub>2</sub>

Agents	Agent Volume	Change of CO <sub>2</sub>
N <sub>2</sub> O	60%	-0.1
Halothane	4%	-0.2
Enflurane	5%	-0.2
Isoflurane	5%	-0.2
Sevoflurane	5%	-0.2
Desflurane*	5%	-0.2
Helium	50%	-0.3
Ethanol	1%	-0.2
Isopropanol	1%	+0.5
Acetone	1%	+0.1
Methane	1%	-0.1
Metered dose inhaler propellant	1%	+0.2
80% Xenon	Not intended for use with Xenon	N/A

**For Gas Mixtures of 2% Halothane**

Agents	Agent Volume	Change of CO <sub>2</sub>
N <sub>2</sub> O	60%	+0.1
Halothane	4%	N/A
Enflurane	5%	+0.1
Isoflurane	5%	-0.1
Sevoflurane	5%	+0.1
Desflurane*	5%	+0.1
Helium	50%	-0.1
Ethanol	1%	0.0
Isopropanol	1%	+0.1
Acetone	1%	+0.1
Methane	1%	0.0
Metered dose inhaler propellant	1%	0.0
80% Xenon	Not intended for use with Xenon	N/A

**For Gas Mixtures of 2% Enflurane**

Agents	Agent Volume	Change of CO <sub>2</sub>
N <sub>2</sub> O	60%	0.0
Halothane	4%	+0.3
Enflurane	5%	N/A
Isoflurane	5%	+0.1
Sevoflurane	5%	-0.2
Desflurane*	5%	+0.1
Helium	50%	+0.1
Ethanol	1%	+0.1
Isopropanol	1%	+0.1
Acetone	1%	+0.1
Methane	1%	0.0
Metered dose inhaler propellant	1%	+0.1
80% Xenon	Not intended for use with Xenon	N/A

**For Gas Mixtures of 2% Isoflurane**

Agents	Agent Volume	Change of CO <sub>2</sub>
N <sub>2</sub> O	60%	0.0
Halothane	4%	-0.1
Enflurane	5%	+0.6
Isoflurane	5%	N/A
Sevoflurane	5%	+0.2
Desflurane*	5%	-0.2
Helium	50%	0.0
Ethanol	1%	+0.1
Isopropanol	1%	+0.1
Acetone	1%	+0.1
Methane	1%	0.0
Metered dose inhaler propellant	1%	+0.1
80% Xenon	Not intended for use with Xenon	N/A

**For Gas Mixtures of 2% Sevoflurane**

Agents	Agent Volume	Change of CO <sub>2</sub>
N <sub>2</sub> O	60%	0.0
Halothane	4%	+0.3
Enflurane	5%	+0.6
Isoflurane	5%	+0.2
Sevoflurane	5%	N/A
Desflurane*	5%	-0.2
Helium	50%	0.0
Ethanol	1%	+0.1
Isopropanol	1%	+0.1
Acetone	1%	+0.1
Methane	1%	0.0
Metered dose inhaler propellant	1%	+0.1
80% Xenon	Not intended for use with Xenon	N/A

**For Gas Mixtures of 2% Desflurane**

Agents	Agent Volume	Change of CO <sub>2</sub>
N <sub>2</sub> O	60%	0.0
Halothane	4%	+0.5
Enflurane	5%	+0.4
Isoflurane	5%	+0.5
Sevoflurane	5%	-0.1
Desflurane*	5%	N/A
Helium	50%	-0.1
Ethanol	1%	0.0
Isopropanol	1%	0.0
Acetone	1%	0.0
Methane	1%	-0.1
Metered dose inhaler propellant	1%	+0.2
80% Xenon	Not intended for use with Xenon	N/A

**For Gas Mixtures of 40% N<sub>2</sub>O**

Agents	Agent Volume	Change of CO <sub>2</sub>
N <sub>2</sub> O	60%	N/A
Halothane	4%	+1.0
Enflurane	5%	+1.2
Isoflurane	5%	+1.3
Sevoflurane	5%	+1.0
Desflurane*	5%	+1.2
Helium	50%	+0.4
Ethanol	1%	+0.8
Isopropanol	1%	+1.5
Acetone	1%	-0.1
Methane	1%	+0.5
Metered dose inhaler propellant	1%	+0.3
80% Xenon	Not intended for use with Xenon	N/A

\*Presence of 15% Desflurane in a mixture with other halogenated gases will result in the display of 15% Desflurane readings or greater.

**Other Interference**

Ether, cyclopropane and methoxyflurane are contraindicated for use with the multigas unit. The effect of ethyl alcohol and metabolic ketones and acetone are negligible.

 <b>WARNING</b>	The multigas unit is not intended for monitoring gas mixtures containing methoxyflurane or halogenated hydrocarbons not specifically listed as a monitored gas.
--	---

## **Gas Concentration (Multigas Unit: MGU-801P/MGU-802/MGU-803, optional)**

The performance is according to the ARTEMA Medical AB OEM AION<sup>TM</sup> Multigas module specification.

### **Sampling Flow and Accuracy:**

Flow Range : 70 to 200mL/min  
Accuracy :  $\pm 10\text{mL/min}$  or  $\pm 10\%$ , whichever is greater

### **System Response Time:**

< 4 sec.  
(Includes sampling delay and response time when using the sampling line shorter than 2.5m.)

### **Warm-Up Time:**

ISO Accuracy : 45 sec.  
Full Accuracy : 10 min.

### **Auto Zeroing Interval:**

ISO Accuracy : 30 sec.  
Full Accuracy : 4 hours

### **Measurement Method:**

CO<sub>2</sub>, N<sub>2</sub>O, Agents: Sidestream, Non-dispersive infra-red (NDIR) technology  
O<sub>2</sub>: Paramagnetic oxygen technology (MGU-801P only)

#### **CO<sub>2</sub>:**

Measurement Range: 0 to 10.0vol%  
(0 to 76mmHg, 0 to 10kPa)

Measurement Rise Time: 250ms

##### **Accuracy:**

0 to 1% of Volume :  $\pm 0.1\%$  of Reading\*  
1 to 5% of Volume :  $\pm 0.2\%$  of Reading\*  
5 to 7% of Volume :  $\pm 0.3\%$  of Reading\*  
7 to 10% of Volume :  $\pm 0.5\%$  of Reading\*  
>10% of Volume : Unspecified

##### **Interference from other gases:**

O<sub>2</sub> : 0.1% of Reading  
N<sub>2</sub>O : 0.1% of Reading  
Any agent : 0.3% of Reading

Threshold : 0.1vol% (0.3% during ISO accuracy mode)  
(0.0% is displayed if value is < 0.1%).

#### **Respiration Rate:**

Resp. Detection : >1.0vol% change in CO<sub>2</sub> level  
Measurement Range : 0, 2 to 100Bpm  
Accuracy :  $\pm 1\text{Bpm}$  @ < 60Bpm  
Unspecified @ >60 Bpm

#### **O<sub>2</sub> (MGU-801P only):**

Measurement Range : 0 to 100vol%  
Measurement Rise Time : 500ms (@200mL/min)  
: 600ms (@120mL/min)

##### **Accuracy:**

0 to 25% of Volume :  $\pm 1\%$  of Reading\*  
25 to 80% of Volume :  $\pm 2\%$  of Reading\*  
80 to 100% of Volume :  $\pm 3\%$  of Reading\*

##### **Interference from other gases:**

CO<sub>2</sub> : 0.2% of Reading  
N<sub>2</sub>O : 0.2% of Reading  
Any Agent : 1.0% of Reading

#### **N<sub>2</sub>O:**

Measurement Range : 0 to 100vol%  
Measurement Rise Time : 250ms

Accuracy	
0 to 20% of Volume	: ±2% of Reading*
20 to 100% of Volume	: ±3% of Reading*
Interference from other gases;	
CO <sub>2</sub>	: 0% of Reading
O <sub>2</sub>	: 0% of Reading
Any agent	: 0% of Reading
Threshold	: 3vol% (3% during ISO accuracy mode) (0.0% is displayed if value is < 3%).)

#### Anesthetic agents:

Measurement Range:	
Halothane, Enflurane, and Isoflurane	: 0 to 5vol%
Sevoflurane	: 0 to 8vol%
Desflurane	: 0 to 18vol%

#### Measurement Rise Time:

Halothane, Isoflurane, Sevoflurane, and Desflurane: 300ms  
Enflurane : 350ms

#### Accuracy:

Halothane, enflurane, and isoflurane	
0 to 1% of Volume	: ±0.15% of Reading*
1 to 5% of Volume	: ±0.2% of Reading*
>5% of Volume	: Unspecified
Sevoflurane	
0 to 1% of Volume	: ±0.15% of Reading*
1 to 5% of Volume	: ±0.2% of Reading*
5 to 8% of Volume	: ±0.4% of Reading*
>8% of Volume	: Unspecified
Desflurane	
0 to 1% of Volume	: ±0.15% of Reading*
1 to 5% of Volume	: ±0.2% of Reading*
5 to 10% of Volume	: ±0.4% of Reading*
10 to 15% of Volume	: ±0.6% of Reading*
15 to 18% of Volume	: ±1.0% of Reading*
>18% of Volume	: Unspecified

#### Interference from other gases:

CO <sub>2</sub>	: 0% of Reading
N <sub>2</sub> O	: 0.1% of Reading
O <sub>2</sub>	: 0.1% of Reading
2nd agent	: 0.2% of Reading (Typical)

Threshold:	Primary agent ID 0.15% (0.4% during ISO accuracy mode)
	Secondary agent ID 0.3% (0.5% during ISO accuracy mode) or 5% <sub>REL</sub> (10% <sub>REL</sub> for Isoflurane) of primary agent if primary agent >10%

\*Specification reflects International Standards Organization accuracy conditions:

- Add ±0.3% <sub>ABS</sub> to inaccuracy for CO<sub>2</sub>
- Add ±0.8% <sub>REL</sub> to inaccuracy of all Agents
- N<sub>2</sub>O inaccuracy is ±(8% <sub>REL</sub> +2% <sub>ABS</sub>)
- O<sub>2</sub> no addition

#### Contaminants Interference:

Contaminant	Interference [% <sub>ABS</sub> ]		
	CO <sub>2</sub>	N <sub>2</sub> O	Agents
< 1% Acetone	0.1	0.1	0
< 1% Methane	0.1	0.1	0
< 0.1% Ethanol	0	0.1	0
< 80 % He	Unspecified	Unspecified	Unspecified
< 50 ppm NO	Unspecified	Unspecified	Unspecified
< 80% N <sub>2</sub>	0	0	0

**DRYLINE™ WaterTrap:**

Emptying interval (half full, worst case),  
Adult : 17 h @ 200 ml/min, 37°C, 100% RH  
Neonate : 20 h @ 120 ml/min, 37°C, 100% RH

**Gas Concentration (HPD-800 with RESPIRONICS® Capnostat 5, optional)**

Method	: Infra-Red Solid-State Method, Mainstream Method
Measurement Range	: 0 to 150mmHg
Initialization Time	: Within 15 seconds until the measurement can be performed Within 2 minutes until maximum accuracy is achieved
Measurement Accuracy	: 0 to 40mmHg: ± 2mmHg 41 to 70mmHg: ± 5% 71 to 100mmHg: ± 8% 101 to 150mmHg: ± 10%
Response Time	: Airway Adapter (Adult) 60ms and below Airway Adapter (Pediatric) 50ms and below
RR Measurement Range	: 0 to 150Bpm
RR Measurement Accuracy	: ± 1Bpm

**Cardiac Output**

Measurement Method	: Thermodilution Method
Measurement Range	: 0.1 to 20L/min
Measurement Accuracy	: 0.1 to 10L/min: less than ± 10% 10 to 20L/min: less than ± 15%
Measurement Temperature Range and Accuracy	
Blood Temperature	: 17 to 45°C ± 0.3°C
Injectate Temperature	: -1 to 35°C ± 0.5°C

**Recording**

Recording Speed	: 50mm/s, 25mm/s (Error: within ±5%)
Resolution	
Head Direction	: 8 dots/mm
Feed Direction	: 40 lines/mm (at recording speed of 25mm/s)
Rec. Waveform	: 3 waveforms
Rec. Type	: Waveform Recording, Table Recording, Graphic Recording
Detection	: Paper out, page mark, paper cassette error, printhead temperature
Protective Circuit	: Printhead overcurrent, printhead overheating, motor overcurrent, surge current

**Analog Waveform Output**

Output Voltage	: ECG output 1V/mV (fixed), BP output 1V/100mmHg (fixed)
Output Voltage Accuracy	: within ±10% (Both ECG and BP output)
Delay Time	: 35ms and below (Both ECG and BP waveform)
Frequency Range	: ECG output 0.05Hz to 30Hz BP output DC to 30Hz
Pacemaker Pulse	: No Pacemaker Pulse

## Setup Item

## Default and Backup

This section lists selection, default setting, and backup status for each setup item.

### Backup Status

- “○” : The setting will be retained even when the power is turned OFF.
- “△” : The setting will be retained even when the power is turned OFF. When discharge procedure is performed, the value will be reset to the initial setting.
- “—” : The setting will be reset to the initial setting when the power is turned OFF.
- “○/△” : The setting will be retained even after a discharge procedure if **ON** is selected for “Backup at Discharge” in the “Discharge Mode” menu. If **OFF** is selected, the setting will be initialized after a discharge procedure.  
Alarm setting will be initialized with the selected alarm mode.  
Display configuration will be initialized with the selected display mode.



Refer to “9. Initial Settings –Operation at Discharge–” for procedure to set “Backup at Discharge”.

## Patient Admit / Discharge

Item	Selection	Default	Backup
Patient Name	Numeric, Alphabet, Symbol (16 characters)	Blank	△
Sex	Male, Female	Undetermined	△
Age	0 to 150 years or 0 to 999 days	0 year	△
Height	0.0 to 300.0cm	0.0cm	△
Weight	0.0 to 350.0kg	0.0kg	△
BSA	0.00 to 9.99m <sup>2</sup>	0.00 m <sup>2</sup>	△
BSA/BMI Display	BSA,BMI	BSA	○
Blood Type	A, B, O, AB Rh +/-	Blank	△
Birth Date	Year, Month, Day	Blank	△
ID	Numeric, Alphabet, Symbol (20 characters)	Blank	△
Patient Classification	Adult, Child, Neonate	Adult	○
Pacemaker	Yes, No	No	△
Filter Mode	Monitor, Diagnosis, ESIS	Monitor	○
Admit Date	Year, Month, Day	Blank	△

## Alarm Setup

Item	Selection	Default	Backup
HR PR-SpO <sub>2</sub> PR-IBP	ON, OFF 20 to 300bpm	Adult: ON 50 to OFF Child: ON 60 to OFF Neonate: ON 70 to OFF	O/Δ
ASYSTOLE	ON 3 to 10sec.	ON 5sec.	O/Δ
VF	ON, OFF	ON	
VT	ON, OFF	ON	
SLOW VT	ON, OFF	OFF	
RUN	ON, OFF 2 to 8 beats	OFF 3 beats	
COUPLET	ON, OFF	OFF	
PAUSE	ON, OFF 1.5 to 5sec.	OFF 3.0sec.	
BIGEMINY	ON, OFF	OFF	
TRIGEMINY	ON, OFF	OFF	
FREQUENT	ON, OFF 1 to 50 beats/min.	OFF, 10beats/min.	
TACHY	ON, OFF	OFF	
BRADY	ON, OFF	OFF	
ST(I), ST(II), ST(III), ST(aVR), ST(aVL), ST(aVF), ST(V) (mm)	ST All Alarm ON, OFF Indiv. Alarm ON, OFF -20mm to +20mm	ST All Alarm OFF Indiv. Alarm OFF OFF to OFF	O/Δ
ST(I), ST(II), ST(III), ST(aVR), ST(aVL), ST(aVF), ST(V) (mV)	ST All Alarm ON, OFF Indiv. Alarm ON, OFF -2.0mV to +2.0mV	ST All Alarm OFF Indiv. Alarm OFF OFF to OFF	O/Δ
BP1	ON, OFF 0 to 300mmHg, 0 to 40kPa	ON S 80 to 200mmHg 10 to 27kPa D OFF to OFF M OFF to OFF	O/Δ
BP2-6	ON, OFF 0 to 300mmHg, 0 to 40kPa	OFF S OFF to OFF D OFF to OFF M OFF to OFF	O/Δ
CVP (mmHg)	ON, OFF 0 to 300mmHg 0 to 40kPa	OFF S OFF to OFF D OFF to OFF M OFF to OFF	O/Δ
CVP (cmH <sub>2</sub> O)	ON, OFF 0 to 40 cmH <sub>2</sub> O	OFF S OFF to OFF D OFF to OFF M OFF to OFF	
RR (RR-IMP, RR-CO <sub>2</sub> , RR-VENT) (Adult)	ON, OFF 5 to 150Bpm	ON 5 to 30	O/Δ
RR (RR-IMP, RR-CO <sub>2</sub> , RR-VENT) (Child, Neonate)	ON, OFF 2 to 150Bpm	ON 5 to 30	O/Δ
APNEA	ON, OFF 10 to 60sec.	ON 60 sec.	O/Δ
SpO <sub>2</sub>	ON, OFF 70 to 100%	Adult: ON 90 to OFF Child: ON 90 to OFF Neonate: ON 85 to OFF	O/Δ

<b>Item</b>	<b>Selection</b>	<b>Default</b>	<b>Backup</b>	
NIBP	ON, OFF 10 to 300mmHg Adult: S low 60 to 245mmHg 8.0 to 32.5kPa up 65 to 250mmHg 8.5 to 33.0kPa D low 40 to 195mmHg 5.0 to 25.5kPa up 45 to 200mmHg 5.5 to 26.0kPa M low 45 to 230mmHg 6.0 to 30.5kPa up 50 to 235mmHg 6.5 to 31.0kPa Child: S low 40 to 175mmHg 5.0 to 23.5kPa up 45 to 180mmHg 5.5 to 24.0kPa D low 20 to 145mmHg 2.5 to 19.5kPa up 25 to 150mmHg 3.0 to 20.0kPa M low 30 to 155mmHg 4.0 to 20.5kPa up 35 to 160mmHg 4.5 to 21.0kPa Neonate: S low 30 to 115mmHg 4.0 to 15.5kPa up 35 to 120mmHg 4.5 to 16.0kPa D low 10 to 85mmHg 1.0 to 11.5kPa up 15 to 90mmHg 1.5 to 12.0kPa M low 15 to 95mmHg 2.0 to 12.5kPa up 20 to 100mmHg 2.5 to 13.0kPa	Adult : ON S 70 to 200mmHg 9 to 27kPa D OFF to OFF M OFF to OFF Child : ON S 70mmHg to OFF 9kPa to OFF D OFF to OFF M OFF to OFF Neonate : ON S 50mmHg to OFF 7kPa to OFF D OFF to OFF M OFF to OFF	O/Δ	
TEMP1-TEMP3 (°C)	ON, OFF 30 to 50°C/86 to 122°F	OFF OFF to OFF	O/Δ	
Tb (°C)	ON, OFF 30 to 45°C/86 to 113°F	OFF OFF to OFF		
EtCO <sub>2</sub> (mmHg)	ON, OFF 1 to 115mmHg	OFF	O/Δ	
EtCO <sub>2</sub> (kPa)	ON, OFF 0.1 to 15.0kPa	OFF		
EtCO <sub>2</sub> (%)	ON, OFF 0.1 to 15.0%	OFF		
In-CO <sub>2</sub> (mmHg)	ON, OFF 1 to 24mmHg	OFF	O/Δ	
In-CO <sub>2</sub> (kPa)	ON, OFF 0.1 to 3.0kPa	OFF		
In-CO <sub>2</sub> (%)	ON, OFF 0.1 to 3.0%	OFF		
Ex-O <sub>2</sub> (%)	ON, OFF 10 to 100%	OFF	O/Δ	
FiO <sub>2</sub> (%)	ON, OFF 18 to 100%	OFF		
In-N <sub>2</sub> O (%)	ON, OFF 0 to 100%	OFF		
Ex-N <sub>2</sub> O (%)	ON, OFF 0 to 100%	OFF	O/Δ	
Ex-ISO (%)	ON, OFF 0.5 to 6.0%	OFF		
Ex-HAL (%)				
Ex-ENF (%)				
In-ISO (%)	ON, OFF 0.5 to 6.0%	OFF	O/Δ	
In-HAL (%)				
In-ENF (%)				
Ex-DES (%)	ON, OFF 0.5 to 20.0%	OFF		
In-DES (%)	ON, OFF 0.5 to 20.0%	OFF		
Ex-SEV (%)	ON, OFF 0.5 to 8.0%	OFF		
In-SEV (%)	ON, OFF 0.5 to 8.0%	OFF		
MAC	ON, OFF 0 to 10	OFF		

<b>Item</b>	<b>Selection</b>	<b>Default</b>	<b>Backup</b>
Alarm Setup	Alarm Silence	1, 3, 5min.	<input type="radio"/>
	Alarm Sound (Suspend)	3min, 10min, 30min, 60min., 90min., 120min.	<input type="radio"/>
	Alarm Limit Display	Graph, Numeric, OFF	<input type="radio"/>
	Save Data to Table	ON, OFF	<input type="radio"/>
	Status Alarm Control	Linked to alarm silence time, Linked to each new occurrence	<input type="radio"/>

<b>NOTE</b>	If <b>ON</b> is selected for “Backup at Discharge” on the Dicharge Mode setup under the Initial Settings menu, the set value will be stored even after a discharge procedure is performed. If <b>OFF</b> is selected, the alarm settings will be initialized with the selected alarm mode.
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## Parameter Setup

	<b>Item</b>	<b>Selection</b>	<b>Default</b>	<b>Backup</b>
ECG	Lead	I, II, III, aVR, aVL, aVF, V	ECG1 II ECG2 aVR ECG3 I ECG4 III ECG5 aVL ECG6 aVF ECG7 V	O/Δ
	Waveform Size	×1/4, ×1/2, ×1, ×2, ×4	ECG1, ECG2 ×1	O/Δ
	Filter Mode	Monitor, Diagnosis, ESIS	Monitor	O
	Impedance Meas.	ON, OFF	ON	△
	Pacemaker	Yes, No	No	△
	Pacemaker Pulse	ON, OFF	OFF	O
	Pace Pulse Mask Time	Auto, 10ms, 20ms, 40ms, OFF	Auto	△
	AC Filter	ON, OFF	ON	O
	ECG Drift Filter	ON, OFF	OFF	O
	Automatic Lead Switch	ON, OFF	OFF	O
	Sync. Mark/Tone	HR, PR, OFF, Sync.	HR	O
	HR Average	Instant, Average	Average	O
	Arrhy. Analysis Filter	Disp Waveform, Fixed	Disp Waveform	O
	HR Low Limit for VT	120, 140	120	O
	Noise Detection	ON, OFF	ON	O
	HR/PR Alarm Source	HR, PR, Auto	HR	O
	ST/VPC/Arrhy. Alarm Display	ON, OFF	ON	O
RESP	ECG Waveform Display during Lead-OFF	ON, OFF	OFF	O
	HR Display during Lead-OFF	ON, OFF	OFF	O
	Waveform Size	×1/4, ×1/2, ×1, ×2, ×4	×1	△
	RR Sync. Indicator	ON, OFF	ON	O
	RR Source	Impedance, Ventilator, GAS	Impedance	O
SpO <sub>2</sub> (DS-7000)	Impedance Meas	ON, OFF	ON	△
	CVA	ON, OFF	ON	△
	Waveform Size	×1/4, ×1/2, ×1, ×2, ×4	×1	△
	SpO <sub>2</sub> SEC Alarm	OFF, 10, 25, 50, 100	OFF	O
	PR Source	SpO <sub>2</sub> /BP, BP/SpO <sub>2</sub>	SpO <sub>2</sub> /BP	O
	Alarm during NIBP	ON, OFF	ON	O
	Sync. Mark/Tone	HR, PR, OFF, Sync.	HR	O
	HR/PR Alarm Source	HR, PR, Auto	HR	O

<b>Item</b>	<b>Selection</b>	<b>Default</b>	<b>Backup</b>
SpO <sub>2</sub> (DS-7000M)	Waveform Size	×1/4, ×1/2, ×1, ×2, ×4	×1
	PR Source	SpO <sub>2</sub> /BP, BP/SpO <sub>2</sub>	SpO <sub>2</sub> /BP
	Alarm during NIBP	ON, OFF	OFF
	SpO <sub>2</sub> Averaging	2-4sec. 4-6sec. 8sec. 10sec. 12sec. 14sec. 16sec.	8sec.
	Sync. Mark/Tone	HR, PR, OFF, Sync.	HR
	HR/PR Alarm Source	HR, PR, Auto	HR
	Pulse Sens.	High, Low	Low
	FAST SAT	ON, OFF	OFF
	PI Display	ON, OFF	ON
	Signal IQ Wave	ON, OFF	OFF
NIBP	SpO <sub>2</sub> Low Perfusion Alarm	Level 3, Level 4	Level 3
	Interval	OFF, Cont., 1M, 2M, 2.5M, 5M, 10M, 15M, 30M, 60M, 120M	2.5M
	NIBP Measurement at Alarm Occurrence	ON, OFF	ON
		HR, ST, RR, APNEA, SpO <sub>2</sub> , BP1, BP2, BP3, BP4, BP5, BP6, T1, T2, T3, Tb, CO <sub>2</sub> , O <sub>2</sub> , N <sub>2</sub> O, AGT, MAC	HR, SpO <sub>2</sub> , T1, CO <sub>2</sub>
		Asystole, VF, VT, Slow VT, Run, Couplet, Pause, Bigeminy, Trigeminy, Frequent, Tachy, Brady	(No selection)
	Patient Classification	Adult, Child, Neonate	Adult
	Quick Meas.	ON, OFF	ON
	Dyna Alert	ON, OFF	ON
	SMART Inflation	ON, OFF	OFF
	Osc. Graph Display	ON, OFF	ON
BP1 to 6	Mean BP Display	ON, OFF	ON
	PR Display	ON, OFF	OFF
	End Tone	ON, OFF	ON
	Pump Setup	Normal, Silent	Normal
	Start 5min. Early	ON, OFF	OFF
	NIBP Data Erase Time	60min, 120min	120min
	Displayed Time	Elapsed Time, Meas. Time	Elapsed Time
	Scale (The selectable scale depends on the BP label.)	20, 50, 75, 100, 150, 200, 250, 300 (mmHg) 4, 8, 12, 16, 20, 24, 32, 40 (kPa)	200mmHg 50mmHg (BP2) 24kPa 8kPa (BP2)
	Label	BP *, ART, RAP, RVP, PAP, CVP, ICP, UAP, LAP, LVP, Label 1, Label 2	BP *: BP1 to BP6
	Filter	6, 8, 12, 40Hz	12Hz
Item with *mark will be displayed only for BP1 or when BP label is ART	Display Type	S/D/M, S/D, M	S/D/M
	Mean Wave	ON, OFF	OFF
	Respiration Filter	ON, OFF	OFF
	PR Source Setup*	SpO <sub>2</sub> /BP, BP/SpO <sub>2</sub>	SpO <sub>2</sub> /BP
	BP Record Scale	40mm, 20mm	40mm
	HR/PR Alarm Source*	HR, PR, Auto	HR
	Alarm during NIBP	ON, OFF	ON
	Label	T *, Tsk, Tre, Tes, Tco, Label 1, Label 2, Label 3	T *: (T1 to T3)
	ΔT Display	ON, OFF	ON
			O/△
TEMP 1 to 3			O/△

<b>Item</b>	<b>Selection</b>	<b>Default</b>	<b>Backup</b>
VENT	AWP Scale	10, 20, 30, 50, 120cmH <sub>2</sub> O	50 cmH <sub>2</sub> O
	AWF Scale	5, 10, 20, 50, 180 L/min	20L/min
Cardiac Output	Auto Start	ON, OFF	ON
	Time Scale	30sec., 60sec.	30sec.
CO <sub>2</sub>	Scale	50, 100mmHg	50mmHg
		4, 8, 10kPa	4kPa
		4, 8, 10%	4%
	Unit	mmHg, kPa, %	mmHg
O <sub>2</sub>	Scale	18–30, 18–60, 18–100, 0–30, 0–60, 0–100%	18–30%
AGT	Label	ISO, HAL, ENF, SEV, DES, Auto	Auto
	Scale	4, 8, 16%	4%
GAS (MGU-701/702)	GAS Meas.	ON, OFF	ON
	Flow Rate	100, 150, 200mL/min	100mL/min
	Wave Clip	ON, OFF	ON
GAS (MGU-801P/802/803)	GAS Meas.	ON, OFF	ON
	Flow Rate (when using Water Trap for Adult)	120, 150, 200mL/min	200mL/min
	Flow Rate (when using Water Trap for Neonate)	70, 100, 120mL/min	120mL/min
	Wave Clip	ON, OFF	ON
GAS (Capnostat5)	GAS Meas.	ON, OFF	ON
	EtCO <sub>2</sub> Peak Picking Duration	10, 20 sec., OFF	10 sec.
	O <sub>2</sub> Comp.	0–100%	21%
	N <sub>2</sub> O Comp.	ON, OFF	OFF
	Anesthetic Comp.	0.0–20.0%	0.0%
	Atmos. Pressure	400–850mmHg	760mmHg
Vigilance	STAT Mode	ON, OFF	OFF
	Index Display	ON, OFF	OFF
SpO <sub>2</sub> (R)	Size	×1/4, ×1/2, ×1, ×2, ×4	×1

\* The scale selection will differ depending on the label.

## Review Function Setup

<b>Item</b>	<b>Selection</b>	<b>Default</b>	<b>Backup</b>	
Trend	1st Page Upper	HR, NIBP, SpO <sub>2</sub> , VPC, ST(I), ST(II), ST(III), ST(aVR), ST(aVL), ST(aVF), ST(V), BP1, BP2, BP3, BP4, BP5, BP6, RR-IMP, APNEA, PDP, PCWP, CPP, PR-SpO <sub>2</sub> , T1, T2, T3, PR-IBP, Tb, CO, SvO <sub>2</sub> , CCO, CCI, BT, RR-CO <sub>2</sub> , RR-VENT, EtCO <sub>2</sub> , In-CO <sub>2</sub> , Ex-O <sub>2</sub> , FiO <sub>2</sub> , Ex-N <sub>2</sub> O, In-N <sub>2</sub> O, AGENT, $\Delta$ T, ScvO <sub>2</sub> , MV, BIS, SQI, EMG, SR, MAC	HR, NIBP, OFF, OFF	<input type="radio"/>
	1st Page Lower	SpO <sub>2</sub> , RR-IMP, T1, EtCO <sub>2</sub>	<input type="radio"/>	
	2nd Page Upper	BP1, OFF, OFF, FiO <sub>2</sub>	<input type="radio"/>	
	2nd Page Lower	In-CO <sub>2</sub> , Ex-O <sub>2</sub> , ST(II), VPC	<input type="radio"/>	
	Time	1, 2, 4, 8, 12, 24hrs.	1hr	<input type="radio"/>
	Auto Scale : ON, OFF	ON	<input type="radio"/>	
	HR, PR-SpO <sub>2</sub> , PR-IBP : 100, 200, 300bpm	100bpm		
	ST: $\pm$ 0.2, $\pm$ 0.5, $\pm$ 1.0, $\pm$ 2.0mV $\pm$ 2, $\pm$ 5, $\pm$ 10, $\pm$ 20mm	$\pm$ 0.5mV $\pm$ 5mm		
	VPC: 20, 50, 100 beats	20 beats		
	BP1 to BP6, PDP, CPP, PCWP : 20, 50, 100, 150, 200, 300mmHg 4, 8, 16, 20, 24, 40kPa	150mmHg/24kPa		
	NIBP: 100, 150, 200, 300mmHg 16, 20, 24, 40kPa	150mmHg/24kPa		
	TEMP1 to TEMP3, Tb : 20–45, 30–40 °C 86–104, 68–113 °F	30–40°C 86–104°F		
	SpO <sub>2</sub> : 0–100, 50–100, 80–100%	80–100%		
	RR-IMP, RR-VENT, RR-CO <sub>2</sub> , : 50, 100, 150Bpm	50Bpm		
	APNEA: 16, 30, 70sec.	16sec.		
	SvO <sub>2</sub> : 0–100, 50–100, 80–100%	80–100%		
	ScvO <sub>2</sub> : 0–100, 50–100, 80–100%	80–100%		
	CCO: 6, 12, 20, 60L/min	20L/min		
	CCI: 6, 12, 20L/min/m <sup>2</sup>	6L/min/m <sup>2</sup>		
	BT: 20–46, 30–40°C	30–40°C		
	EtCO <sub>2</sub> , In-CO <sub>2</sub> : 50, 100mmHg 4, 8, 10kPa 4, 8, 10%	50mmHg	<input type="radio"/>	
	Ex-O <sub>2</sub> , FiO <sub>2</sub> : 50, 100%	50%		
	Ex-N <sub>2</sub> O, In-N <sub>2</sub> O: 50, 100%	50%		
	AGENT: 4, 8, 10%	4%		
	BIS: 25, 50, 75, 100	100		
	MV: 6.0, 12.0, 20.0, 60.0L/min	20.0L/min		
	SQI: 25, 50, 75, 100%	25%		
	EMG : 25, 50, 75, 100dB	25dB		
	SR : 25, 50, 75, 100%	25%		
	CO : 6.0, 12.0, 20.0 L/min	6.0L/min		
	Tb : 30–40, 20–45°C 86–104, 68–113°F	30–40°C 86–104°F		
	$\Delta$ T : 10, 25°C 18, 45°F	10°C 18°F		
	MAC: 5.0, 10.0	5.0		
	SpO <sub>2</sub> (R) : 80-100, 50-100, 0-100	80-100%		
	PR(R) : 100, 200, 300bpm	100bpm		
	PI(R) : 10.00, 20.00%	20.00%		
	PVI(R) : 30, 60, 100%	100%		
	SpCO(R) : 20, 40, 100%	100%		
	SpMet(R) : 20.0, 40.0, 100.0%	100.0%		
	SpHb(R) : 10.0, 20.0, 30.0g/dL	30g/dL		

<b>Item</b>		<b>Selection</b>	<b>Default</b>	<b>Backup</b>
Trend	Scale	SpOC(R) : 10, 20, 40mL/dL	40mL/dL	<input type="radio"/>
	Duration	1, 2, 2.5, 5, 10, 15, 30, 60min, NIBP	10min.	<input type="radio"/>
	Table Setup	HR/PR, NIBP, PR-NIBP, SpO <sub>2</sub> , VPC, ST(I), ST(II), ST(III), ST(aVR), ST(aVL), ST(aVF), ST(V), BP1, BP2, BP3, BP4, BP5, BP6, RR-IMP, APNEA, PDP, PCWP, CPP, Tb, T1, T2, T3, CO, SvO <sub>2</sub> , CCO, CCI, BT, CO <sub>2</sub> , O <sub>2</sub> , N <sub>2</sub> O, AGENT, MAC, ScvO <sub>2</sub> , BIS, SQI, EMG, SR, MV, ΔT, ARRHY, RR-CO <sub>2</sub> , RR-VENT, SpO <sub>2</sub> (R), PR(R), PI(R), PVI(R), SpCO(R), SpMet(R), SpHb(R), SpOC(R)	HR/PR, NIBP, SpO <sub>2</sub> , T1, BP1, BP2, RR-CO <sub>2</sub> , CO <sub>2</sub> , O <sub>2</sub> , N <sub>2</sub> O, AGENT, VPC, ST(II), OFF, OFF, OFF, OFF, OFF	<input type="radio"/>
Table	Basic Table Setup	HR/PR, NIBP, PR-NIBP, SpO <sub>2</sub> , VPC, ST(I), ST(II), ST(III), ST(aVR), ST(aVL), ST(aVF), ST(V), BP1, BP2, BP3, BP4, BP5, BP6, RR-IMP, APNEA, PCWP, Tb, T1, T2, T3, CO, SvO <sub>2</sub> , CCO, CCI, BT, CO <sub>2</sub> , O <sub>2</sub> , N <sub>2</sub> O, AGENT, ScvO <sub>2</sub> , BIS, SQI, EMG, SR, MV, ΔT, ARRHY, RR-CO <sub>2</sub> , RR-VENT, SpO <sub>2</sub> (R), PR(R), PI(R), PVI(R), SpCO(R), SpMet(R), SpHb(R), SpOC(R)	HR/PR, NIBP, SpO <sub>2</sub> , T1, RR-CO <sub>2</sub> , CO <sub>2</sub> , OFF, OFF	<input type="radio"/>
	HR/PR Data Individual Display	ON, OFF	ON	<input type="radio"/>
	NIBP Display	All Data, Display Interval	All Data	<input type="radio"/>
	Alarm Display	All Data, Display Interval	All Data	<input type="radio"/>
	Print Size*	Half-width, Full-width	Half-width	<input type="radio"/>
OCRG	Display Time	5, 10min.	5min.	<input type="radio"/>
	Waveform	Impedance Resp., CO <sub>2</sub>	Impedance Resp.	<input type="radio"/>
	Waveform	ECG1, ECG2, BP1 to 6, SpO <sub>2</sub> , RESP, CO <sub>2</sub>	ECG1, ECG2	<input type="radio"/>
		HR(HR/SpO <sub>2</sub> /IBP) : ON, OFF	ON	
		ST: ON, OFF	OFF	
		NIBP: ON, OFF	ON	
		BP1 to 6: ON, OFF	ON	
		RR (IMP/CO <sub>2</sub> /VENT) : ON, OFF	ON	
		APNEA: ON, OFF	ON	
		SpO <sub>2</sub> : ON, OFF	ON	
		TEMP1 to 3: ON, OFF	ON	
		Tb: ON, OFF	ON	
		CO <sub>2</sub> : ON, OFF	ON	
		O <sub>2</sub> : ON, OFF	ON	
		N <sub>2</sub> O: ON, OFF	ON	
		AGENT: ON, OFF	ON	
		MAC: ON, OFF	ON	
		ASYSTOLE: ON, OFF	ON	
		VF: ON, OFF	ON	
		VT: ON, OFF	ON	
		SLOW VT: ON, OFF	ON	
		RUN: ON, OFF	ON	

<b>Item</b>	<b>Selection</b>	<b>Default</b>	<b>Backup</b>	
Recall Factor	COUPLET: ON, OFF	ON	○	
	PAUSE: ON, OFF	ON		
	BIGEMINY: ON, OFF	ON		
	TRIGEMINY: ON, OFF	ON		
	FREQUENT: ON, OFF	ON		
	TACHY: ON, OFF	ON		
	BRADY: ON, OFF	ON		
	HR (HR/SpO <sub>2</sub> /IBP) : ON, OFF	ON		
	ST: ON, OFF	OFF		
	NIBP: ON, OFF	ON		
	BP1 to 6: ON, OFF	ON		
	RR (IMP/ CO <sub>2</sub> /VENT) : ON, OFF	ON		
	APNEA: ON, OFF	ON		
	SpO <sub>2</sub> : ON, OFF	ON		
Recall	TEMP1 to 3: ON, OFF	ON	○	
	Tb: ON, OFF	ON		
	CO <sub>2</sub> : ON, OFF	ON		
	O <sub>2</sub> : ON, OFF	ON		
	N <sub>2</sub> O: ON, OFF	ON		
	AGENT: ON, OFF	ON		
	MAC: ON, OFF	ON		
	ASYSTOLE: ON, OFF	ON		
	VF: ON, OFF	ON		
	VT: ON, OFF	ON		
	SLOW VT: ON, OFF	ON		
	RUN: ON, OFF	ON		
	COUPLET: ON, OFF	ON		
	PAUSE: ON, OFF	ON		
	BIGEMINY: ON, OFF	ON		
	TRIGEMINY: ON, OFF	ON		
	FREQUENT: ON, OFF	ON		
	TACHY: ON, OFF	ON		
	BRADY: ON, OFF	ON		
ST	Meas. Point	0 to 560ms	120ms	△
	Ref. Point	0 to -240ms	-80ms	△
	HR Scale	0-100, 0-200, 0-300bpm	0-100bpm	○
	ST Scale	±2.0, ±5.0, ±10.0, ±20.0 (mm)	±5.0mm	○
		±0.2, ±0.5, ±1.0, ±2.0 (mV)	±0.5mV	○
ST Display Lead Setup	ST-A	I, II, III, aVR, aVL, aVF, V	I, II, III, aVR	○
	ST-B		aVL, aVF, V	○
Ventilator	P-V Loop	Volume (mL) : 250, 500, 750, 1000	500mL	○
		Pressure (cmH <sub>2</sub> O) : 10, 20, 30, 50, 120	30cmH <sub>2</sub> O	○
	F-V Loop	Flow (L/min) : ±5, ±10, ±20, ±50, ±180	±20L/min	○
		Volume (mL) : 250, 500, 750, 1000	500mL	○
Resp. Table	Interval	1, 2, 5, 10, 15, 30, 60min.	10min.	○
	Parameter Selection	RR-IMP, RR-VENT, RR-CO <sub>2</sub> , APNEA, SpO <sub>2</sub> , E-TV, I-TV, MV, P-PEAK, P-PAUSE, PEEP, P-MEAN, E-RES, I-RES, COMP, VF <sub>i</sub> O <sub>2</sub> , CO <sub>2</sub> , O <sub>2</sub> , N <sub>2</sub> O, AGENT	RR-IMP, APNEA, RR-VENT, SpO <sub>2</sub> , P-PEAK, P-PAUSE, P-MEAN, PEEP, E-TV, I-TV, MV, E-RES, OFF, I-RES, COMP, VF <sub>i</sub> O <sub>2</sub> , OFF	○
	Print Size*	Half-width, Full-width	Half-width	○

<b>Item</b>	<b>Selection</b>	<b>Default</b>	<b>Backup</b>
ST Trend	Group A	HR, ST (I), ST (II), ST (III), ST (aVR), ST (aVL), ST (aVF), ST (V)	<input type="radio"/>
	Group B	ST (III), ST (aVR), ST (aVL)	<input type="radio"/>
	Group C	ST (aVF), ST (V), OFF	<input type="radio"/>
	Group D	HR, ST (I), ST (II)	<input type="radio"/>
	Time	1, 2, 4, 8, 12, 24 hours	<input type="radio"/>
	Scale	ST: ±0.2, ±0.5, ±1.0, ±2.0mV ±2, ±5, ±10, ±20mm	<input type="radio"/>
		HR: 0–100, 0–200, 0–300bpm	<input type="radio"/>
	Interval	1, 2, 5, 10, 15, 30, 60min.	<input type="radio"/>
ST Table	Print Size*	Half-width, Full-width	<input type="radio"/>
	Interval	1, 2, 5, 10, 15, 30, 60min.	<input type="radio"/>
Vigilance Table	Table Setup	SvO <sub>2</sub> , ScvO <sub>2</sub> , SaO <sub>2</sub> , O <sub>2</sub> EI, DO <sub>2</sub> VO <sub>2</sub> , SV, SV-STAT, SVI, SVI-STAT, HR, MAP, CVP, CCO, CCO-STAT, CCI, CCI-STAT, SVR, SVRI, B-Temp, EF, EF-STAT, EDV, EDV-STAT, EDVI, EDVI-STAT, ESV, ESVI	<input type="radio"/>
		SvO <sub>2</sub> , CCO, EDV, B-Temp, HR, EF, SV, CCI, EDVI, ESV, SVR, SaO <sub>2</sub> , SVI, ESVI, SVRI, CCO-STAT, EDV-STAT	
NICO Table	Interval	1, 2, 5, 10, 15, 30, 60min.	<input type="radio"/>
	Table Setup	CO, CI, CO-F, VCO <sub>2</sub> , MV, MVAL, TV-E, TV-I, PIP, MAP, PEEP, CDYN, RAW, EtCO <sub>2</sub> , RR, SpO <sub>2</sub> , PR, SV, PECO <sub>2</sub> , VDAW, VTALV	<input type="radio"/>
		PR, SpO <sub>2</sub> , RR, CO, CO-F, CI, SV, VCO <sub>2</sub> , EtCO <sub>2</sub> , PECO <sub>2</sub> , MV, MVAL, TV-I, TV-E, VTALV, VDAW, PIP	
	Print Size*	Half-width, Full-width	<input type="radio"/>
BIS Table	Interval	1, 2, 5, 10, 15, 30, 60 min.	<input type="radio"/>
	Table Setup	BIS, SQI, EMG, SR, SEF, TOTPOW, IMP	<input type="radio"/>
		Half-width, Full-width	
Stop Watch	Label 1	Alphanumeric, 8 characters	<input type="radio"/>
	Label 2		<input type="radio"/>
Full Disc. Wave Rec.	ECG Size	x1/4, x1/2, x1, x2, x4	<input type="radio"/>
	Meas. Qty	1, 2, 3, 4, 5, 6	<input type="radio"/>
	Wave Qty	1, 2, 3, 6	<input type="radio"/>
	Meas. Selection	HR, VPC+PACE, ST+BPC, ST-A, ST-B, RR-CO <sub>2</sub> , SpO <sub>2</sub> , PR-SpO <sub>2</sub> , SpO <sub>2</sub> +PR, NIBP, PR-IBP, BP1, BP2, BP3, BP4, BP5, BP6, TEMP1, TEMP2, TEMP3, TEMP1,2, TEMP1,2,3, Tb, HR+ST, RR-IMP, RR-VENT, CO <sub>2</sub> , O <sub>2</sub> , N <sub>2</sub> O, AGENT, GAS(CO <sub>2</sub> +N <sub>2</sub> O+AGENT+O <sub>2</sub> )	<input type="radio"/>
		HR, NIBP, SpO <sub>2</sub> +PR, BP1, GAS(CO <sub>2</sub> +N <sub>2</sub> O+AGENT T+O <sub>2</sub> ), RR-CO <sub>2</sub>	
	Wave Selection	ECG(I), ECG(II), ECG(III), ECG(aVR), ECG(aVL), ECG(aVF), ECG(V), RESP, SpO <sub>2</sub> , BP1, BP2, BP3, BP4, BP5, BP6, CO <sub>2</sub> , O <sub>2</sub> , AGENT	<input type="radio"/>

\* The same "Print Size" setting will be applied to ST table, respiration table, BIS table, and NICO table.

<b>NOTE</b>	<ul style="list-style-type: none"> <li>The trend data and table data excluding the following will be stored even when the power is turned OFF. SpO<sub>2</sub>(R), PR(R), PI(R), PVI(R), SpCO(R), SpMet(R), SpHb(R), SpOC(R)</li> <li>The data of ST, OCRG, recall will be stored for 5 minutes even when the power is turned OFF.</li> </ul>
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## Setup Item

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### ● Record Setup

	<b>Item</b>	<b>Selection</b>	<b>Default</b>	<b>Backup</b>
Manual Recording	Output Recorder	Built-in, Central, 8ch	Built-in	<input type="radio"/>
	Waveform	ECG1, ECG2, BP1 to 6, SpO <sub>2</sub> , RESP, CO <sub>2</sub> , AWF, AWP	ECG1, SpO <sub>2</sub>	<input type="radio"/>
	Rec. Duration	24 sec., Cont., Page	24sec.	<input type="radio"/>
	Delay Time	None, 8sec., 16 sec.	8sec.	<input type="radio"/>
Alarm Recording	Alarm Record	ON, OFF	OFF	<input type="radio"/>
	Output Recorder	Built-in, Central, 8ch	Built-in	<input type="radio"/>
	Waveform	ECG1, ECG2, BP1 to 6, SpO <sub>2</sub> , RESP, CO <sub>2</sub> , AWF, AWP, Alarm Factor	ECG1, Alarm Factor	<input type="radio"/>
	Rec. Duration	12, 24 sec., Page	12sec.	<input type="radio"/>
	Alarm Factor	HR (HR/PR/BPR), Numeric Data, Arrhythmia	HR (HR/PR/BPR) Arrhythmia	<input type="radio"/>
	Arrhythmia	ASYSTOLE, VF, VT SLOW VT, RUN COUPLET, PAUSE BIGEMINY, TRIGEMINY FREQUENT TACHY, BRADY	ASYSTOLE, VF, VT SLOW VT, RUN COUPLET, PAUSE BIGEMINY, TRIGEMINY FREQUENT TACHY, BRADY	<input type="radio"/>
Periodic Recording	Periodic Record	ON, OFF	OFF	<input type="radio"/>
	Output Recorder	Built-in, Central, 8ch	Built-in	<input type="radio"/>
	Waveform	ECG1, ECG2, BP1 to 6, SpO <sub>2</sub> , RESP, CO <sub>2</sub> , AWF, AWP	ECG1	<input type="radio"/>
	Periodic Interval	Interval, Timer	Timer	<input type="radio"/>
	Interval	1, 2, 3, 5, 10, 15, 20, 30, 60, 120min.	120min.	<input type="radio"/>
	Timer	0:00 to 23:00 (1:00 interval)	None	<input type="radio"/>
	Rec. Duration	6, 12, 24 sec., Page	12 sec.	<input type="radio"/>
Record Setup	QRS Classification	ON, OFF	OFF	<input type="radio"/>
	Graphic Output Recorder	Built-in, Central	Built-in	<input type="radio"/>
	Osc. Graph Record	ON, OFF	ON	<input type="radio"/>
	Built-in Recorder	Feed: Both, Top, End, OFF	End	<input type="radio"/>
		Speed: 50mm/s, 25mm/s	25mm/s	<input type="radio"/>
	8ch Recorder	Recorder No.: 1 to 8	1	<input type="radio"/>
		Speed 50mm/s, 25mm/s, 10mm/s, 25mm/m, 10mm/m	25mm/s	<input type="radio"/>

## ● Tone/Volume Setup

<b>Item</b>	<b>Selection</b>	<b>Default</b>	<b>Backup</b>
Pulse	Volume: 16 levels	Level 8 from left	<input type="radio"/>
	Tone: 8 types	Level 7 from left	
Key	Volume: 16 levels	Level 10 from left	<input type="radio"/>
	Tone: 4 types	Level 3 from left	
Alarm	Volume: 16 levels	Level 10 from left	<input type="radio"/>
	Tone: 8 types	Level 2 from left	
Other Monitor	Volume: 16 levels	Level 10 from left	<input type="radio"/>
	Tone: 9 types	Level 4 from left	
Other Sound	Volume: 16 levels	Level 10 from left	<input type="radio"/>
HR Sync. Tone Setup	Link to Tone/Volume Setup, Sync. with SpO <sub>2</sub> Value	Link to Tone/Volume Setup	<input type="radio"/>
Ventilator Alarm	ON, OFF	OFF	<input type="radio"/>

## ● Time/Date Setup

<b>Item</b>	<b>Selection</b>	<b>Default</b>	<b>Backup</b>
Date Format	07/19, Jul.19, 19.Jul	Jul.19	<input type="radio"/>

## ● Home Display Configuration

<b>Item</b>	<b>Default</b>	<b>Backup</b>
Mode Selection	Mode 1	<input type="radio"/>
Mode 1	Display Configuration	<input type="radio"/>
	Auto	
	Numeric : HR/PR, NIBP, SpO <sub>2</sub> , TEMP1, RR Wave : ECG1, ECG2, SpO <sub>2</sub> , RESP	
	Standard	
	Numeric : HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1, 2, 3, RR, NIBP Wave : ECG1, BP Overlap, SpO <sub>2</sub> , RESP	
	Zoom	
	Numeric : HR/PR, SpO <sub>2</sub> +TEMP1, NIBP, RR Wave : ECG1, SpO <sub>2</sub> , RESP	
	Extended	
	Numeric : HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1, 2, 3, RR, NIBP, VPC+PACE, ST-A, NIBP List Wave : ECG1 Cascade, ECG2 Cascade, BP Overlap, SpO <sub>2</sub> , RESP	
	BP Overlap	
Comment	(Depends on the used Option Unit)	
Short Trend	Config. 1	
Grid	OFF	
GAS CO <sub>2</sub> Waveform	ON	
Block Cascade	Fill	
BP Label Setup	Wave Quantity: 2, Waveforms: ECG1, ECG2 BP1–BP1, BP2–BP2, BP3–BP3, BP4–BP4, BP5–BP5, BP6–BP6	
TEMP Label Setup	TEMP1–T1, TEMP2–T2, TEMP3–T3	

<i>Item</i>	<i>Default</i>	<i>Backup</i>
Display Configuration	Extended	○
Auto	Numeric : HR/PR, NIBP, SpO <sub>2</sub> , TEMP1, RR Wave : ECG1, ECG2, SpO <sub>2</sub> , RESP	
Standard	Numeric : HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1, 2, 3, RR, NIBP Wave : ECG1, BP Overlap, SpO <sub>2</sub> , RESP	
Zoom	Numeric : HR/PR, SpO <sub>2</sub> +TEMP1, NIBP, RR Wave : ECG1, SpO <sub>2</sub> , RESP	
Extended	Numeric : HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1, 2, 3, RR, NIBP, VPC+PACE, ST-A, NIBP List Wave : ECG1 Cascade, ECG2 Cascade, BP Overlap, SpO <sub>2</sub> , RESP	
BP Overlap	(Depends on the used Option Unit)	
Comment	Config. 2	
Short Trend	OFF	
Grid	ON	
GAS CO <sub>2</sub> Waveform	Fill	
Block Cascade	Wave Quantity: 2, Waveforms: ECG1, ECG2	
BP Label Setup	BP1–BP1, BP2–BP2, BP3–BP3, BP4–BP4, BP5–BP5, BP6–BP6	
TEMP Label Setup	TEMP1–T1, TEMP2–T2, TEMP3–T3	
Display Configuration	Standard	○
Auto	Numeric : HR/PR, NIBP, SpO <sub>2</sub> , TEMP1, RR Wave : ECG1, ECG2, SpO <sub>2</sub> , RESP	
Standard	Numeric : HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1, 2, 3, RR, NIBP Wave : ECG1, BP Overlap, SpO <sub>2</sub> , RESP	
Zoom	Numeric : HR/PR, SpO <sub>2</sub> +TEMP1, NIBP, RR Wave : ECG1, SpO <sub>2</sub> , RESP	
Extended	Numeric : HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1, 2, 3, RR, NIBP, VPC+PACE, ST-A, NIBP List Wave : ECG1 Cascade, ECG2 Cascade, BP Overlap, SpO <sub>2</sub> , RESP	
BP Overlap	(Depends on the used Option Unit)	
Comment	Config. 3	
Short Trend	OFF	
Grid	ON	
GAS CO <sub>2</sub> Waveform	Fill	
Block Cascade	Wave Quantity: 2, Waveforms: ECG1, ECG2	
BP Label Setup	BP1–BP1, BP2–BP2, BP3–BP3, BP4–BP4, BP5–BP5, BP6–BP6	
TEMP Label Setup	TEMP1–T1, TEMP2–T2, TEMP3–T3	

	<i>Item</i>	<i>Default</i>	<i>Backup</i>
Mode 4	Display Configuration	Extended	○
	Auto	Numeric : HR/PR, NIBP, SpO <sub>2</sub> , TEMP1, RR Wave : ECG1, ECG2, SpO <sub>2</sub> , RESP	
	Standard	Numeric : HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1, 2, 3, RR, NIBP Wave : ECG1, BP Overlap, SpO <sub>2</sub> , RESP	
	Zoom	Numeric : HR/PR, SpO <sub>2</sub> +TEMP1, NIBP, RR Wave : ECG1, SpO <sub>2</sub> , RESP	
	Extended	Numeric : HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1, 2, 3, RR, NIBP, VPC+PACE, ST-A, NIBP List Wave : ECG1 Cascade, ECG2 Cascade, BP Overlap, SpO <sub>2</sub> , RESP	
	BP Overlap	(Depends on the used Option Unit)	
	Comment	Config. 4	
	Short Trend	OFF	
	Grid	ON	
	GAS CO <sub>2</sub> Waveform	Fill	
	Block Cascade	Wave Quantity: 2, Waveforms: ECG1, ECG2	
	BP Label Setup	BP1–BP1, BP2–BP2, BP3–BP3, BP4–BP4, BP5–BP5, BP6–BP6	
	TEMP Label Setup	TEMP1–T1, TEMP2–T2, TEMP3–T3	
Mode 5	Display Configuration	Standard	○/△
	Auto	Numeric : HR/PR, NIBP, SpO <sub>2</sub> , TEMP1, RR Wave : ECG1, ECG2, SpO <sub>2</sub> , RESP	
	Standard	Numeric : HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1, 2, 3, RR, NIBP Wave : ECG1, BP Overlap, SpO <sub>2</sub> , Trend (6 rows)	
	Zoom	Numeric : HR/PR, SpO <sub>2</sub> +TEMP1, NIBP, RR Wave : ECG1, ECG2, SpO <sub>2</sub> , RESP	
	Extended	Numeric : HR/PR, BP1, BP2, SpO <sub>2</sub> , TEMP1, 2, 3, RR, NIBP, VPC+PACE, ST-A, NIBP List Wave : ECG1 Cascade, ECG2 Cascade, BP Overlap, SpO <sub>2</sub> , RESP	
	BP Overlap	(Depends on the used Option Unit)	
	Comment	Config. 5	
	Short Trend	OFF	
	Grid	ON	
	GAS CO <sub>2</sub> Waveform	Fill	
	Block Cascade	Wave Quantity: 2, Waveforms: ECG1, ECG2	
	BP Label Setup	BP1–BP1, BP2–BP2, BP3–BP3, BP4–BP4, BP5–BP5, BP6–BP6	
	TEMP Label Setup	TEMP1–T1, TEMP2–T2, TEMP3–T3	
BP Label Color (Common for Mode 1 to 5)		ART–Red, CVP–Light Blue, PAP–Yellow, Other Labels–White	○

## ●Display Setup

	<i>Item</i>	<i>Selection</i>	<i>Default</i>	<i>Backup</i>
Brightness		7 levels	Level 5 from left	○
Sweep Speed	ECG, BP, SpO <sub>2</sub>	50, 25, 12.5, 6.25mm/s	25mm/s	○
	RESP, CO <sub>2</sub> , O <sub>2</sub> , AGENT, AWP, AWF	25, 12.5, 6.25mm/s	6.25mm/s	○
Drift Filter display	Display/Exp. clock	Drift Filter Display/Exp. clock display	Drift Filter Display	○
Message Icon		ON, OFF	ON	○
Event Key		ON, OFF	ON	○
Draw Line Between SYS/DIA		ON, OFF	ON	○
Table Order		Descend, Ascend	Ascend	○

## ●Color Setup

<b>Item</b>	<b>Selection</b>	<b>Default</b>	<b>Backup</b>
Color Setup	ECG/HR	Green	<input type="radio"/>
	ST	Green	<input type="radio"/>
	VPC	White	<input type="radio"/>
	PACE	White	<input type="radio"/>
	BP1	Red	<input type="radio"/>
	BP2	Light Blue	<input type="radio"/>
	BP3	Yellow	<input type="radio"/>
	BP4	Green	<input type="radio"/>
	BP5	Orange	<input type="radio"/>
	BP6	Magenta	<input type="radio"/>
	NIBP	Light Blue	<input type="radio"/>
	SpO <sub>2</sub>	Yellow	<input type="radio"/>
	TEMP1 to 3	Orange	<input type="radio"/>
	Tb	Orange	<input type="radio"/>
	RESP	White	<input type="radio"/>
	CO <sub>2</sub>	Light Blue	<input type="radio"/>
	O <sub>2</sub>	Green	<input type="radio"/>
	N <sub>2</sub> O	Blue	<input type="radio"/>
	MAC	White	<input type="radio"/>
	AWF	Light Blue	<input type="radio"/>
	AWP	Orange	<input type="radio"/>
	SvO <sub>2</sub> +CO	White	<input type="radio"/>
	STOPWATCH	White	<input type="radio"/>
	BIS	White	<input type="radio"/>
	MV+CO	White	<input type="radio"/>

## ●Other Monitor Alarm Setup

<b>Item</b>	<b>Selection</b>	<b>Default</b>	<b>Backup</b>
Other Monitor Alarm Setup (DS-LAN II)	1 to 48 monitors ON/OFF	All monitors: OFF	<input type="radio"/>
Other Monitor Alarm Setup (DS-LAN III)	1 to 100 monitors ON/OFF	All monitors: OFF	<input type="radio"/>

## Initial Settings Item

### ●Serial Communication Setup

<i>Item</i>	<i>Selection</i>	<i>Default</i>	<i>Backup</i>
Gas Unit	OFF, MGU701, MGU702, MGU801, MGU802, MGU803	OFF	<input type="radio"/>
ORC Communication Port	OFF, HLX, PC Comm.	OFF	<input type="radio"/>
External Connected Device	Port A	OFF, NICO-7300, A-2000, Vigilance, Oximatrix3, Q-vue, Q2 Computer, Servo-i, Drager, Magnetic Card Reader, Bar Code Reader, Radical-7	OFF
	Port B		OFF
	Port C		OFF
	Port D		OFF

### ●User Key Setup

<i>Item</i>	<i>Selection</i>	<i>Default</i>	<i>Backup</i>
Selection	<p>OFF, Other Key Admit/Discharge, Monitor Suspend, Freeze, Key Lock, Alarm Silence, NIBP Start/Stop, Record Start/Stop, NIBP Auto Mode Size/Scale, BP Zero, HR/PR, Switch Display, Display Config., OCRG, Mode Select Parameter, Alarm, Alarm Auto, Record, Tone/Volume, Time/Date, Stopwatch Night Mode, Other Monitor Display, Recall, ST, ST Table, ST Trend Cardiac Output, Hemodynamics, PCWP, Respiration Table, Vigilance Table, NICO Table, BIS Table, Ventilator, Full Disc. Wave Rec., Calculator, Disp. mode 1 to 5, RR Alarm Suspend</p>	Without BP module (from left) 1/2 F2: Other Key F3: Size/Scale F4: Tone/Volume F5: Alarm F6: HR/PR F7: Switch Display  2/2 F2: Other Key F3: Time/Date F4: Record F5: Parameter F6: Admit/Discharge F7: Freeze  With BP module (from left) 1/2 F2: Other Key F3: Size/Scale F4: BP Zero F5: Alarm F6: HR/PR F7: Switch Display  2/2 F2: Other Key F3: Tone/Volume F4: Record F5: Parameter F6: Admit/Discharge F7: Freeze	<input type="radio"/>

## ●Menu Setup

Item	Selection	Default	Backup
Function	Size/Scale, BP Zero, HR/PR, Switch Display, Freeze, Recall, Stopwatch, Key Lock, Monitor Suspend, ST, ST Table, ST Trend, OCRG, Cardiac Output, Hemodynamics, PCWP, BIS Table, Vigilance Table, Respiration Table, NICO Table, Other Monitor Display, Night Mode, Ventilator, Full Disc. Wave Rec., Calculator, OFF	Size/Scale, BP Zero, HR/PR, Switch Display, Freeze, Recall, Stopwatch, Key Lock, Monitor Suspend, ST, ST Table, ST Trend, OCRG	<input type="radio"/>
Settings	Admit/Discharge, Parameter, Alarm, Record, Tone/Volume, Time/Date, Alarm Auto, Display Config., Display Setup, Color, CF Card, Other Monitor Alarm, OFF	Admit/Discharge, Parameter, Alarm, Record, Tone/Volume, Time/Date, Alarm Auto, Display Config., Display Setup	<input type="radio"/>

## ●Key Mask Setup

Item	Selection	Default	Backup
Function	All Keys	Display all keys	<input type="radio"/>
Settings	All Keys	Display all keys	<input type="radio"/>
Initial Settings	All Keys	Display all keys	<input type="radio"/>
Maintenance	All Keys	Display all keys	<input type="radio"/>

## ●User Label

Item	Selection	Default	Backup
BP User Label	User 1	Alphanumeric:3 characters	<input type="radio"/>
	User 2		
TEMP User Label	User 1	Alphanumeric:3 characters	<input type="radio"/>
	User 2		
	User 3		
	User 4		

## ●Measurement Unit Setup

Item	Selection	Default	Backup
BP	mmHg, kPa	mmHg	<input type="radio"/>
CVP	mmHg/kPa, cmH <sub>2</sub> O	mmHg	<input type="radio"/>
ST	mm, mV	mm	<input type="radio"/>
TEMP	°C, °F	°C	<input type="radio"/>
CO <sub>2</sub>	mmHg, kPa, %	mmHg	<input type="radio"/>
Height, Weight	cm/kg, in/lb	cm/kg	<input type="radio"/>

## ●Telemeter Setup

Item	Selection	Default	Backup
Telemeter	Channel	1001–1080, 2001–2120 3001–3040, 4001–4080 5001–5080, 6001–6080	Depends on the telemetry transmission module
	Group	00 to 63	00 * <input type="radio"/>
Telemetry Wave		ECG1, ECG1+2	ECG1 <input type="radio"/>

**NOTE** The group number setting is backed up, and performing a F-start (turning the power ON with the rotary switch set to F) will not initialize the setting.

## ● Remote Control Setup

Item	Selection	Default	Backup
ID	OFF, 1 to 8	OFF	<input type="radio"/>
Section	1 to 4	1	<input type="radio"/>
Key	ECG1 Size, ECG2 Size, ECG1 Size, ECG 2 Lead, ECG Auto Size, BP1 to BP6, Scale, PCWP, NIBP Start/Stop, Record Start/Stop, Resume, Freeze, Trend, Table, OCRG, Recall, ST, ST Trend, ST Table, Cardiac Output, Hemodynamics, Night Mode, Switch Display, Respiration Table, Vigilance Table, NICO Table, BIS Table, VENT (P-V), VENT (F-V), VENT (Numeric), OFF	F1: ECG1 Size F2: ECG1 Lead F3: NIBP Start/Stop F4: Record Start/Stop F5: Night Mode F6: Table F7: Trend F8: Switch Display	<input type="radio"/>

## ● Alarm Indicator Setup

Item	Selection	Default	Backup
Alarm Indicator	ON, OFF	ON	<input type="radio"/>
Alarm Level	Level 1, Level 1/2, Level 1/2/3, Ventilator Alarm	Level 1	<input type="radio"/>
Pattern Setup	Pattern 1 to 10	Level 1: Pattern 1 Level 2: Pattern 5 Level 3: Pattern 4 Ventilator Alarm: Pattern 1	<input type="radio"/>

## ● Password Setup

Item	Selection	Default	Backup
Password	ON, OFF	OFF	<input type="radio"/>

## ● Operating Room Setup

Item	Selection	Default	Backup
Ward Name	Alphanumeric, symbol (4 characters)	OPE-	<input type="radio"/>
Operating Room No.	0 to 999	0	<input type="radio"/>
DS-LAN Pat. ID Tx Transmission Start Position	1st to 20th character	1st character	<input type="radio"/>

## ● Discharge Setup

Item	Selection	Default	Backup
Check Discharge at Power ON	ON, OFF	OFF	<input type="radio"/>
Discharge Automatically at Power ON	10min., 1 hour, 2 hours, 4 hours, OFF	OFF	<input type="radio"/>
Backup at Discharge	ON, OFF	OFF	<input type="radio"/>
NIBP Auto Mode at Power ON/Discharge	2M, 2.5M, 5M, 10M, 15M, 30M, 60M, 120M, OFF	2.5M	<input type="radio"/>
Label Setup at Discharge/Change of Disp. Mode	Backup, Disp. Mode	Backup	<input type="radio"/>

## ●MAC Value Setup

Item	Selection	Default	Backup
MAC Value Display	ON, OFF	OFF	<input type="radio"/>
N <sub>2</sub> O		100	<input type="radio"/>
Isoflurane		1.15	<input type="radio"/>
Halothane		0.75	<input type="radio"/>
Enflurane		1.70	<input type="radio"/>
Sevoflurane		2.05	<input type="radio"/>
Desflurane		6.0	<input type="radio"/>

## ●Arrhythmia Analysis Setup

Item	Selection	Default	Backup
Arrhythmia Analysis Filter	Disp. Waveform, Fixed	Disp. Waveform	<input type="radio"/>
Suspend Arrhy. Analysis during Noise Interference	ON, OFF	OFF	<input type="radio"/>

## ●Magnetic Card Reader Setup

Item	Selection	Default	Backup
Magnetic Card Reader Setup	Pat. ID	Alphanumeric characters	1 - 10
	Name		OFF - OFF
	Comment		OFF - OFF
	DOB : Year		OFF - OFF
	DOB : Month		OFF - OFF
	DOB : Day		OFF - OFF
	Age		OFF - OFF
	Sex		OFF - OFF
	Height		OFF - OFF
	Weight		OFF - OFF
Sex (Character String for Male)		3 alphanumeric characters	MEN
Read ID Process		None, Numeric, Alphanumeric	None

## ●DS-LAN Setup

Item	Selection	Default	Backup
DS-LAN Setup	DS-LANII (10Mbps), DS-LANIII (100Mbps)	DS-LANII (10Mbps)*	<input type="radio"/>

**NOTE** For the item with \* mark, the setting is backed up. Performing F-start (turning the power ON with the rotary switch set to F) will not initialize the setting.

## ●Source Setup

Item	Selection	Default	Backup
PR Source Auto Switch	ON, OFF	ON	<input type="radio"/>
HR/PR Auto Alarm Source Priority	HRECG/SpO <sub>2</sub> /BP, ECGHR/BP/SpO <sub>2</sub> , SpO <sub>2</sub> /HRECG/BP, SpO <sub>2</sub> /BP/HRECG, BP/HRECG/SpO <sub>2</sub> , BP/SpO <sub>2</sub> /HRECG	HRECG/SpO <sub>2</sub> /BP	<input type="radio"/>

## Alarm Mode Setup

<i>Item</i>	<i>Default</i>	<i>Backup</i>
Alarm Mode	1	
HR	ON, 50 to OFF	
ASYSTOLE	ON, 5sec.	
VF	ON	
VT	ON	
SLOW VT	OFF	
RUN	OFF, 3beats	
COUPLET	OFF	
PAUSE	OFF, 3.0sec.	
BIGEMINY	OFF	
TRIGEMINY	OFF	
FREQUENT	OFF, 10beats/min.	
TACHY	OFF	
BRADY	OFF	
STI, II, III, aVR, aVL, aVF, V	All Alarms OFF Indiv. Alarm OFF OFF to OFF	
BP1	ON S 80 to 180mmHg/10 to 27kPa D OFF to OFF M OFF to OFF	○
BP2 to 6	OFF S OFF to OFF D OFF to OFF M OFF to OFF	
RR	ON, 5 to 30	
APNEA	ON, 60sec.	
SpO <sub>2</sub>	ON, 90 to OFF	
SEC Alarm (Nellcor Model: DS-7000)	OFF	
NIBP	ON S 70 to 200mmHg/9.0 to 27kPa D OFF to OFF M OFF to OFF	
TEMP1-3, Tb	OFF OFF to OFF	
EtCO <sub>2</sub>	OFF OFF to OFF	
In-CO <sub>2</sub>	OFF OFF	
Ex-O <sub>2</sub>	OFF OFF to OFF	
FiO <sub>2</sub>	OFF 18 to OFF	
Ex-N <sub>2</sub> O	OFF OFF to OFF	
In-N <sub>2</sub> O	OFF OFF to OFF	
Ex-AGT	OFF OFF to OFF	
In-AGT	OFF OFF to OFF	
MAC	OFF OFF	

	<i>Item</i>	<i>Default</i>	<i>Backup</i>
Alarm Mode 1 to 5 (Child)	HR	ON, 60 to OFF	○
	ASYSTOLE	ON, 5sec.	
	VF	ON	
	VT	ON	
	SLOW VT	OFF	
	RUN	OFF, 3beats	
	COUPLET	OFF	
	PAUSE	OFF, 3.0sec.	
	BIGEMINY	OFF	
	TRIGEMINY	OFF	
	FREQUENT	OFF, 10beats/min.	
	TACHY	OFF	
	BRADY	OFF	
	STI, II, III, aVR, aVL, aVF, V	All Alarms OFF Indiv. Alarm OFF OFF to OFF	
	BP1	ON S 80 to 180mmHg/10 to 27kPa D OFF to OFF M OFF to OFF	
	BP2 to BP6	OFF S OFF to OFF D OFF to OFF M OFF to OFF	
	RR	ON, 6 to 30	
	APNEA	ON, 60sec.	
	SpO <sub>2</sub>	ON, 90 to OFF	
	SEC Alarm (Nellcor Model: DS-7000)	OFF	
	NIBP	ON S 70 to OFF D OFF to OFF M OFF to OFF	
	TEMP1 to TEMP3, T <sub>b</sub>	OFF OFF to OFF	
	EtCO <sub>2</sub>	OFF OFF to OFF	
	In-CO <sub>2</sub>	OFF OFF	
	Ex-O <sub>2</sub>	OFF OFF to OFF	
	FiO <sub>2</sub>	OFF 18 to OFF	
	Ex-N <sub>2</sub> O	OFF OFF to OFF	
	In-N <sub>2</sub> O	OFF OFF to OFF	
	Ex-AGT	OFF OFF to OFF	
	In-AGT	OFF OFF to OFF	
	MAC	OFF OFF	

<b>Item</b>	<b>Default</b>	<b>Backup</b>
Alarm Mode 1 to 5 (Neonate)	HR	ON, 70 to OFF
	ASYSTOLE	ON, 5sec.
	VF	ON
	VT	ON
	SLOW VT	OFF
	RUN	OFF, 3beats
	COUPLET	OFF
	PAUSE	OFF, 3.0sec.
	BIGEMINY	OFF
	TRIGEMINY	OFF
	FREQUENT	OFF, 10beats/min.
	TACHY	OFF
	BRADY	OFF
	STI, II, III, aVR, aVL, aVF, V	All Alarms OFF Indiv. Alarm OFF OFF to OFF
	BP1	ON S 80 to 180mmHg/10 to 27kPa D OFF to OFF M OFF to OFF
	BP2 to BP6	OFF S OFF to OFF D OFF to OFF M OFF to OFF
	RR	ON, 6 to 30
	APNEA	ON, 60sec.
	SpO <sub>2</sub>	ON, 85 to OFF
	SEC Alarm (Nellcor Model: DS-7000)	OFF
	NIBP	ON S 50 to OFF D OFF to OFF M OFF to OFF
	TEMP1 to TEMP3, T <sub>b</sub>	OFF OFF to OFF
	EtCO <sub>2</sub>	OFF OFF to OFF
	In-CO <sub>2</sub>	OFF OFF
	Ex-O <sub>2</sub>	OFF OFF to OFF
	FiO <sub>2</sub>	OFF 18 to OFF
	Ex-N <sub>2</sub> O	OFF OFF to OFF
	In-N <sub>2</sub> O	OFF OFF to OFF
	Ex-AGT	OFF OFF to OFF
	In-AGT	OFF OFF to OFF
	MAC	OFF OFF

## External Connection

## Pin Assignments

This section explains the connector pin assignments and signals.

### RS-232C Connector Output Signal

#### ●COM1 Connector

No.	Signal Type	Description	Signal Level
1	RESET	Port Reset	TTL Hi Level Reset
2	NC	No Connection	—
3	TxD	Serial Transmit Data Output	RS232C
4	SG	Signal GND	—
5	RxD	Serial Reception Data Input	RS232C
6	+5V	+5V	+5V power supply (150mA)
7	NC	No Connection	—
8	NC	No Connection	—

#### ●COM2 Connector

No.	Signal Type	Description	Signal Level
1	RESET	Port Reset	TTL Hi Level Reset
2	DIG_L	Digital Output (LOAD)	TTL (Extended Function)
3	TxD	Serial Transmission Data Output	RS232C
4	SG	Signal GND	—
5	RxD	Serial Reception Data Input	RS232C
6	+5V	+5V	+5V power supply (150mA)
7	DIG_D	Digital Output (DATA)	TTL (Extended Function)
8	DIG_C	Digital Output (CLK)	TTL (Extended Function)

#### ●COM3 Connector

No.	Signal Type	Description	Signal Level
1	RESET	Port Reset	TTL Hi Level Reset
2	ALM2_H	External Alarm Input	TTL Hi Level
3	TxD	Serial Transmission Data Output	RS232C
4	SG	Signal GND	—
5	RxD	Serial Reception Data Input	RS232C
6	+5V	+5V	+5V power supply (150mA)
7	ALM2_L	External Alarm Input	TTL Lo Level
8	NC	No Connection	—

## ●COM4 Connector

No.	Signal Type	Description	Signal Level
1	RESET	Port Reset	TTL Hi Level Reset
2	ALM2_H	External Alarm Input	TTL Hi Level
3	TxD	Serial Transmission Data Output	RS232C
4	SG	Signal GND	
5	RxD	Serial Reception Data Input	RS232C
6	+5V	+5V	+5V power supply (150mA)
7	ALM2_L	External Alarm Input	TTL Lo Level
8	NC	No Connection	—

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## Chapter 12

# Accessories

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## Accessories

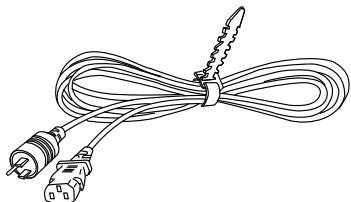
This section lists the accessories for the DS-7000.

### ⚠ CAUTION

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

## Accessories

**Power Cable: CS-24 (3m)**



### ⚠ CAUTION

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.

**This Operation Manual**

## Optional Accessories

The following products are available as optional accessories for the DS-7000.  
Purchase them as required.

<b>CAUTION</b>	<ul style="list-style-type: none"><li>● Use only the accessories specified for this device. Otherwise, proper function cannot be executed.</li><li>● For quality improvement, specifications are subject to change without prior notice.</li></ul>
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## ECG, Impedance Respiration Measurement

<i>Item</i>	<i>Model Type</i>	<i>Description</i>
ECG Lead Cable	3380.0648.13	3-electrode AAMI
ECG Lead Cable	500398800	4-electrode AAMI
ECG Lead Cable	3380.0661.13	5-electrode AAMI
ECG Relay Cable	CI-700D-3 (FA)	3-electrode (defibrillation-proof)
ECG Relay Cable	CI-700E-3 (FA)	3-electrode (defibrillation and electrosurgery-proof)*
ECG Relay Cable	CI-700D-4 (FA)	4-electrode (defibrillation-proof)
ECG Relay Cable	CI-700E-4 (FA)	4-electrode (defibrillation and electrosurgery-proof)*
ECG Relay Cable	CI-700D-5 (FA)	5-electrode (defibrillation-proof)
ECG Relay Cable	CI-700E-5 (FA)	5-electrode (defibrillation and electrosurgery-proof)*

<b>CAUTION</b>	* When using the defibrillation and electrosurgery-proof type ECG relay cable, respiration measurement can not be performed.
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## Invasive Blood Pressure Measurement

<i>Item</i>	<i>Model Type</i>	<i>Description</i>
Interface Cable (for DTX Plus)	CJ-410	For use with Becton-Dickinson DTX Plus Disposable Pressure Transducers
Interface Cable (for CDX III / Press)	CJ-369	For use with Argon Medical Devices CDX III / Press Disposable Pressure Transducers
Interface Cable (for TruWave)	CJ-428	For use with Edwards TruWave Disposable Pressure Transducers

## Non-Invasive Blood Pressure Measurement

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<b>Item</b>	<b>Model Type</b>	<b>Description</b>
Adult Cuff (Large)	CUF-7101	Width 17cm, Reusable
Adult Cuff (Medium)	CUF-7102A	Width 14.5cm, Reusable
Adult Cuff (Small)	CUF-7103	Width 11cm, Reusable
Pediatric Cuff	CUF-7104	Width 10.5cm, Reusable
Infant Cuff	CUF-7105	Width 8.5cm, Reusable
NIBP Air Hose (1.5m)	OA-7109A	
NIBP Air Hose (3.5m)	OA-7109B	
NIBP Extension Hose (1.5m)	OA-7110A	
NIBP Extension Hose (3.5m)	OA-7110B	

<b>Item</b>	<b>Model Type</b>	<b>Description</b>
Tempa-Kuff® Neonatal Cuff Infant #5	99750	Disposable, Latex-Free, 40/box
Tempa-Kuff® Neonatal Cuff Neonatal Extra Large #4	99848	Disposable, Latex-Free, 40/box
Tempa-Kuff® Neonatal Cuff Neonatal Large #3	99729	Disposable, Latex-Free, 40/box
Tempa-Kuff® Neonatal Cuff Neonatal Medium #2	99890	Disposable, Latex-Free, 40/box
Tempa-Kuff® Neonatal Cuff Neonatal Small #1	99801	Disposable, Latex-Free, 40/box
Adapter	CUFJ-NO1	

\*Tempa-Kuff® Neonatal Cuffs, manufactured by TRIMLINE Medical Products Corporation.

## Temperature Measurement

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<b>Item</b>	<b>Model Type</b>	<b>Q'ty</b>	<b>Description</b>
Rectal Temperature Probe (for adult)	401	1	
Rectal Temperature Probe (for pediatric)	402	1	
Body Surface Temperature Probe	409B	1	

\* 400-series general purpose temperature probe, manufactured by Measurement Specialties, Inc.

## SpO<sub>2</sub> Measurement (Nellcor® Model: DS-7000)

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<b>Item</b>	<b>Model Type</b>	<b>Description</b>
Durasensor®	DS-100A	
OxiMax®	MAX-N	MAXN (Box of 24)
OxiMax®	MAX-I	MAXI (Box of 24)
OxiMax®	MAX-P	MAXP (Box of 24)
OxiMax®	MAX-A	18" cable, MAXA (Box of 24)
OxiMax®	MAX-R	MAXR (Box of 24)
OxiMax®	MAXPAC	MAX-A × 2, MAX-N × 2
OxiMax®	MAX-FAST	MAXFAST (Box of 24)
SpO <sub>2</sub> Relay Cable	DOC-10	

## SpO<sub>2</sub> Measurement (Masimo® Model: DS-7000M)

Item	Model Type	Description
Masimo SET Sensor	LNOP® DCI	
Masimo SET Sensor	LNOP® Neo	
Masimo SET Sensor	LNOP® Neo-L	
Masimo SET Sensor	LNOP® NeoPt	
Masimo SET Sensor	LNOP® Inf-L	
Masimo SET Sensor	LNOP® NeoPt-L	
Masimo SET Sensor	LNOP® Pdt	
Masimo SET Sensor	LNOP® Adt	
Masimo SET Sensor	LNOP® Adt Long	
SpO <sub>2</sub> Patient Cable	PC04	1.2m
SpO <sub>2</sub> Patient Cable	PC08	2.4m
SpO <sub>2</sub> Patient Cable	PC12	3.6m

## Cardiac Output Measurement

Item	Model Type	Description
Catheter Relay Cable	CJ-382	
Flow-through Sensor Relay Cable	CJ-413	
In-line Sensor Relay Cable	CJ-412	
Injectate Probe Relay Cable	CJ-411	

## Multigas Concentration Measurement (Criticare Systems Inc® Model)

### Sampling Devices

Item	Model Type	Description
Agent Sample Lines	625N	Box of 25
WaterChek2 + Water Trap	938F-NC	Box of 30
Disposable Nasal Cannula	624	Box of 10
Divided Nasal Cannula	628	Box of 10
Endotracheal Adaptor, Straight	616	Box of 10
Endotracheal Adaptor, Elbow	617	Box of 10

### Calibration Accessories

Item	Model Type	Description
Cal Gas Cylinder (80% O <sub>2</sub> , Balance N <sub>2</sub> )	1547	
Hardware Regulator for Cylinder	623	
Regulator Tubing	613B	

### Others

Item	Model Type	Description
Scavenging Kit (Exhaust Line)	655-FD	

## Multigas Concentration Measurement (ARTEMA® Model)

### Sampling Devices

Item	Model Type	Description
DRYLINE™ Water Trap, Adult	60-13100-00	Non-sterile
DRYLINE™ Water Trap, Neonate	60-13200-00	Non-sterile
DRYLINE™ Airway Adaptor, Straight	60-14100-00	Non-sterile, Disposable
DRYLINE™ Airway Adaptor, Elbow	60-14200-00	Non-sterile, Disposable
DRYLINE™ Sampling Line, Adult	60-15200-00	Non-sterile, 2.5m, Disposable
DRYLINE™ Sampling Line, Neonate	60-15300-00	Non-sterile, 2.5m, Disposable

## Others

<i>Item</i>	<i>Model Type</i>	<i>Description</i>
Scavenging Kit (Exhaust Line)	655-FD	

## Multigas Measurement (RESPIRONICS® Capnostat 5)

<i>Item</i>	<i>Model Type</i>	<i>Description</i>
Mainstream CO <sub>2</sub> Sensor Capnostat 5	1015928	
Airway Adapter (Adult/Pediatric)	7007	
Airway Adapter (Neonate)	7053	
Airway Adapter (Single-Patient Use, Adult/Pediatric)	6063	10 per box
Airway Adapter (Single-Patient Use, Neonate)	6312	10 per box

## Others

<i>Item</i>	<i>Model Type</i>	<i>Description</i>
Ground Cable	CE-12	
Flash Memory Card (CF Card)	FCF-128	
Flash Memory Card (CF Card)	FCF-16GB	For full disclosure waveform recording
Remote Control Unit	CF-700	
Telemetry Transmission Module	HLX-561	
Wire Adapter	OAO-23A	For HLX-561
Recording Paper	OP-124TE	
Cleaning Cloth	OA-57	
Ethernet Branch Cable (For DS-LANII)	CJ-522A	Length: 1m
	CJ-522B	Length: 2m
	CJ-522C	Length: 4m
	CJ-522D	Length: 10m
	CJ-522E	Length: 20m
Connection Cable (For DS-LANII)	CJ-530A	Length: 2.5m
	CJ-530B	Length: 5m
	CJ-530C	Length: 10m
External Device Connection Cable	CJ-502	For Servo-i, VigilanceII, Vigileo, NICO, Fabius GS
	CJO-04RS4	For Vigilance, Vigilance CEDV, Q-vue, Q2 Computer
	CJ-508	For OXIMETRIX3
	CJO-03RS4	For BIS, Fabius GS, Radical 7
Air Filter	OAO-33A	
Fan Filter	OAO-34A	For MGU-701/702
Analog Output Conversion Cable	CJO-07JJ1	Length: 1m
Gas Unit I/F	HPD-800	For Capnostat 5
MGU IF Unit	OAO-41B	For MGU-801P/802/803
Unit Connection Cable	CJO-09SS0.3	For MGU-801P/802/803, Length: 0.3m
	CJO-09SS1.5	For MGU-801P/802/803, Length: 1.5m
	CJO-09SS5	For MGU-801P/802/803, Length: 5m

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