DynaScope 7000 Series

Bedside Monitor

DS-7300 System

Ver.07

Operation Manual

《 Maintenance 》

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

FUKUDA DENSHI

This operation manual is for the DS-7300 System Version 07.

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

Printed in Japan

Preface

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

Composition of This Operation Manual

The DS-7300 System Operation Manual is composed of the following 3 sections.

≪General Description≫

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

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

≪Monitoring Operation≫

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

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

≪Maintenance≫

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

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

Safety Precautions

- Read the “Safety Precautions” thoroughly before use to ensure correct and safe use of the product.
- Be sure to follow the precautions indicated below, as these are important messages related to safety.

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

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

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

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

Labels Attached to the Unit

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

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

DS-7300 System Main Unit (DSC-7300)

⚠ DANGER

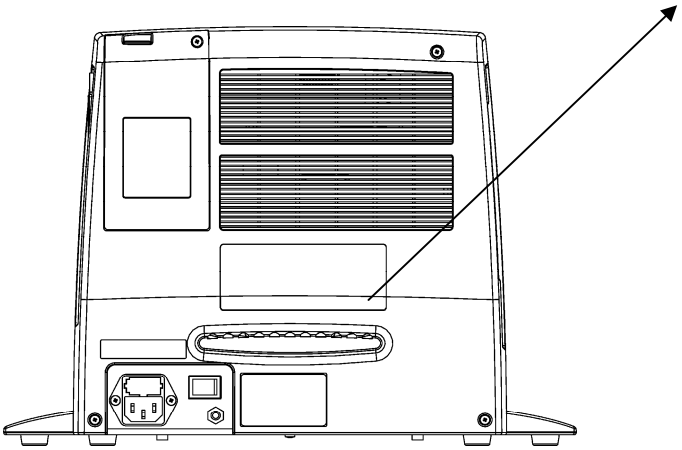
Risk of explosion if used in the presence of flammable anesthetics.

⚠ 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.



DS-7300 System Super Module

⚠ DANGER

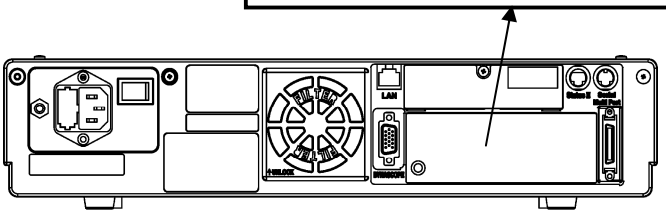
Risk of explosion if used in the presence of flammable anesthetics.

⚠ 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.



＜HS-720E＞

Measurement Unit for Each Parameter

The measurement units for this equipment are as follows.

Detail	*Parameter*	*Display*	*Unit*	*Default*
Heart Rate / Pulse Rate	ECG	HR	bpm (beats per minute)	
	Invasive Blood Pressure	PR_IBP	bpm (beats per minute)	
	SpO_2	PR_SpO_2	bpm (beats per minute)	
ST Level	ECG	ST	mm, mv	mv
VPC	ECG	VPC	beat/minute	
Respiration Rate	Impedance Respiration	RR_IMP	Bpm (breaths per minute)	
	CO_2	RR_CO_2	Bpm (breaths per minute)	
	Ventilator	RR_VENT	Bpm (breaths per minute)	
	Gas Module	RR_GAS	Bpm	
Apnea	Impedance Respiration	APNEA	s (second)	
	CO_2	APNEA	s (second)	
	Ventilator	APNEA	s (second)	
Invasive Blood Pressure	Invasive Blood Pressure	BP	mmHg, kPa cmH_2O (CVP only)	mmHg
Non-Invasive Blood Pressure	Non-Invasive Blood Pressure	NIBP	mmHg, kPa	mmHg
Arterial Oxygen Saturation	SpO_2	SpO_2	%	
	Perfusion Index	PI	%	
Temperature	Temperature	TEMP	°C / °F	°C
End-Tidal CO_2 Concentration	CO_2	$EtCO_2$	mmHg, kPa, %	mmHg
Inspiratory CO_2 Concentration	CO_2	$InspCO_2$	mmHg, kPa, %	mmHg
Cardiac Output	Cardiac Output	CO	L/minute	
	Cardiac Index	CI	L/minute/m^2	
Blood Temperature	Blood Temperature	Tb	°C / °F	°C
Injectate Temperature	Injectate Temperature	Ti	°C / °F	°C
Airway Flow	Airway Flow	AWF	L/minute	
Airway Pressure	Airway Pressure	AWP	cmH_2O	
Tidal Volume	Inspiratory Tidal Volume	I-TV	mL	
	Expiratory Tidal Volume	E-TV	mL	
	Tidal Volume	TV	mL	
	Inspiratory/Expiratory Ratio	I:E	(none)	
Minute Ventilation	Minute Ventilation	MV	L/minute	
	Spontaneous Minute Ventilation	SMV	L/minute	
Compliance	Compliance	COMP	mL/cmH_2O	
	Static Compliance	S_COMP	mL/cmH_2O	
	Dynamic Compliance	D_COMP	mL/cmH_2O	
Airway Resistance	Inspiratory Resistance	I-RES	cmH_2O/L/Sec	
	Expiratory Resistance	E-RES	cmH_2O/L/Sec	
	Static Airway Resistance	S-RES	cmH_2O/L/Sec	
	Dynamic Airway Resistance	D-RES	cmH_2O/L/Sec	
Airway Pressure	Mean Airway Pressure	MEAN	cmH_2O	
	Maximum Airway Pressure	PEAK	cmH_2O	
	Pause Airway Pressure	PAUSE	cmH_2O	
	Minimum Airway Pressure	P_Min	cmH_2O	

Detail	*Parameter*	*Display*	*Unit*	*Default*
Spontaneous Respiration	Spontaneous Respiration	S_RR	Bpm	
Peak End Expiratory Pressure	Peak End Expiratory Pressure	PEEP	cmH_2O	
Fraction of Inspiratory Oxygen	Fraction of Inspiratory Oxygen	FIO_2	%	
Vigilance Data ・Vigilance ・Vigilance CEDV ・VigilanceII ・Vigileo	Mixed Venous Oxygen Saturation	SvO_2	%	
	Central Venous Oxygen Saturation	$ScvO_2$	%	
	Arterial Oxygen Saturation	SaO_2	%	
	Oxygen Uptake Index	O_2EI	%	
	Oxygen Transport	DO_2	mL/minute	
	Oxygen Consumption	VO_2	mL/minute	
	Stroke Volume	SV	mL	
	Stroke Volume (STAT Mode)	SV_STAT	mL	
	Stroke Volume Index	SVI	mL/m^2	
	Stroke Volume Index (STAT Mode)	SVI_STAT	mL/m^2	
	Heart Rate	HR	bpm (beats per minute)	
	Mean Arterial Pressure	MAP	mmHg	
	Central Venous Pressure	CVP	mmHg	
	Continuous Cardiac Output	CCO	L/minute	
	Continuous Cardiac Output (STAT Mode)	CCO_STAT	L/minute	
	Continuous Cardiac Index	CCI	$L/minute/m^2$	
	Continuous Cardiac Index (STAT Mode)	CCI_STAT	$L/minute/m^2$	
	Systemic Vascular Resistance	SVR	$dynes\text{-}sec/cm^5$	
	Systemic Vascular Resistance Index	SVRI	$dynes\text{-}sec/cm^5$	
	Blood Temperature	BT	°C	
	Ejection Fraction	EF	%	
	Ejection Fraction (STAT Mode)	EF_STAT	%	
	End-Diastolic Volume	EDV	mL	
	End-Diastolic Volume (STAT Mode)	EDV_STAT	mL	
	End-Diastolic Volume Index	EDVI	mL/m^2	
	End-Diastolic Volume Index (STAT Mode)	EDVI_STAT	mL/m^2	
	End-Systolic Volume	ESV	mL	
	End-Systolic Volume Index	ESVI	mL	
	Stroke Volume Variance	SVV	%	
Multigas Data	End-tidal Carbon Dioxide	CO_2-E	mmHg, kPa, %	mmHg
	Inspired Carbon Dioxide	CO_2-I	mmHg, kPa, %	mmHg
	Expired Oxygen	O_2-E	%	
	Inspired Oxygen	O_2-I	%	
	Expired Nitrous Oxide	N_2O-E	%	
	Inspired Nitrous Oxide	N_2O-I	%	
	Expired Agent gas	AGT-E	%	
	Inspired Agent gas	AGT-I	%	

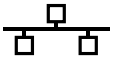
Detail	*Parameter*	*Display*	*Unit*	*Default*
Multigas Data	Expired Isoflurane	ISO_E	%	
	Inspired Isoflurane	ISO_I	%	
	Expired Halothane	HAL_E	%	
	Inspired Halothane	HAL_I	%	
	Expired Enflurane	ENF_E	%	
	Inspired Enflurane	ENF_I	%	
	Expired Sevoflurane	SEV_E	%	
	Inspired Sevoflurane	SEV_I	%	
	Expired Desflurane	DES_E	%	
	Inspired Desflurane	DES_I	%	
	Minimum Alveolar Concentration	MAC	(no unit)	
BIS Monitor Data	Bispectral Index	BIS	(no unit)	
	Signal Quality Index	SQI	%	
	Electromyograph	EMG	dB	
	Suppression Ratio	SR	%	

Graphic Symbols

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

Symbols indicated on the equipment

Symbol	*Description*
	Caution; refer to accompanying documents Indicates the need to refer to related accompanying documents before operation.
	Equipotential Terminal Indicates the terminal to equalize the potential difference when interconnecting the devices.
	Protective Earth Indicates the protective earth inside the equipment.
	Alternating Current (Main Power Input Indicator)
	Power ON This indicates that the main power switch is in the ON position.
	Power OFF This indicates that the main power switch is in the OFF position.
	Electrostatic Sensitive Part Directly touching this connector part with hands should be avoided.
	Type CF Applied Part with Defibrillation-Proof Indicates the degree of protection against electric shock is Type CF Applied Part with defibrillation-proof.
	Type BF Applied Part with Defibrillation-Proof Indicates the degree of protection against electric shock is Type BF Applied Part with defibrillation-proof.

Symbol	*Description*
	Type BF Applied Part Indicates the degree of protection against electric shock is Type BF Applied Part.
	Signal Output Part
	GAS Output Part
	Signal Input Part
	TCP/IP Network Connector Connects to TCP/IP network.
	RS-232C Connector Connects the related device.
	Eject Indicates the switch to remove the recorder paper cassette.

Symbols displayed on the screen

Symbol	*Description*
	Alarm OFF Indicates the alarm is OFF.
	Heart Rate Synchronization Mark This mark flashes synchronizing to the heartbeat.
	Respiration Synchronization Mark This mark flashes synchronizing to the inspiration.
	Event Key This mark will be displayed when an alarm generates. Whether or not to display this icon can be selected on the monitor setup menu.
	Device Configuration Icon This mark will be displayed when device configuration has changed. Whether or not to display this icon can be selected on the monitor setup menu.
	Message Icon This mark will be displayed inside the parameter key when an alarm message is present for that parameter. Whether or not to display this icon can be selected on the monitor setup menu.
	SEC Alarm Display Indicates the SEC alarm status.
	Scroll Keys These keys will allow to scroll the screen.

Precautions for Safe Operation of Medical Electrical Equipment

⚠CAUTION	Read the following precautions thoroughly to correctly operate the device. ● Users should have a thorough knowledge of the operation before using this system. ● Pay attention to the following when installing and storing the equipment. • Do not install or store in an area where the equipment will be subject to splashing water. • Do not install or store in an area where the environmental conditions, such as atmospheric pressure, temperature, humidity, ventilation, sunlight, dust, sodium, sulfur, will adversely affect the system. • Place the equipment on a stable surface where there is no inclination, vibration, or shock (including during transportation). • Do not install or store in an area where there are chemical or gasses stored. • Verify the power frequency, voltage and allowable current (or power consumption). • Ensure the grounding is proper by connecting the accompanying power cable to the hospital grade outlet. ● Before operating the system, verify the following items. • Verify the power voltage. • Check the cable connection and polarity to ensure proper operation of the equipment. • Make sure the power system has adequate earth ground. • Ensure that all cables are firmly and safely connected. • Pay special attention when the device is used in conjunction with other equipment as it may cause erroneous judgment and danger. • Ensure all patient connections are proper and secure. ● During operation of the system, verify the following items. • Always observe the system and patient to ensure safe operation of the equipment. • If any abnormality is found on the equipment or patient, take appropriate measures such as ceasing operation of the equipment in the safest way for the patient. • Do not allow the patient to come in contact with the device. ● After using the system, verify the following items. • Unplug all the cables from the patient before turning off the power. • When unplugging the cables, do not apply excessive force by pulling on the cord. Pull by the connector part of the cable. • Clean the accessories and cables, and keep them together in one place. • Keep the unit clean to ensure proper operation of the next use. ● If the equipment is damaged and in need of repair, user should not attempt service. Label the unit “OUT OF ORDER” and contact Fukuda Denshi. ● Do not remodel the equipment. ● Maintenance Check • Make sure to periodically check the equipment, accessories and cables. • Before reusing the device that has been left unused for a while, make sure that the device works normally and safely. ● When using the electrosurgical knives or defibrillator with this equipment, verify proper attachment of patient ground plate, ECG electrode type for the electrosurgical knives, and paste volume, output energy for the defibrillator. Also, verify that proper ground is selected.

Precautions for Safe Operation of Medical Telemetry

⚠CAUTION	Precautions for Safe Operation of Medical Telemetry To operate the device correctly, read the following precautions carefully. ● The medical institution (hereinafter referred as “Institution”) must decide the telemetry installation plan for the medical institution in order to prevent interference and interference between transmitters (telemetry based on destination country’s radio law). ● When using telemetry which requires zone location, the institution is to set up the zones as an operation unit for each transmitter to prevent electronic interference between telemetry throughout the medical institution. ● When using telemetry which requires zone location, display and identify each prepared zone in the equipment. ● When laying receiver antenna for each transmitter, the institution has to be examined so as not to generate electronic interference. ● Based on the above examination result, the institution places each receiver antenna as required. In managing, be sure to follow the precautions below. ● The institution appoints a person to manage the wireless channels for the whole medical institution. And when using telemetry which requires zone location, the institution nominates a person to manage the wireless channels in each zone (a “Zone Manager”). However, when using such telemetry in a local medical institution, one person can perform both functions. ● Select a telemetry manager who understands the characteristics and functionality of telemetry systems, and is skilled in operating telemetry. ● When installing telemetry, the Overall Manager and the Zone Manager have to understand the precautions for use of the telemetry in advance. ● The Overall Manager takes responsibility of wireless channel management and transmitter storage for the whole medical institution by giving proper instruction. ● The Overall Manager creates a management log, list of wireless channels, management status for the whole medical institution (hereinafter referred to as the “management log”). When changing a wireless channel, register it in the log and give proper instructions to the zone manager or to the user. ● The Zone Manager assumes responsibility for managing the wireless channels, storing, and managing telemetry. ● The Zone Manager assigns the transmitter to the user, and provides enough education for use inside the zone. ● The telemetry user verifies operation of the transmitter/receiver before use. ● The telemetry user, if using the telemetry in a zone location, follows the instructions of the zone manager for the zone and gives instructions to the patient if required. ● When interference or breakdown occurs in telemetry communication, the user is required to inform the zone manager and the overall manager of the problems. The zone manager and overall manager are to deal with the problem properly and/or contact their nearest Fukuda Denshi representative for service.

Precautions about the Maintenance

Safety Inspection and Maintenance

For safe operation of the equipment, regular inspection and maintenance is required. Once a year, check all cables, devices, and accessories for damage, earth impedance, earth and leakage currents, and all alarm functions. Also, ensure that all safety labels are legible. Maintain a record of these safety inspections.

Immediate maintenance has to be carried out if ;

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

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-7300 system is available from your local Fukuda Denshi representative.

Precautions about the Pacemaker

⚠WARNING	● Minute ventilation rate-adaptive implantable pacemakers can occasionally interact with certain cardiac monitoring and diagnostic equipment, causing the pacemakers to pace at their maximum programmed rate. The cardiac monitoring and diagnostic equipment may possibly send wrong information. If such event occurs, please disconnect the cardiac monitoring and diagnostic equipment, or follow the procedures described in the operation manual of the pacemaker. (For more details, contact FUKUDA DENSHI personnel, your institution’s professionals, or your pacemaker distributors.) ➲ Reference “Minute Ventilation Rate-Adaptive Pacemakers” In the USA, 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. [October 14, 1998 (Letter: www .fda.gov/cdrh/safety.html) – FDA] ● 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 “11 Technical Information” for disclosure of the pacemaker pulse rejection capability of this equipment.

Non-Explosion Proof

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

Defibrillation Safety

⚠WARNING	● When 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. ● 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. ● 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.

Electrosurgery Safety

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

Precautions about Magnetic Resonance Imaging

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

Precautions about Connections to Peripheral Devices

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

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

⚠CAUTION	All the peripheral device connectors on the DS-7300 system 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-7300 system, it is the user's responsibility to verify that the overall system complies with IEC60601-1-1, "Collateral Standard: Safety Requirements for Medical Electrical Systems".

Precautions about the Fuse

⚠DANGER	If the fuse blows, contact Fukuda Denshi Service Representative. Do not continue using it as internal damage to the equipment may be considered.

Accessories and Optional Accessories

⚠WARNING	Use only the cables specified by Fukuda Denshi. • Use of other cables may result in increase in emission or decrease in immunity. • We are not liable of the performance if product other than specified is used.

Precautions about the DS-7300 System

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

⚠WARNING	● Do not connect unit or cable not authorized by Fukuda Denshi to any I/O connector. If done so by mistake, the DS-7300 system cannot deliver its maximum performance and the connected units may be damaged, resulting in a safety hazard. ● If the DS-7300 system is used under an environment not fulfilling the specified condition, not only that the equipment cannot deliver its maximum performance, the equipment may be damaged and safety cannot be ensured. If using the equipment under condition other than specified, contact our service representative. ● Use only the 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. ● The patient type selection influences the precision of the QRS detection and NIBP measurement. Make sure the correct selection is made. ● The pacemaker use selection influences the precision of the QRS detection and arrhythmia analysis. Make sure the correct selection is made. ● If the QRS pace pulse mask function is set to [OFF], [10ms] or [20ms], a decrease in heart rate may not generate HR or ASYSTOLE alarms due to erroneously detected QRS. Set this function to [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_2 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 compression necrosis and burn injury. ● For the following case, accurate measurement of SpO_2 may not be possible. • Patient with excessive abnormal hemoglobin (COHb, MetHb) • Patient with the pigment injected to the blood • Patient receiving CPR treatment • When a sensor is applied to a limb with NIBP cuff, arterial catheter, or intracatheter • When measuring at site with venous pulse • Patient with body motion • Patient with small pulse ● Before the NIBP measurement, make sure the patient type ([Adult] / [Child] / [Neonate]) is properly selected. Otherwise, correct measurement cannot be performed, and congestion or other injury may result. ● Use only the specified accessories. ● For HS-710E, 720E, 702E, and HC-500, always consider the circumference of the intubation tube when using the airway adapter. If inappropriate airway adapter is used for a patient with low ventilation, CO_2 may mix in to the inspired air resulting in incorrect measurement, or apnea detection may become difficult.

⚠WARNING	● When the system alarm is suspended, all the alarm will be suspended even if the parameter alarm is set to ON. Also, the alarm event will not be stored as recall. ● If the upper/lower alarm limit of the parameter is set to OFF, or arrhythmia alarm is set to OFF, alarm will not function even if the system alarm is set to ON. Pay attention when setting them OFF. ● 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. If the waveform/numeric data is not displayed for a monitored parameter, check the patient's condition and pay attention not to miss the connector-off condition. ● Objective and constant arrhythmia detection is possible through the fixed algorithm incorporated in this monitor. However, excessive waveform morphology change, motion artifact, or the inability to determine the waveform pattern may cause an error, or fail to make adequate detection. Therefore, physicians should make final decisions using manual recording, alarm recording and recall waveform for evaluation. ● The alarm for the parameter not selected for the "HR/PR Alarm Source" (ECG/SpO_2/BP) will be set to OFF on the DS-7600 Central Monitor. • The "HR/PR Alarm Source" setting will synchronize between the bedside monitor and the central monitor. • For example, if PR is set as the HR/PR alarm source on the DS-7300, HR alarm will be set to OFF on the central monitor. ● The HR/PR alarm will not be generated unless the parameter key corresponded to the selected HR/PR source is displayed. Be sure to display the parameter key for the HR/PR source. ● If PURITAN-BENNETT Ventilator is used, APNEA alarm will not generate when ventilator is the RR/APNEA alarm 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. ● The RR/APNEA alarm will not be generated unless the parameter key corresponded to the selected RR/APNEA source is displayed. Be sure to display the parameter key for the RR/APNEA source. ● Fix the monitor on an adapter before setting on the trolley. Verify it is securely locked. Fixing on with 2 screws will ensure more safe use. If not securely fixed, the monitor may fall off the trolley which may damage the monitor or cause injury. ● When lifting this device, hold the bottom part of the main unit and not the display unit. ● When attaching the display unit to the main unit, insert the display unit to the attaching guide on the main unit from top and push in until a click sound can be heard. Verify that it is securely locked. ● About the Air Filter for Cooling Fan (Super Module, Input Box) • When the air filter is washed with neutral detergent, dry it completely before reattaching. If the moisture is remained on the air filter, it may damage the equipment. • The air filter must be attached. If the equipment is used with the air filter detached, it may damage the equipment.

⚠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. • 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. • When the product is used in regions whose voltage is other than 220-240V, a cable appropriate to the regulations and voltage of the country in which the product is being used shall be used.

⚠CAUTION	• 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. • Always operate the touch panel with fingers or a touch panel pen. Do not touch with a pen-point or other hard-edged instruments. It may cause malfunction or damage the touch panel. In addition, do not apply pressure to whole or part of the panel for a prolonged time. • Do not use the touch panel with the film attached. Malfunction of the touch panel or damage may result. • As the touch panel is made of glass, a strong impact may cause damage. Pay attention not to hit or drop the touch panel.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. • Turning off the power of the LC-7315T/LC-7319T Display Unit will also turn off the power of the Input Box. • As the Super Module and DSC-7300 communicates via Input Box, the power of the Input Box must be always turned ON even if the module is not inserted in the Input Box. • There are following restrictions when recording on the HR-500 Module. ・Only manual recording, periodic recording, alarm recording, recall recording can be performed on the HR-500. ・If the measurement unit of BP is “kPa”, BP waveform, BP numeric data, and NIBP numeric data will be treated as non-measured data. ・If the TEMP measurement unit is “°F”, the TEMP numeric data will be treated as non-measured data. ・For the non-measured parameter, the waveform will not be printed, and numeric data will be printed as “– – –” or left blank. ・The numeric data displayed as “×××” will be printed as “———”. ・The QRS classification symbol of “S” will be printed as “N” on the HR-500. ・The waveform recording is not possible for some scale depending on the parameter. ・If the HR alarm source is BP, ECG will not be recorded. PR_IBP data will be printed for the HR data instead. ・If the RR/APNEA alarm source is other than impedance respiration, the respiration waveform will not be recorded. ・If the RR/APNEA alarm source is other than CO_2/GAS, the CO_2 waveform will not be recorded. • When connecting the BIS monitor, make sure that the power of the patient monitor and the BIS monitor is turned OFF. ● ECG Monitoring • Use only the specified relay cables, lead cables, and electrodes. • The conductive parts of electrodes and associated connectors for applied parts, including the neutral electrode, should not contact other conductive parts including earth. • 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.

⚠CAUTION	• If different types of electrodes are used at the same time, the difference between the polarization potential from each electrode may interfere monitoring. Make sure to use electrodes of the same type. • The threshold level for arrhythmia detection and QRS detection changes with ECG waveform size. Set a proper waveform size for monitoring. When the waveform size is ×1/4, ×1/2, or ×1, the detection threshold is 250μV. When the waveform size is ×2 or ×4, the detection threshold is 150μV. • The QRS detection leads, arrhythmia detection leads, monitoring leads on the central monitor, recording leads are fixed as ECG1 and ECG2. Especially for arrhythmia detection, set the most appropriate leads with high QRS for ECG1 and ECG2. • Automatic size/position of the ECG is effective only at the time the AUTO key is pressed. This does not continually adjust size and position. • The ESIS mode can largely reduce the artifact such as electrosurgery noise and EMG, but it may also reduce the QRS amplitude. The ESIS mode should be selected only during electrosurgery. • There are some cases when 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 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) (Electrosurgery-proof, 3-electrode) ・Relay Cable CI-700E_4 (FA) (Electrosurgery-proof, 4-electrode) ・Relay Cable CI-700E_5 (FA) (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_2 Monitoring • If the sensor site is too thick, thin, deeply pigmented, or deeply colored (ex. nail polish, dye, or pigmented cream), it may lead to inaccurate measurements. In such case, reposition the sensor or choose an alternate sensor for use on a different site. • If irritation such as skin reddening or skin fit appears with the sensor use, change the attachment site or stop using the sensor. • When fixing the sensor with a tape, do not wind the tape too tight. At the same time, check the blood flow constantly so that congestion is not generated at the peripheral. • Even a short duration of attachment may inhibit the blood flow and generate compression necrosis and burn injury. • Change the sensor attachment site at regular time intervals (about 4 hours). The temperature of attachment site will rise 2 to 3°C due to the sensor heat which may result in compression necrosis and burn injury. • As skin for neonate / low birth weight infant is immature, change the sensor attachment site more frequently depending on the condition. Direct sunlight to the sensor area can cause a measurement error. Place a black or dark cloth over the sensor. • Excessive light may cause inaccurate measurements. In such cases, cover the sensor with opaque material.

	• When not performing the measurement, unplug the relay cable and sensor from the SpO_2 connector. Otherwise, the measurement data may be erroneously displayed by the ambient light. • Precautions for Reusable Type Sensors ・The light-emitting part of the sensor should be over the root of the fingernail. Do not insert the finger too far into the sensor as it may hurt the patient. ・The DS-100A is intended for use on finger of adults weighing over 40 kg (approximate). Do not use them on children or neonates. Also do not apply them on the thumb or toe. ・The DS-100A must be moved to a new site at least every 4 hours. Because individual skin condition affects the ability of the skin to tolerate sensor placement, it may be necessary to change the sensor site more frequently with some patients. If skin integrity changes, move the sensor to another site. • Precautions for Single-Use Type Sensors ・Do not wind the tape too strong. It may obstruct the blood flow. ・The sensor is contraindicated for use on patients who exhibit allergic reactions to the adhesive tape. ・The Nellcor® sensor OXISENSOR Ⅲ, MAX Fast can be reused on the same patient as long as the adhesive tape attaches without slippage. But do not reuse it on other patients. It is intended for single patient use only. ・For the Nellcor® single-use type sensors, the site must be inspected every 8 hours to ensure adhesion, skin integrity, and correct optical alignment. If skin integrity changes, move the sensor to another site. ・Do not reuse the sensor by resterilizing it. ・Dispose the sensor after use. In the event of damage to the sterile packaging, do not use it.
⚠CAUTION	● NIBP Monitoring • Select the appropriate cuff size which best fits the arm circumference. If the cuff size is inappropriate, it may cause measurement error. • Do not use a cuff which is worn out. The cuff may burst during inflation. • If there is any air leakage, correct NIBP measurement cannot be performed. Make sure that the connection is secure. • Correct NIBP measurement cannot be performed if artificial heart lung machine is used or if the pulse is difficult to detect. • Pay attention when measuring the NIBP of patient with bleeding disorders or hyper coagulation. The cuff inflation may cause petechia or circulatory failure by 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. • 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. • If the air hose is twisted, or weighed down, the cuff air cannot be exhausted. Properly arrange the cuff and air 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 • For the following situation, measurements will be terminated. When the measurement time has exceeded 120 seconds for adult, 90 seconds for child, 60 seconds for neonate. When the inflation value has exceeded 310mmHg for adult, 210mmHg for child, 160mmHg for neonate.

⚠CAUTION	• If used with the incorrect patient type, it will not only cause erroneous measurement, but the inflating level for the adult may be applied to child or neonate causing dangerous situation to the patient. • The 1-minute interval measurement will always start from 00 second. Pressing the [1min start] key will start the measurement from the next 00 second. • The 1-minute interval measurement will automatically stop after 10 minutes and returns to the previous interval mode setup. • The alarm function will be ineffective for the BP value measured by Quick SYS regardless of the ON/OFF selection of NIBP alarm. • If the mean BP display is set to OFF, the mean BP alarm will not be generated. Also the mean BP will not be displayed for the tabular trend or the NIBP list function if the display is set to OFF. ● BP Monitoring • When the main power is turned ON, the BP value will not be displayed until zero balance is performed. However, if the power is turned ON within 5 minutes after the power is turned OFF, the previous zero balance information will be maintained, and BP value will be displayed. If HB-500 BP Module is used, the balance information will be maintained for 1 minute. • 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 cocks 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 cock of pressure transducers are opened to air. The zero balance procedure is required for the following case. • When starting the measurement. • When the position of the heart has changed due to body movement. • When the position of the transducer has changed. • When measuring for a long period of time and there is a possibility of measurement error due to change in ambient temperature, etc. • When the connector is connected / disconnected, or transducer is replaced. • When the power has been turned OFF for more than 5 minutes. • Note that Systolic Pressure (SYS) = Peak Systolic Pressure (PSP) for the graphic trend, data base, and alarm setup. • When ECG is not measured, PDP cannot be calculated. • When HB-500 is used, do not set the BP label to IAP. PDP will not be calculated and displayed as "– – –". S/D/M will not be displayed either. • The BP data (SYS/DIA/Mean) not displayed will not generate the BP alarm or be displayed for the tabular trend function. Select the appropriate display type according to the monitoring purpose. ● Temperature Monitoring • Do not reuse the probe cover. It is intended for single patient use only. ● CO_2 Monitoring (HS-710E, 720E, 702E) • If the Super Module and the HC-500 (CO_2 Module) are simultaneously used, the CO_2 measurement priority will be according to the "CO_2 Module Priority" set on the "Input Box Setup" (Monitor Setup). With the default setting, the HC-500 will be prioritized. • Perform calibration after 20 minutes when the main power of the Super Module is turned ON. • Do not disconnect the sampling tube during calibration. If disconnected, calibration will cease. • Conduct CO_2 calibration for the following case. ・ When 4,000 operating hours has elapsed from the last calibration date or once a year whichever comes first. ・ When $EtCO_2$ measurement is not stable or accuracy is degraded compared with other measuring device. ・ When the patient monitor was not used for a while, or when $EtCO_2$ was not measured for a while.

⚠CAUTION	● CO_2 Monitoring (HS-720C, 702C: Respironics® Capnostat5) • If the Super Module and the HC-500 (CO_2 Module) are simultaneously used, the CO_2 measurement priority will be according to the "CO_2 Module Priority" set on the "Input Box Setup" (Monitor Setup). With the default setting, the HC-500 will be prioritized. • The disposable airway adapter should be opened just before use. Do not sterilize it. • Do not reuse the disposable airway adapter. • Do not sterilize the airway adapter using autoclave methods. ● CO_2 Monitoring (HC-500) • The airway adapter should be attached with the thicker side facing to the patient. If attached oppositely, it may damage the CO_2 sensor or airway adapter. If the Super Module and the HC-500 (CO_2 Module) are simultaneously used, the CO_2 measurement priority will be according to the "CO_2 Module Priority" set on the "Input Box Setup" (Monitor Setup). With the default setting, the HC-500 will be prioritized. ● Multigas Monitoring (Poet IQ 8500A) • When performing the O_2 cell drift check and calibration, read and follow the instructions listed on the gas cylinder labels. Do not use the calibration gas cylinder if it is beyond the expiration date. • Use only the specified calibration gas. Proper calibration is not possible if unapproved calibration gas is used. • Make sure to restart the Poet IQ 8500A after the calibration. Otherwise, Poet IQ 8500A will not function properly. • If O_2 gain adjustment is started without supplying the calibration gas, the message, "Check calibration gas." will be displayed and O_2 gain adjustment will cease. • If O_2 offset adjustment is started without opening to air, the message, "Check calibration gas." will be displayed and O_2 offset adjustment will cease. • If O_2 offset is adjusted, it is necessary to readjust the O_2 gain. If O_2 offset adjustment was not necessary, O_2 gain readjusting screen will not be displayed. ● Alarm • Alarm messages will be displayed according to the priority. (Level 1 → Level 2 → Level 3 → Level 4) • For the same alarm level, the alarm message for the newer alarm will be displayed. • The alarm message for the arrhythmia alarm will continue to be displayed for 30 seconds after the alarm is resolved. • While the "LEAD OFF" message is displayed, HR alarm and arrhythmia alarm will not function. Leaving this condition unresolved may result in missing a sudden change of the patient. Promptly check the electrodes when this message is displayed. • For HS-710E, 720E, 702E, and HC-500 Module, the upper $EtCO_2$ alarm will not generate if the upper limit is set to 100mmHg/13.4kPa and above as the measurement range is 0 to 99mmHg / 0 to 13.3kPa. • 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. • For the SpO_2 measurement, whether to use the SEC alarm function and its threshold selection should be based on the patient's clinical indication portent and medical evaluation. (For Nellcor® SpO_2 unit) • If the SpO_2 alarm and SEC alarm setup is set to OFF, the SEC alarm integral value will be set to 0. (For Nellcor® SpO_2 unit) • The alarm silence ON/OFF setup will remain effective even when the power is turned OFF. Be cautious not to miss any important alarm by leaving the alarm silenced. • Pay attention not to set the alarm volume too low to avoid missing any important alarms.

⚠CAUTION	● System Configuration • When waveform and numeric data display is set to OFF, the alarm generation and tabular/graphic trend data input will also cease. • If the display of waveform / numeric data labeled as BP1 or ART is set to OFF, the BP pulse rate will not be displayed. • When the waveform and numeric data display for SpO_2 is set to OFF, the pulse rate measured by SpO_2 will not be displayed either. • When the waveform and numeric data display for CO_2 is set to OFF, RR measured by CO_2 will not be displayed either. • When the waveform and numeric data display for the gas module is set to OFF, RR measured by the gas module will not be displayed. • If the time/date is not correctly set, or changed during monitoring, malfunction may occur to NIBP measurement, periodic recording, trend, NIBP list data. • If the time/date is changed during monitoring, patient's age will not be recalculated. ● 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. • Resuming monitoring will resume the alarm in suspension. ● ST Measurement • For the lead which the electrode is detached, the reference waveform setup cannot be performed. Check if the electrode is correctly attached, and perform the setup again. ● CF Card • Use only the specified CF card. • Use only the CF card formatted with this device. • Restart the system after reading the setup data from the CF card. The setup data will become effective after the system is restarted. • Reading the patient data from the CF card will erase all previous patient data stored in the patient monitor. ● Maintenance • The maintenance procedure will be performed by our service representative. Users should not attempt this procedure as malfunction may result to the device. • If stains cannot be removed from the touch panel surface, wipe softly with a dry or ethanol dampened cleaning cloth. Never use strong-acidic cleaning solution. Neither is it recommended that mild acidic or alkaline cleaning solution to be used. • A special coating is applied to the surface of the touch panel. Do not wipe the surface with a cloth or gauze with coarse texture. Wipe the surface with a soft cleaning cloth provided as optional accessory or with an eyeglass cleaning cloth. • Clean the equipment frequently so stains can be removed easily. • To prevent injury, it is recommended to wear gloves when cleaning the equipment. • Do not allow liquids such as alcohol or cleaning solution enter the equipment or connectors. • Do not use organic solvents, thinner, toluene and benzene to avoid damaging the resin case. • Do not polish the housing with abrasive or chemical cleaner. • When sterilizing the entire room using a spray solution, pay close attention not to have liquids get into the equipment or connectors. • Use only neutral detergent to clean the housing. Do not use chemical cloth, scrub brush, abrasive, polishing powder, hot water, volatile solvent and chemicals (cleanser, thinner, toluene, benzine, benzol, and synthetic detergent for house and furniture), or sharp-edged tools. The surface resin coating may be damaged, resulting in discoloration, scratches, and other problems.

⚠CAUTION	• Do not open the housing. • 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-LANII/DS-LANIII)

⚠WARNING	● Do not connect unspecified device to a wired network. ● Do not mix devices with DS-LANII and DS-LANIII setting in the same wired network. The network may cease and proper monitoring may not be possible.

⚠CAUTION	● If performing wired network transmission, configure the display so that the numeric data corresponded to the waveform is displayed. If not, the displayed waveform or numeric data may not be transmitted. ● The Bed ID is factory set to 000. If connected to the wired network with the ID unchanged, monitoring on the central monitor will not be possible. ● When connecting to the wired network, verify that the Bed ID does not duplicate with other bedside monitors. Otherwise, monitoring on the central monitor for both bedside monitors will not be possible. ● Make sure to set the bed ID in the following range. • For DS-LANII network: 001 to 048 • For DS-LANIII network: 001 to 100 ● As the DS-7300 do 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-7300 system, it will be corrected to the time/date of the central monitor. ● The setups for “HR Low Limit for VT” and “HR Low Limit for Run” cannot be performed on some central monitors. ● On a wired network, the alarm generated on the DS-7300 will be transmitted to the central monitor with 2.5 seconds delay. ● If ECG lead (ECG1 or ECG 2) is changed on the DS-7300 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/APNEA alarm source selected on the DS-7300 will be displayed on the central monitor. The monitoring RR and APNEA will be the same as the one monitored on the DS-7300. ● If the measurement unit of CO_2 concentration is “mmHg”, and [99mmHg] is selected for “CO_2 (mmHg) Upper Limit for LAN, Telemetry” on the monitor setup menu, the CO_2 value of 100mmHg or above will be transmitted as 99mmHg. ● If [BP] is selected for “HR/PR source” (Or, if [Auto] selects BP for HR/PR Source), ECG waveform will not be transmitted on the DS-LANII wired network. PR_IBP value will be displayed for the HR value on the central monitor. However, HR value from ECG will be displayed for the ST measurement list. In case of DS-LANIII network, refer to the operation manual for the central monitor. ● There are following restrictions when connecting the DS-7300 system to the DS-LANII network. • When DS-5800N/NX/NX^{MB} is used as a central monitor, recall, graphic trend, and tabular trend will not be displayed. Also, Σ recording cannot be performed. • On the ST display, overlap waveform will not be displayed on the DS-5800N/NX/NX^{MB} until 15 minutes have passed since the reference waveform is set on the DS-7300. • If the measurement unit for BP (mmHg/kPa) is different between the bedside monitor and the central monitor, the corresponding waveform and numeric data will not be displayed on the central monitor. • When the temperature unit is °F, the temperature data will not be transmitted. It will be treated as not measured data, and will not be displayed on the central monitor. Also, alarm limit setup on the central monitor cannot be performed.

⚠CAUTION	• Arrhythmia alarm of TACHY, BRADY, COUPLET, PAUSE, TRIGEMINY will not be transmitted. • Arrhythmia alarm of “SLOW_VT” will be transmitted as “VT”. • On the DS-LANII network, waveform, numeric data, alarm of BP7, BP8, TEMP3–8 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. • If DS-7600 system is used as the central monitor, O_2, N_2O, AGENT alarm will not be generated on the central monitor. • If the HR/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 list. • If the RR/APNEA alarm source is other than impedance respiration, respiration waveform will not be transmitted on a wired network. • If the RR/APNEA alarm source is other than CO_2/GAS, CO_2 waveform will not be transmitted on a wired network. • For numeric data displayed as “×××”, maximum or minimum value of measurable range will be transmitted. • The numeric data displayed as “– – –” will be treated as not measured data. ● There are following restrictions when connecting the DS-7300 system to the DS-LANIII network. • When connecting to the DS-LANIII network, select DS-LANIII under “DS-LAN Setup” in the Monitor Setup menu and restart the system before connecting the LAN cable. • 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 network construction, use the HUB recommended by Fukuda Denshi. • The displayable waveform, numeric data, alarm will differ depending on the central monitor. Please also refer to the operation manual of the central monitor. ● There are following restrictions when recording the DS-7300 data on the central monitor recorder or the AU-5500N 8ch Recorder. • The AU-5500N can be connected to DS-LANII network only. Do not connect it to DS-LANIII network. Malfunction may occur to the network. • Only manual recording, alarm recording, periodic recording, and recall recording can be performed on the AU-5500N. • If the measurement unit of BP is kPa, the BP waveform, BP numeric data, and NIBP numeric data will be treated as not measured data. • If the measurement unit of temperature is °F, the temperature data will be treated as not measured data. • When a parameter is not measured, the waveform for that parameter will not be recorded, and measurement data will be recorded as “– – –” or blank. • The measurement data displayed as “×××” will be recorded as “– – –” on the central monitor recorder. • The “S” (QRS symbol) printed on the HS built-in recorder will be printed as “N” on the central recorder, AU-5500N, and HR-500 Recorder Module. • For the waveform recording and graphic trend recording, some parameters may not be able to be recorded depending on the scale. • When performing tabular trend recording or graphic trend recording on the central recorder, some numeric data may not be recorded depending on the parameter. Also, there are some graphic trend scales that cannot be recorded. • If BP is the HR/PR source, ECG will not be recorded on the central recorder. PR_IBP value will be printed instead for the HR value. • If the RR/APNEA alarm source is other than impedance respiration, respiration waveform will not be output on the central recorder.

⚠CAUTION	(Continued from previous page) • If the RR/APNEA alarm source is other than CO_2/GAS, CO_2 waveform will not be output on the central recorder. • When graphic trend recording, tabular trend recording, or NIBP list recording is output on the central monitor recorder from the DS-7300, HR measurement value from ECG will be recorded for the HR value and ST trend.

Precautions about the Wired Network System (AU-5500N 1:N Network)

⚠CAUTION	● The AU-5500N can be connected to DS-LANII network only. Do not connect it to DS-LANIII network. Malfunction may occur to the network. ● The bed ID is factory set to “000”. If used on a wired network with the default ID unchanged, recording on the AU-5500N will not be possible. ● When using on a wired network, make sure that there are no other bedside monitors with the same ID. If there are more than one bedside monitors with the same bed ID, the duplicated bedside monitors cannot record on the AU-5500N. ● For 1:N network, set the bed ID in the range from 001 to 016. ● When connecting the AU-5500N to a 1:N network, internal switch setting of the AU-5500N is required. For details, refer to our service representative.

Precautions about the Wireless Network System

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

⚠WARNING	● 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	● On a wireless network, the alarm generated on the DS-7300 will be transmitted to the central monitor with 15 seconds delay. ● If performing telemetry transmission, configure the display so that the numeric data corresponded to the waveform is displayed. If not, the displayed waveform or numeric data may not be transmitted. ● The setup of channel ID and group ID should be performed only by our service representative. Users should not perform this procedure as malfunction of the equipment may occur. ● If the measurement unit is "°F" and "kPa" on the DS-7300 system, it will be converted to "°C" and "mmHg" respectively when transmitted to the central monitor. If the measurement unit "°F" and "kPa" are set on the central monitor, it will be reconverted to the value in "°F" and "kPa" after transmitted to the central monitor. ● On a wireless network system, O_2, N_2O, AGT alarm generation will not be transmitted to the central monitor. ● For the alarm generation on the bedside monitor, maximum of 15 seconds delay will occur for the alarm generation on the central monitor. ● BP waveform with a scale above the programmed scale can not be properly transmitted. When transmitting the BP waveform, check the displayed BP waveform scale. ● If the measurement unit of CO_2 concentration is "mmHg", and 99mmHg is selected for "CO_2 (mmHg) Upper Limit for LAN, Telemetry" on the monitor setup menu, the CO_2 value of 100mmHg or above will be transmitted as 99mmHg.

Precautions about Ventilator Monitoring

⚠WARNING	● The ventilator alarm on this monitor should be used as supplementary function. Check the patient's condition, ventilator alarm sound and message occasionally. ● The ventilator alarm sound is set to OFF at factory default setting. The alarm sound can be turned ON on the volume setup menu. ● If the DS-7300 system does not generate an alarm even though the ventilator is generating an alarm, or if any other malfunction occurs, immediately check the ventilator, DS-7300 system, cable, and replace the cable if necessary. If the malfunction persists, stop using the device. ● When a ventilator is connected to the DS-7300, verify that "Vent. Online" message is displayed for the connection status. The DS-7300 will not detect the ventilator alarm unless the "Vent. Online" condition is achieved. ● The alarm generation on the DS-7300 system is not assured if the alarm other than specified generates at the ventilator. ➲See For details of the specified alarms, refer to ⚠WARNING on P2-27 "2. Basic Operation Ventilator Alarm Input". ● The Evita 2 dura / Evita 4 / Evita XL / Savina acquires alarm information from the serial port. The ventilator alarm that cannot be acquired from the serial port is not guaranteed. For corresponding alarm, refer to the service representative of the ventilator manufacturer. ● The DS-7300 system will not correspond to the following alarms generated on the Evita 4 / Evita XL / Evita 2 dura. • O_2 monitoring disabled alarm, CO_2 alarm disabled alarm, Oximeter alarm disabled alarm, Neo. volume measurement inoperable alarm, Minute volume alarm disabled alarm, Minute volume alarm low off alarm, Tidal volume alarm high off alarm, Apnea alarm off alarm, Nebulizer active alarm ● The DS-7300 system will not correspond to the following alarms generated on the Savina. • O_2 monitoring disabled alarm, Minute volume alarm disabled alarm, Minute volume alarm low off alarm, Tidal volume alarm high off alarm, Apnea alarm off alarm, Nebulizer active alarm ● For the Evita 4 / Evita XL / Evita 2 dura / Savina, there is a communication delay of 3 seconds between the DS-7300 system and the ventilator. Therefore, if the alarm generated at the ventilator is resolved within 3 seconds, the ventilator alarm may not be generated at the DS-7300 system.

⚠CAUTION	● The ventilator operation should be performed by well-trained and authorized personnel. ● For connecting the DS-7300 system and ventilator, use only the specified connection cable. ● Verify that the DS-7300 system and the ventilator are properly connected. ● When connecting the cable, verify that the main power of the DS-7300 system and the ventilator is OFF. ● For the SV-900, PB, Evita, Savina ventilator, ventilator alarm factor cannot be transmitted to the central monitor. ● The ventilator alarm factor will not be displayed on the bedside monitor. ● Check occasionally the communication status of the DS-7300 and the ventilator. ● Verify that the ventilator alarm is not generated, and the "Vent. Online" message is displayed. ● The confirmation display will be displayed until the proper communication with the ventilator is resumed. When the communication is resumed, the screen will automatically return to the home display. ● When disconnecting the ventilator and the DS-7300, make sure to select OFF on the "Check external alarm" display which appears when the power of the ventilator is turned OFF, or when the cable is disconnected.

⚠CAUTION	● When connecting the PURITAN-BENNETT ventilator, follow the precautions below. • The serial port (RS-232C) of the ventilator should be set as follows. Refer to the service representative of the ventilator manufacturer. Baud Rate : 9600bit/s Data Bit : 8bit Parity Bit : none (Stop Bit) : (1bit) ● The DS-7300 system detects the “ventilator alarm” when the nurse call port on the ventilator outputs the alarm signal. For details of ventilator setup and alarm signal output condition from the nurse call port, refer to the service representative of the ventilator manufacturer. ● When connecting the Evita2dura / Evita4 / Evita XL / Savina ventilator, the serial port (RS-232C) setup of the ventilator should be as follows. Refer to the service representative of the ventilator manufacturer. For Evita2dura / Evita4 / Evita XL Protocol : Medibus Baud Rate : 19200bps Data Bit : 8bit Parity Bit : Even Stop Bit : 1bit For Savina Protocol : Medibus Baud Rate : 9600bps Data Bit : 8bit Parity Bit : None Stop Bit : 1bit ● For PURITAN-BENNETT ventilator, AWP and AWF waveform cannot be displayed or recorded. Only the numeric data will be displayed. ● For PURITAN-BENNETT ventilator, P-V curve and F-V curve cannot be displayed or recorded. Only the numeric data will be displayed.

Precautions for Use of SpO_2 Sensor

⚠DANGER	Burn Risk in Using SpO_2 Sensor In SpO_2 monitoring, always use the sensor/relay cable specified by Fukuda Denshi. If any other sensor/relay cable is used, a high temperature rise of the sensor may place the patient in danger of burns. If there are any questions regarding the sensor/relay cable use for SpO_2 measurements of this device, please contact Fukuda Denshi service representative.

Precautions for Use of NIBP Cuff

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

Disposing of Equipment, Accessories, or Components

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

Precautions about Transportation

For transporting the DS-7300 system, pack with specified packing materials.

Reference

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

Precautions about RTC or Data Backup

⚠CAUTION	● The DS-7300 system is equipped with a built-in clock. When the power of the DS-7300 system is turned off, this clock is backed up by a lithium primary battery. If incorrect time is displayed when turning on the power, a low battery may be the cause. In such case, contact Fukuda Denshi service representative for replacing the battery. ● To protect the data during voltage dip, short interruptions and voltage variations on power supply input lines or during short duration of power turned OFF, this monitor performs 5-minute (approx.) data backup using the secondary battery. The data may not be protected if the power is turned off within 30 minutes from power on.

To Prepare for Emergency Use

Accessories / Optional Accessories

(1) The ECG electrodes are consumables. Always prepare extra supplies of electrodes.

(2) Check if any wire break on the patient cables once a week.

Electromagnetic Compatibility

The performance of this device under electromagnetic environment complies with IEC60601-1-2 (2001).

Precautions for Safe Operation under Electromagnetic Influence

⚠CAUTION	If any sorts of electromagnetic wave, magnetic field, or static electricity exist around the device, noise interference or malfunction of the device may occur. If any unintended malfunction or noise occurs during monitoring, check the magnetic influence and take appropriate countermeasures. The following are examples of the common cause and countermeasures. ● Cellular Phone The radio wave may cause malfunction to the device. Cellular phones and radio sets should be turned off in the room (building) where medical device is located. ● Static Electricity In a dry environment (room), static electricity is likely to occur. Take the following countermeasures. • Both operator and patient should remove any static electricity before entering the room. • Humidify the room. ● Lightning • A lightning nearby may induce excessive voltage to the equipment. If any danger is suspected, use the uninterruptible power supply system. ● High frequency noise interference from other device through the power outlet • Check where the noise is originated and remove it using filtering device, etc. • Stop using the device that is originating the noise. • Use other power outlet.

EMC Guidance

This equipment complies with IEC60601-1-2 (2001). However, if portable transmitter or wireless LAN equipment is used extremely nearby, the electromagnetic influence may largely exceed the compliance level and may cause unexpected phenomenon such as noise interference on the waveform, etc. Therefore, this equipment should be used in a location specified by each medical institution.
If any unexpected noise interference on the waveform or failure to the peripheral device occurs, stop using the equipment and follow the instruction of the technician.

The following is the information relating to EMC (Electromagnetic Compatibility).
(When using this equipment, verify that it is used within the environment specified below.)

●Compliance to the Electromagnetic Emissions

The DS-7300 system is intended for use in the electromagnetic environment specified below.
The customer or the user of the DS-7300 system should assure that it is used in such an environment.

Emissions Test	***Compliance***	***Electromagnetic Environment - Guidance***
RF Emissions CISPR 11	Group 1	The DS-7300 system uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF Emissions CISPR 11	Class A	The DS-7300 system is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic Emissions IEC61000-3-2	Class A	
Voltage Fluctuations/ Flicker Emissions IEC61000-3-3	Complies	

●Compliance to the Electromagnetic Immunity (1)

The DS-7300 system is intended for use in the electromagnetic environment specified below.
The customer or the user of the DS-7300 system should assure that it is used in such an environment.

Immunity Test	***IEC60601-1-2 Test Level***	***Compliance Level***	***Electromagnetic Environment - Guidance***
Electrostatic Discharge (ESD) IEC61000-4-2	±6kV contact ±8kV air	±6kV contact ±8kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient / burst IEC61000-4-4	±2kV for power supply lines ±1kV for input/output lines	±2kV for power supply lines ±1kV input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC61000-4-5	±1kV: differential mode ±2kV: common mode	±1kV: differential mode ±2kV: common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines. IEC61000-4-11	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5sec.	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5sec.	Mains power quality should be that of a typical commercial or hospital environment. If the user of the DS-7300 system requires continued operation during power mains interruptions, it is recommended that the DS-7300 system is powered from an uninterruptible power supply.
Power Frequency (50/60Hz) Magnetic Field IEC61000-4-8	3A/m	3A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

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

●Compliance to the Electromagnetic Immunity (2)

The DS-7300 system is intended for use in the electromagnetic environment specified below.
The customer or the user of the DS-7300 system should assure that it is used in such an environment.

Immunity Test	***IEC60601-1-2 Test Level***	***Compliance Level***	***Electromagnetic Environment - Guidance***
Conducted RF IEC61000-4-6 Radiated RF IEC61000-4-3	3Vrms 150kHz to 80MHz 3V/m 80MHz to 2.5GHz	3Vrms 3V/m	Portable and mobile RF communications equipment should be used no closer to any part of the DS-7300 system, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended Separation Distance d = 1.2 $\sqrt{P}$ d = 1.2 $\sqrt{P}$ 80MHz to 800MHz d = 2.3 $\sqrt{P}$ 800MHz to 2.5GHz Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol: 

Note 1 : At 80MHz and 800MHz, the higher frequency range applies.
Note 2 : These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast can not be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the DS-7300 system is used exceeds the applicable RF compliance level above, the DS-7300 system should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the DS-7300 system.

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

●Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the DS-7300 System

The DS-7300 system is intended for use in an environment in which radiated RF disturbances are controlled. The customer or the user of the DS-7300 system can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the DS-7300 system as recommended below, according to the maximum output power of the communications equipment.

Rated Maximum Output Power of Transmitter (W)	***Separation Distance according to Frequency of Transmitter (m)***		
	150kHz to 80MHz $d = 1.2\sqrt{P}$	80MHz to 800MHz $d = 1.2\sqrt{P}$	800MHz to 2.5GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

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

Note 1 : At 80MHz and 800MHz, the separation distance for the higher frequency range applies.
Note 2 : These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

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Chapter 9

Installation

Precautions for Installing the Equipment

This section describes the environmental condition to use the DS-7300.

Precautions about the Operating Environment

- The following environmental conditions should be observed when operating the DS-7300.
  - Surrounding Temperature : 10 to 40°C
  - Relative Humidity : 30 to 85% (non-condensing)
  - Atmospheric Pressure : 700 to 1060hPa

- The DS-7300 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 power voltage and frequency before connecting to an AC power source.
  - Use the 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 gas may generate
  - where the equipment will be subject to splashing water or humidity from a nebulizer or vapolizer
  - 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.

- The Super Module (HS-700 series) must be placed on a level surface. If installed sideways, water or chemicals may enter the equipment and cause damage. For the Super Module with built-in recorder, it may cause the recording paper to get jammed.

⚠WARNING	If the monitor is used in an environment not fulfilling the above conditions, not only the monitor will not deliver its maximum performance, but 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.

⚠CAUTION	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 equipotential terminal to the same ground terminal. This is called equipotential grounding.

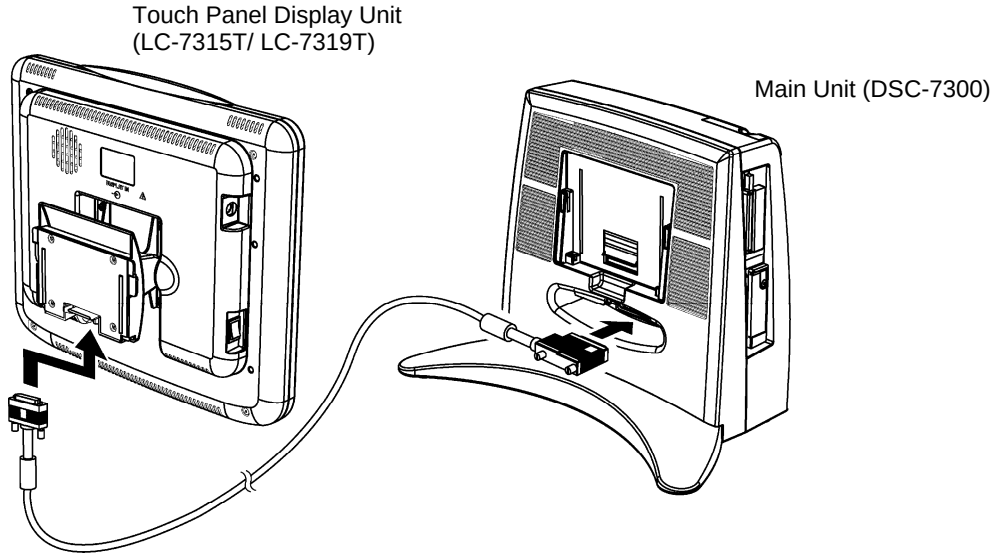
⚠CAUTION	The installation of this equipment should be performed by our service representative or a person who is well acquainted with this equipment.

System Construction

The DS-7300 system is composed of the main unit (DSC-7300), display unit with touch panel (LC-7315T), and the Super Module (HS-700 series).

Connecting the Display Unit

Using the accessory display unit connection cable (CJ-731A), main unit and 15-inch touch panel display unit (LC-7315 / LC-7319T) can be connected. The power is supplied to the display unit via display unit connection cable from the main unit.



Depending on the arrangement of the patient monitor and the display unit, the following cable length can be selected.

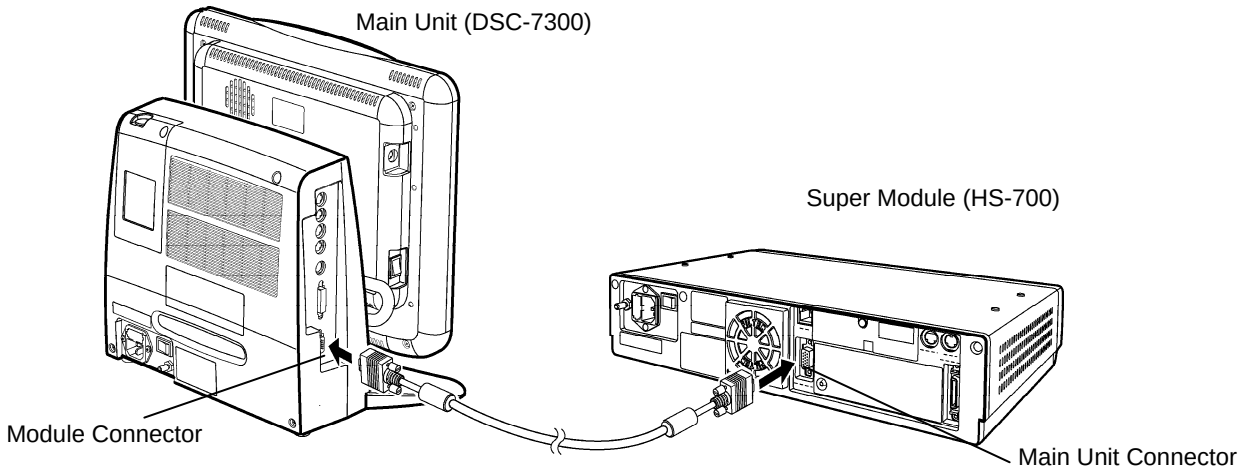
Model Type	***Length***
CJ-731A	0.35m (Standard Accessory)
CJ-731B	2.5m
CJ-731C	6m
CJ-731D	10m

⚠WARNING	● When lifting this device, hold the bottom part of the main unit and not the display unit. ● When attaching the display unit to the main unit, insert the display unit to the attaching guide on the main unit from top and push in until a click sound can be heard. Verify that it is securely locked.

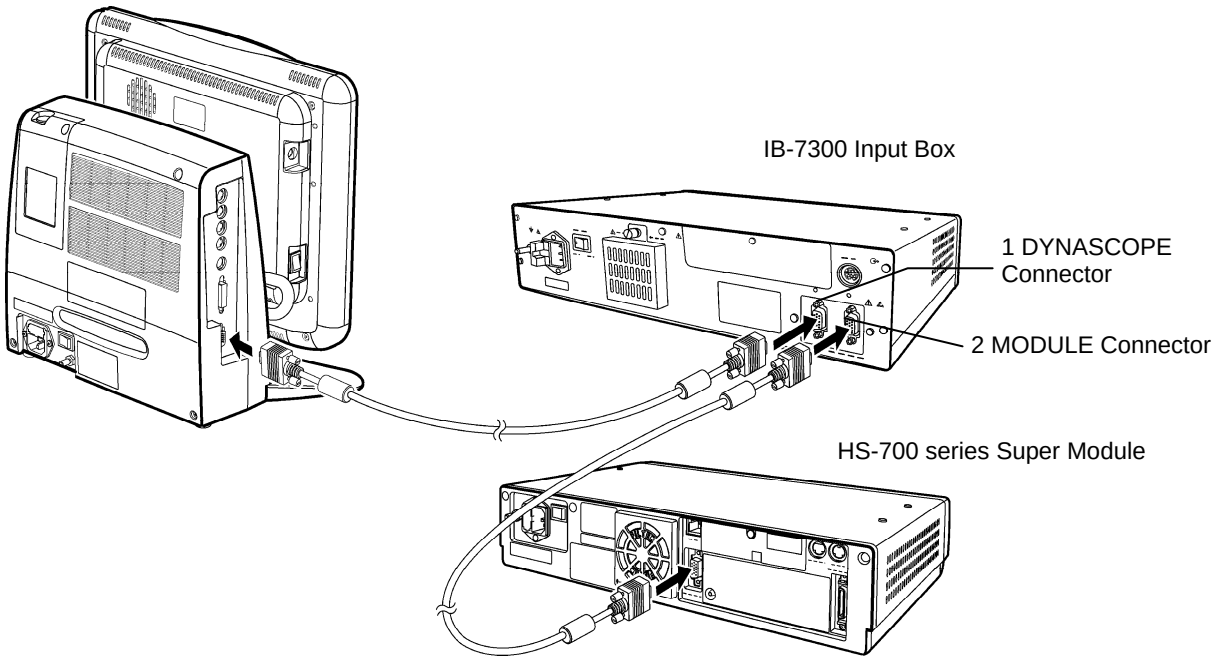
Connecting the Super Module and Input Box

Using the accessory module connection cable (CJ-732B), connect the main unit and Super Module (HS-700 series).
When using the IB-7300 Input Box, connect the Input Box to the Super Module using the module connection cable.

【Connecting the Main Unit and Super Module】



【Connecting the Main Unit, Super Module, and Input Box】



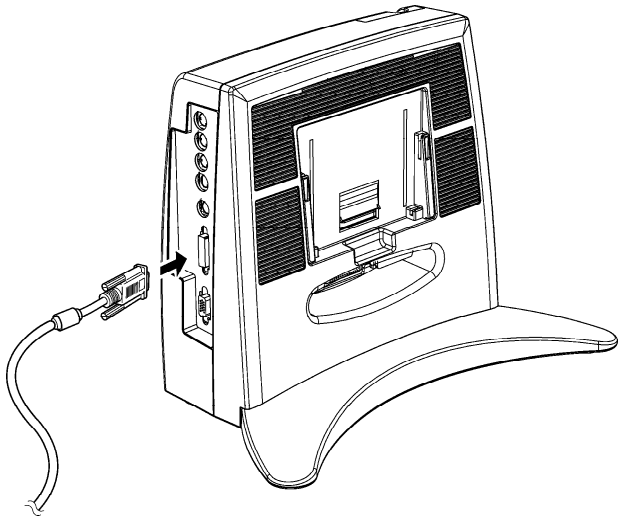
Depending on the arrangement distance of the main unit, Super Module and the Input Box, the following cable length can be selected.

Model Type	***Length***
CJ-732A	0.3m
CJ-732B	0.7m (Standard Accessory)
CJ-732C	5m
CJ-732D	10m
CJ-732E	20m

Connecting the Slave Monitor

The patient monitor is equipped with DVI-I connector for slave monitor output which allows connection of commercially available display unit by digital connection or analog RGB connection. When connecting, contact our service representative.

⚠WARNING	The slave monitor output of the DS-7300 is not isolated. If connecting a commercially available display unit which does not comply with IEC 60601, use an isolation transformer to ensure there is no excessive electric leakage current for safety of the operator and the patient.



To Slave Monitor

Slave Monitor Specification

- A commercially available monitor satisfying the following condition should be used.
  - ・Resolution : XGA size (1024dot x 768dot) (LC-7315T)
    SXGA size (1280dot x 1024dot) (LC-7319T)
  - ・Horizontal Frequency : 48.4kHz (LC-7315T)
    64.0kHz (LC-7319T)
  - ・Vertical Frequency : 60Hz (LC-7315T, LC-7319T)
  - ・Cable Length : when connecting analog RGB monitor 10m(max)※1
    when connecting digital monitor 10m(max)※2

※1 : For analog RGB connection, commercial DVI-I male↔ VGA HD15 female connector changer and VGA cable are required.
: If using a cable longer than 3m, use low-loss cable to maintain the performance.

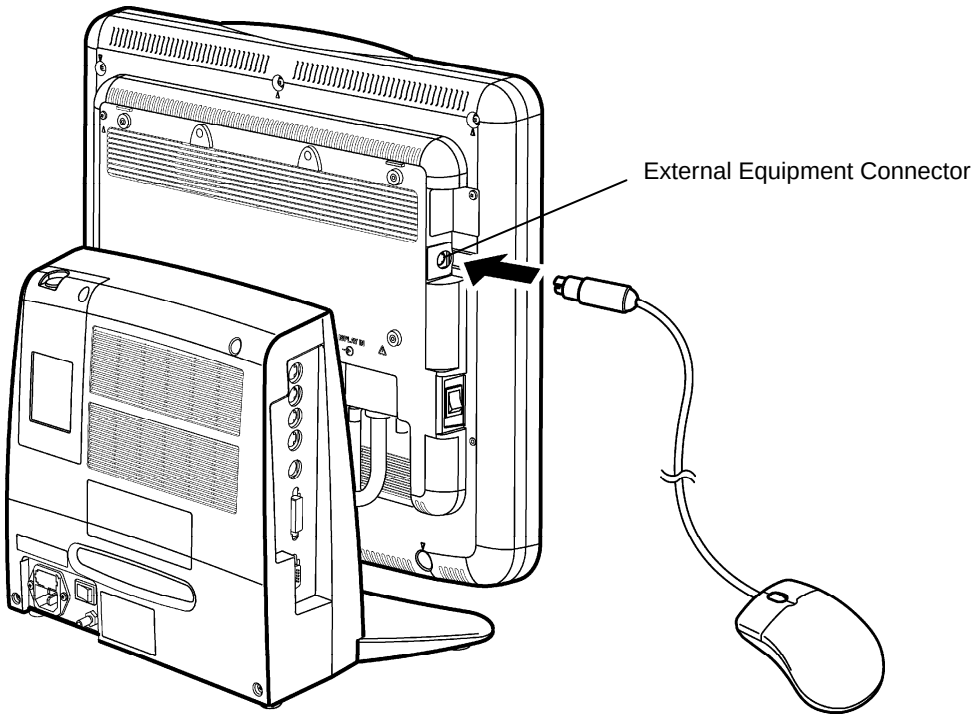
※2 : For digital connection, use the CJZ-01SS digital display connection cable to maintain the performance.

Model Type	***Length***
CJZ-01SS3	3m
CJZ-01SS5	5m
CJZ-01SS10	10m

Connecting the Mouse (Optional) to the 19-inch Display

For the LC-7319T 19-inch Display Unit, a commercially available mouse (including the track ball) can be connected which allows to control the displayed keys by clicking the mouse.
Use the PS/2 compatible mouse.

1 Connect the mouse to the external equipment connector located at the left side of the display unit.

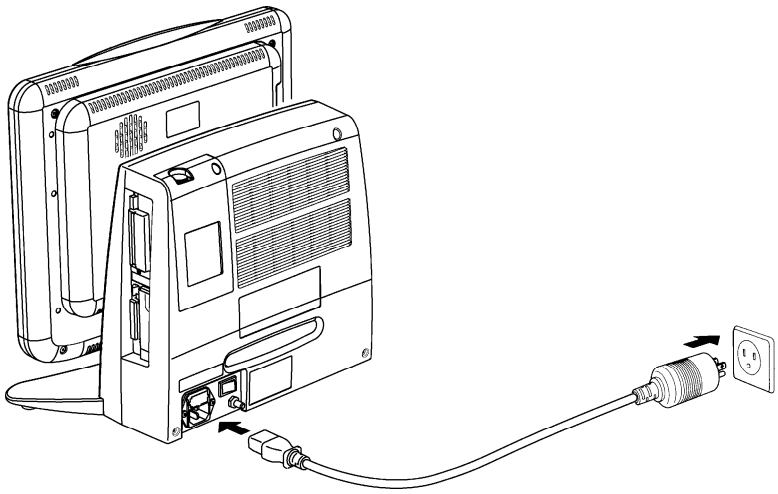


Power Source and Ground Connection

Connect the DS-7300 system to the power source.
The power needs to be supplied independently to the main unit, Super Module, and Input Box.

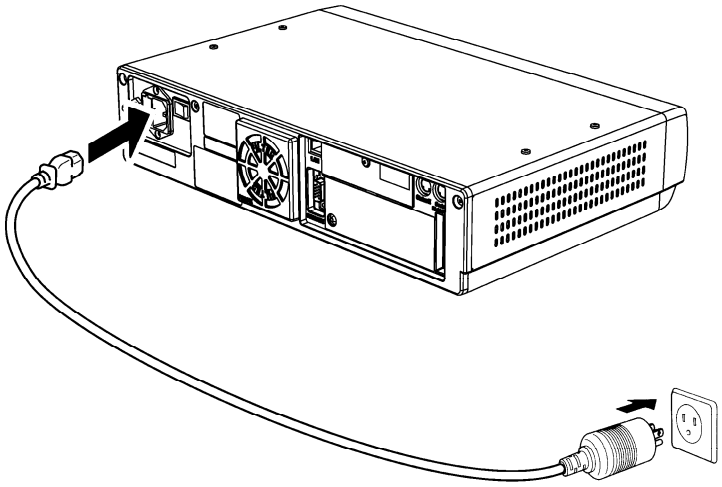
Connecting Patient Monitor to the Power Source

Connect the accessory power cable of the patient monitor (DSC-7300) to the hospital grade outlet with ground terminal.



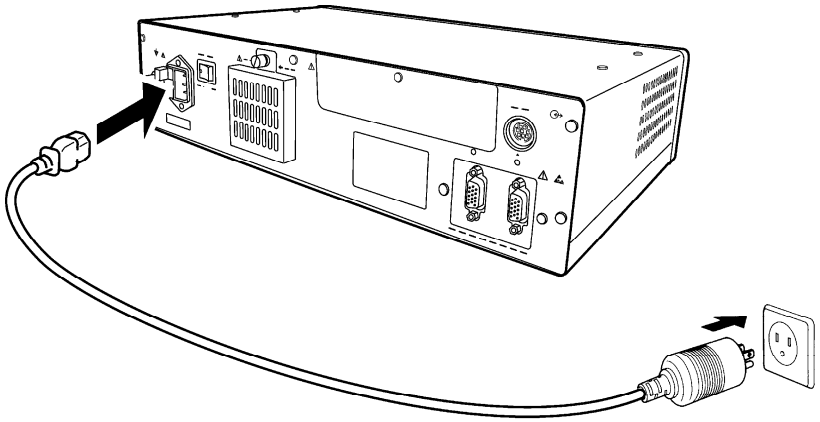
Connecting Super Module to the Power Source

Connect the accessory power cable of the Super Module (HS-700) to the hospital grade outlet with ground terminal.



Connecting Input Box to the Power Source

Connect the accessory power cable of the Input Box (IB-7300) to the hospital grade outlet with ground terminal.



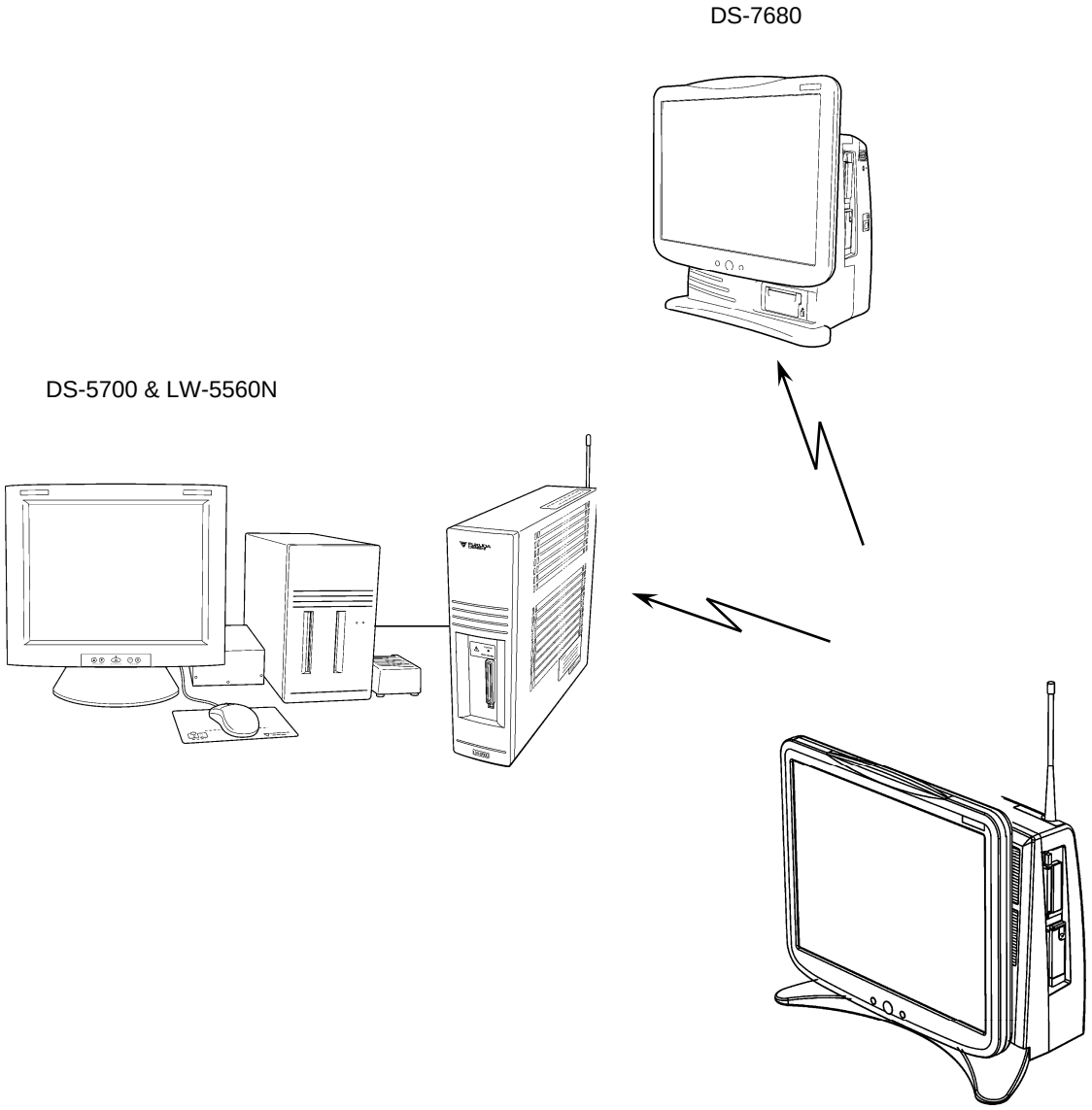
Equipotential Grounding

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 equipotential terminal to the same ground terminal. This is called equipotential grounding.

Wireless Network Connection

This section explains the procedure on how to use this equipment with telemetry system.

By connecting the telemetry transmitting module (HLX-561), the DS-7300 system can construct a wireless network system and display the data on the central monitor.



⚠WARNING	● 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.

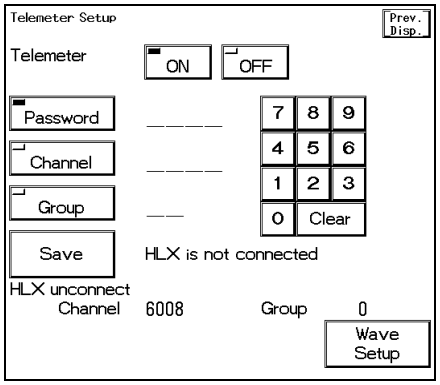
⚠CAUTION	The setup of channel ID and group ID should be performed only by our service representative. Users should not perform this procedure as malfunction to the equipment may occur.

Channel ID Setup

Once the transmitting channel ID and group ID are programmed, these will be retained even after the main power is turned OFF.

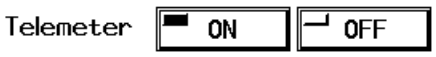
1 Insert the program software card.

2 Press the [Menu] → [System Config.] → [Pre-Set] → [Hospital Setup] → [Telemeter Setup] keys.



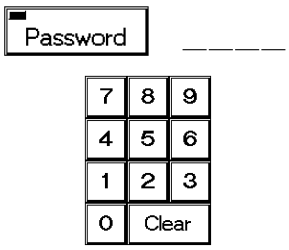
The telemetry setup menu will be displayed.

3 Select ON/OFF of telemetry transmission.



If [OFF] is selected, telemetry transmission will not be performed. The channel ID on the home display will be displayed as "CH OFF".
To perform telemetry transmission, select [ON].

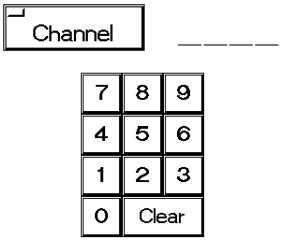
4 Enter the password.



Press the [Password] key, and enter the password.

Use the numeric keypad to enter the password
The entered number will be displayed as "＊＊＊＊".

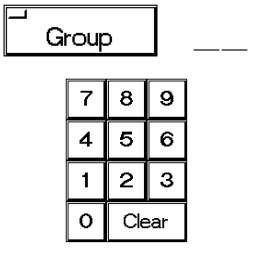
5 Enter the channel ID.



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.

6 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.

7 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.

8 Verify the stored channel ID and group ID.

Channel 3400 Group 0

⚠CAUTION	If the measurement unit of CO_2 concentration is "mmHg", and 99mmHg is selected for "CO_2 (mmHg) Upper Limit for LAN, Telemetry" on the monitor setup menu, the CO_2 value of 100mmHg or above will be transmitted as 99mmHg.

NOTE

When the DS-7300 system 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	Calculates based on ECG waveform.
RR	151Bpm or above	150Bpm Calculates if impedance respiration.
BP	–51mmHg or below	–50mmHg
	301mmhg or above	300mmHg
	–6.8kPa or below	–6.7kPa
	40.1kPa or above	40.0kPa
	If the measurement unit is kPa, it will be converted to mmHg when transmitted to the central monitor.	
TEMP	–0.1°C or below	0°C
	50.1°C or above	46.1°C
	31.9°F or below	32°F
	122.1°F or above	115.0°F
	If the measurement unit is °F, it will be converted to °C when transmitted to the central monitor.	
CO_2 (mmHg)	100mmHg or above	99mmHg
CO_2 (kPa, %)	13.3 (kPa, %) or above	13.2 (kPa, %)

*If the temperature measurement value is 46.1°C (115.0°F) or above, 46.1°C (115.0°F) will be displayed at the central monitor.

Wired Network System

This section describes the procedure on how to use this monitor on a wired system.

There are following 3 types of DS-7300 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.
3) 1:N Network Connection
   (DS-LANII network with one AU-5500N and maximum of 16 DS-7300 monitors)
   AU-5500N will function as the network administrator.

Reference

The setting for the wired network (DS-LANII/ DS-LANIII) can be performed on the Monitor Setup menu. For procedure, refer to ”8. System Configuration ●DS-LAN Setup”.

⚠WARNING	● Do not connect unspecified device to the wired network. ● Do not mix devices with DS-LANII and DS-LANIII setting in the same wired network. The network may cease and proper monitoring may not be possible.

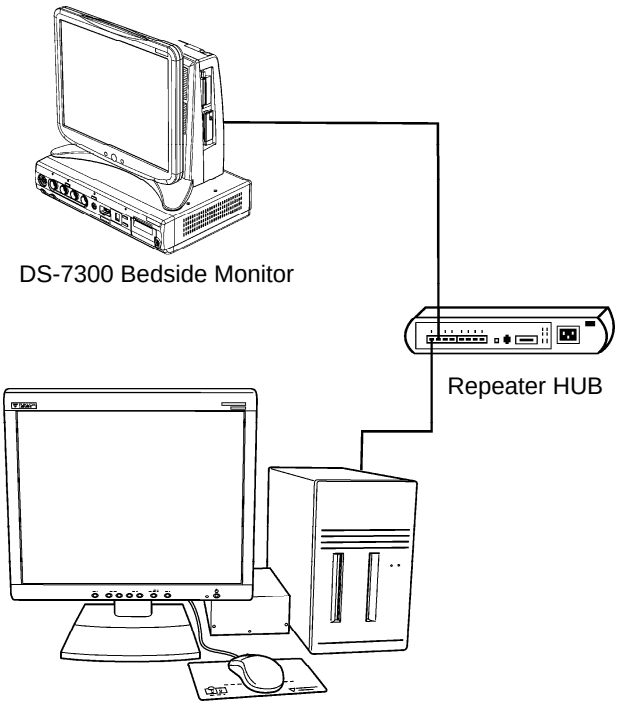
⚠CAUTION	● When connecting to the DS-LAN network, perform “DS-LAN Setup” in the Monitor Setup menu and restart the system before connecting the LAN cable. ● The bed ID is factory set to “000”. If connected to a wired network with the bed ID unchanged, monitoring on the central monitor will not be possible. ● When connecting to the wired network, make sure that there are no other bedside monitors with the same ID. If there are more than one bedside monitors with the same bed ID, the duplicated bedside monitors can not be monitored on the central monitor. ● If the measurement unit of CO_2 concentration is “mmHg”, and 99mmHg is selected for “CO_2 (mmHg) Upper Limit for LAN, Telemetry” on the monitor setup menu, the CO_2 value of 100mmHg or above will be transmitted as 99mmHg.

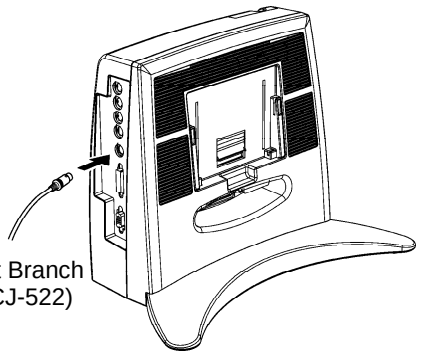
NOTE	When the DS-7300 system indicates that the measurement data is out of range (“xxx” display), the minimum or maximum value of the range will be displayed at the central monitor.

	【Out of range】	【Central Monitor】
HR	301bpm or above	300bpm
RR	151Bpm or above	150Bpm
BP	–51mmHg or below	–50mmHg
	301mmhg or above	300mmHg
	–6.8kPa or below	–6.7kPa
	40.1kPa or above	40.0kPa
TEMP	–0.1°C or below	0°C
	50.1°C or above	50.0°C
	31.9°F or below	32°F (DS-LANIII only)
	122.1°F or above	122°F (DS-LANIII only)
CO_2	100mmHg or above	99mmHg
CO_2	13.3 (kPa, %)	13.2 (kPa, %)

DS-LANII Connection

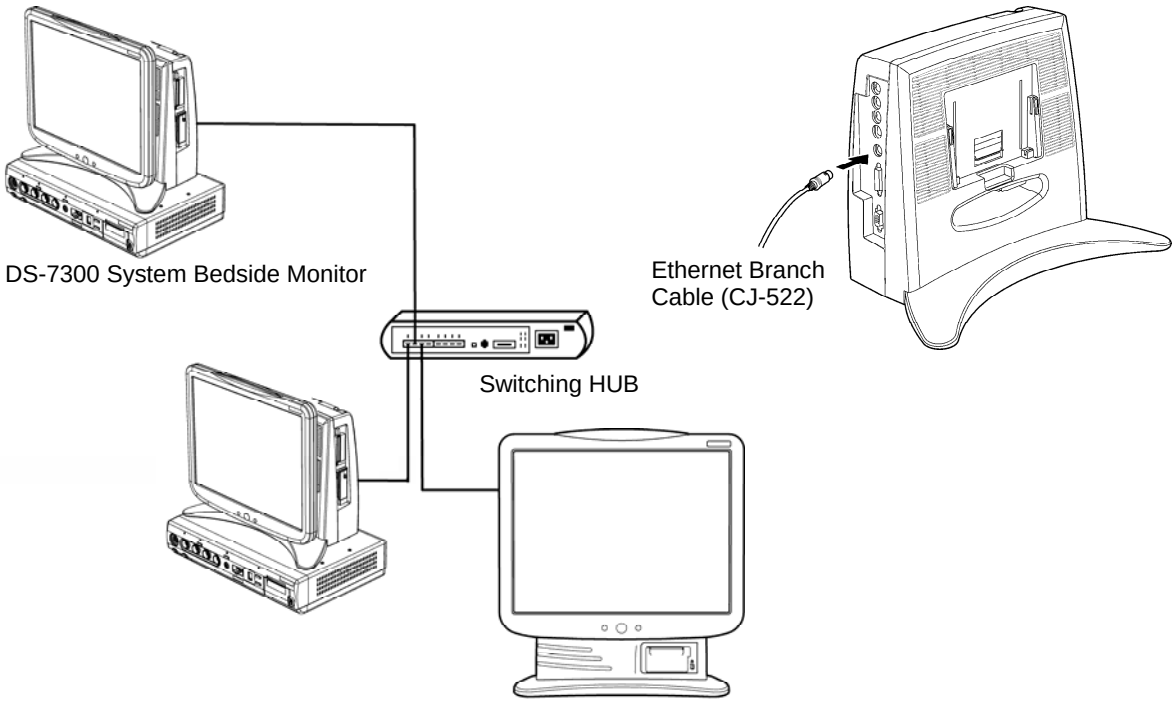
By connecting the LAN cable to the DS-LAN connector on the main unit (DSC-7300), a wired network can be constructed.
The DS-7600 system, DS-5700, and other central monitor with the central ID of “1” will function as the network administrator.





DS-LANIII Connection

By connecting a LAN cable to the DS-LAN connector on the DS-7100, a wired network can be constructed.
The DS-7600 system or other central monitor with the central ID “1” will function as the network administrator.



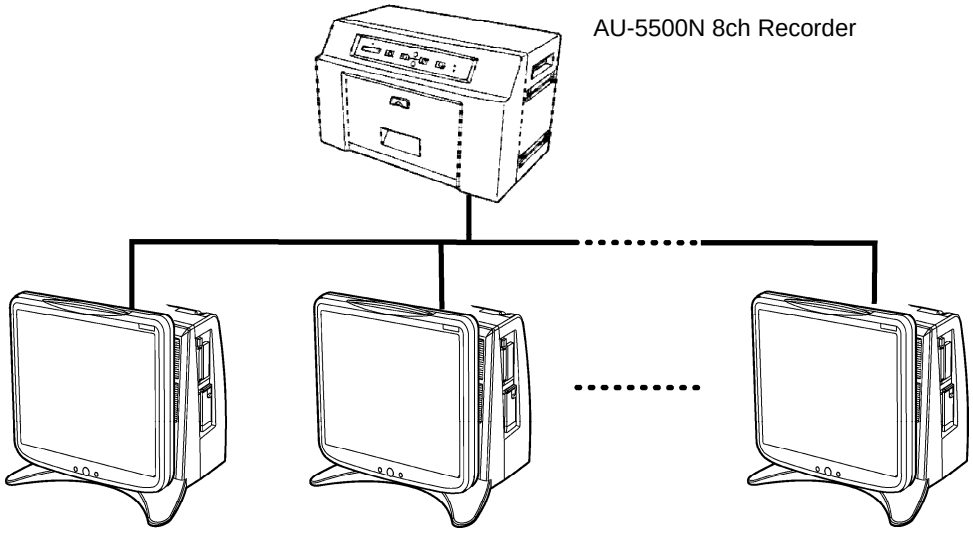
⚠CAUTION	● In order to connect to the DS-LANIII network, the software version needs to be the version which supports the DS-LANIII. For details, refer to our service representative. ● Make sure that “DS-LAN Setup” for all bedside monitors and central monitors are set to DS-LANIII. ● The two different network systems (DS-LANII and DS-LANIII) cannot exist in the same network. ● When connected to the DS-LANIII network, set the Bed ID in the range from “001” to “100”. ● If using a HUB for network construction, use the HUB recommended by Fukuda Denshi.

1:N Network Connection Using the AU-5500N

A network can be constructed with one AU-5500N and maximum of 16 DS-7300 system monitors without connecting the central monitor such as DS-7600 system, etc. In this network, AU-5500N will function as the network administrator.

Reference

To use the 1:N network construction with the AU-5500N, select ON for "AU-5500N Administrator Mode" on the monitor setup menu.
→ "8. System Configuration Monitor Setup ●AU-5500N Administrator Mode"



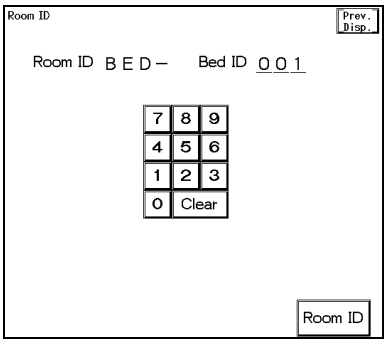
⚠CAUTION	● When using the 1:N network with AU-5500N, make sure to set DS-LANII for "DS-LAN Setup". For procedure, refer to "8. System Configuration DS-LAN Setup" ● The AU-5500N cannot be used on the DS-LANIII network. ● The bed ID is factory set to "000". If used on a wired network with the default ID unchanged, recording on the AU-5500N will not be possible. ● When using on a wired network, make sure that there are no other bedside monitors with the same ID. If there are more than one bedside monitors with the same bed ID, the duplicated bedside monitors cannot record on the AU-5500N. ● For 1:N network, set the bed ID in the range from 001 to 016. ● When connecting the AU-5500N to a 1:N network, internal switch setting of the AU-5500N is required. For details, refer to our service representative.

Room / Bed ID Setup

To connect to a wired network, it is necessary to set the Room / Bed ID.

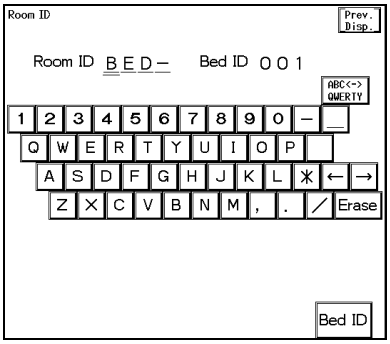
⚠CAUTION	When connecting to a wired network, make sure that there are no other bedside monitors with the same ID. If there is more than one bedside monitor with the same bed ID, the duplicated bedside monitors cannot be monitored on the central monitor.

1 Press the [Menu] → [Admit / Discharge] → [Bed ID] keys.



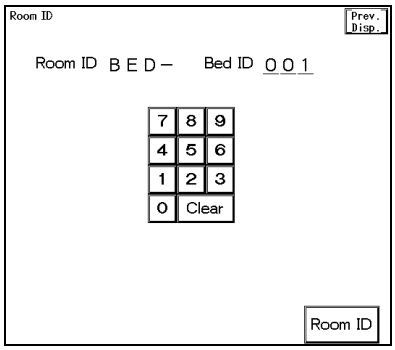
The Room / Bed ID setup menu will be displayed.

2 Set the Room ID.



Enter the Room ID using the alphanumeric keypad.
The entered ID will be displayed on the upper left of the screen.
Next, press the [Bed ID] key to display the Bed ID menu.

3 Set the Bed ID.



Enter the Bed ID using the numeric keypad.
The entered ID will be displayed on the upper left of the screen.

For DS-LANII network, set the ID in the range from 001 to 048.
For DS-LANIII network, set the ID in the range from 001 to 100.

For 1:N network (DS-LANII), set the ID in the range from 001 to 016.

Setup Item Synchronizing within the Same Network

When monitoring on a wired network (DS-LANII/DS-LANIII), some settings will synchronize with other monitors in the same network. (If a setting is changed on one monitor, the same change will apply to the other monitor.)
Also, there are some operations that will synchronize with other monitors. (If a operation is performed on the DS-7300, the same operation will be performed on the central monitor.)

The following list shows the setup items/operations which will synchronize within the same network (DS-LANII/DS-LANIII).

Ex) Sex (Male/Female)
The same setting will apply to all monitors within the same network. If the sex is changed on the DS-7300, it will also change on the central monitor. And, if the sex is changed on the central monitor, it will also change on the bedside monitor.

NOTE	Depending on the type of central monitor, not all setup items listed below are available and cannot be synchronized. Please also refer to the operation manual of the central monitor.

DS-7300 Operation	Synchronize within the Same Network	
	DS-LANII	DS-LANIII
Discharge	Yes	Yes
Monitor Suspend	No	No
ON/OFF of Night Mode	No	Yes
NIBP Measurement	No	Yes

Ex)

DS-7300 Setup Item		Synchronize within the Same Network	
		DS-LANII	DS-LANIII
Admit/Discharge			
Patient ID		Yes (Only 10 digits)	Yes
Patient Name		No	Yes
Sex (Male/Female)		Yes	Yes
Age		Yes	Yes
Height		Yes	Yes
Weight		Yes	Yes
BSA		Yes	Yes
Blood Type		No	No
Birth Date		Yes	Yes
Patient Classification		Yes	Yes
Pacemaker		Yes	Yes
Impedance Mode		No	No
Filter Mode		No	No
Room/Bed ID	Bed ID	Yes (Only display)	Yes (Only display)
	Room ID	Yes (Only display)	Yes (Only display)

Setup Item	Synchronize within the Same Network	
	DS-LANII	DS-LANIII
Alarm		
All Alarm Suspend	Yes	Yes
HR, PR_SpO_2, PR _IBP	Yes	Yes
ASYSTOLE	Yes (Max. 8sec.)	Yes
VF	Yes	Yes
VT	Yes	Yes
SLOW_VT	No (Synchronize with VT)	Yes
RUN	Yes	Yes
COUPLET	No	Yes
PAUSE	No	Yes
BIGEMINY	Yes	Yes
TRIGEMINY	No	Yes
FREQUENT	Yes	Yes
TACHY	No	Yes
BRADY	No	Yes
HR Low Limit for VT	Yes*[1]	Yes*[1]
HR Low Limit for RUN	Yes*[1]	Yes*[1]
ST1–ST12 (mm)	Yes	Yes
ST1–ST12(mV)	Yes	Yes
BP1(mmHg)	Yes	Yes
BP1 (kPa)	Yes	Yes
BP2–BP8 (mmHg)	Yes (BP2–BP6)	Yes
BP2–BP8 (kPa)	Yes (BP2–BP6)	Yes
CVP (mmHg)	Yes	Yes
CVP (cmH_2O)	Yes	Yes
RR_IMP, RR_CO_2, RR_VENT	Yes	Yes
RR_GAS	Yes	Yes
APNEA	Yes	Yes
SpO_2	Yes	Yes
NIBP (mmHg)	Yes	Yes
NIBP (kPa)	Yes	Yes
TEMP1–TEMP8 (°C)	Yes (Only T1, T2)	Yes
TEMP1–TEMP8 (°F)	No	Yes
Tb (°C)	No	No
Tb (°F)	No	No
$EtCO_2$ (mmHg)	Yes	Yes
$EtCO_2$ (kPa)	Yes	Yes
$EtCO_2$ (%)	Yes	Yes
$InspCO_2$ (mmHg)	Yes	Yes
$InspCO_2$ (kPa)	Yes	Yes
$InspCO_2$ (%)	Yes	Yes
CO_2_E (mmHg)	Yes	Yes*[1]
CO_2_E (kPa)	Yes	Yes*[1]
CO_2_E (%)	Yes	Yes*[1]
CO_2_I (mmHg)	Yes	Yes*[1]
CO_2_I (kPa)	Yes	Yes*[1]
CO_2_I (%)	Yes	Yes*[1]
O_2_E (%)	No	Yes*[1]
O_2_I (%)	No	Yes*[1]
N_2O_I (%)	No	Yes*[1]
ISO_E, HAL_E, ENF_E, SEV_E, DES_I (%)	No	Yes*[1]
ISO_E, HAL_E, ENF_E, SEV_E, DES_I (%)	No	Yes*[1]
MAC	No	Yes*[1]

*[1] The setups for “HR Low Limit for VT” and “HR Low Limit for RUN” cannot be performed on some central monitors.

*[2] Alarm limit cannot be set on the central monitor. The bedside monitor setting will be applied to the central monitor.

Setup Item	Synchronize within the Same Network	
	DS-LANII	DS-LANIII
Alarm		
Alarm Setup		
Alarm Suspend Time	No	No
Alarm Silence Time	No	No
Alarm Limit Display	No	No
Status Alarm Control	No	No
Alarm Occurrence at NIBP Failure	No	No
Parameter Setup		
ECG		
Lead	Yes	Yes
Size	Yes	Yes
Filter	Yes	Yes
Pulse Tone	No	No
HR/PR Alarm Source	No	No
Auto Lead Switch	Yes	Yes
Pacemaker Pulse	Yes	Yes
Pace Pulse Mask Time	Yes	Yes (Only Display)
AC Filter	Yes	Yes
ECG Drift Filter	Yes	Yes
3 lead Override	No	No
RESP		
Size	Yes	Yes
CVA detect	Yes	Yes
RR/APNEA Alarm Source	No	No
Impedance Measurement	No	No
RR Sync. Indicator	No	No
SpO_2 (HS-720, HS-720E, HS-720C, HS-702C, HS-702E)		
Size	Yes	No
SpO_2 SEC Alarm	No	No
HR/PR Alarm Source	No	No
Ignore NIBP	No	No
NIBP		
Auto Mode	No	Yes
Quick SYS	No	No
End Tone	No	No
Mean	No	No
PR	No	No
NIBP Speed	No	No
Quick SYS list	No	No

Setup Item	Synchronize within the Same Network	
	DS-LANII	DS-LANIII
Parameter Setup		
BP1–BP8		
Scale	Yes (Only BP1–6)	Yes
Label	Yes (Only BP1–6)	Yes (Only Display)
Filter	No	No
HR/PR Alarm Source (BP1 or ART)	No	No
Display Type	No	No
Mean Wave	No	No
Resp. Rejection Filter	No	No
TEMP1–TEMP8		
Label	Yes	Yes (Only Display)
ΔT Display	No	No
CO_2 (HS-720E, HS-720E, HS-702E)		
Scale	Yes	Yes
$EtCO_2$ Peak Picking Duration	No	No
Unit	Yes	Yes
CO_2 (HS-720C, HS-702C)		
Scale	Yes	Yes
$EtCO_2$ Peak Picking Duration	No	No
Unit	Yes	Yes
O_2 Compensation	No	No
N_2O Compensation	No	No
Anesthetic Compensation	No	No
Atmospheric Pressure	No	No
CO_2 (HC-500)		
Scale	Yes	Yes
$EtCO_2$ Average	No	No
Unit	Yes	Yes
CO_2 Filter	No	No
O_2 Compensation	No	No
N_2O Compensation	No	No
Atmospheric Pressure	No	No
VENT		
AWP Scale	Yes	No
AWF Scale	Yes	No
Cardiac Output		
Auto Start	No	No
Time Scale	No	No
GAS_CO_2		
Scale	Yes	Yes
Unit	Yes	Yes
GAS_O_2		
Scale	No	No
GAS_AGT		
Label	No	Yes (Only Display)
Scale	No	No

Setup Item	Synchronize within the Same Network	
	DS-LANII	DS-LANIII
Patient Data Review		
Graphic Trend	No	No
Tabular Trend	No	No
OCRG	No	No
Recall	No	No
ST Measurement		
Ref. Point / Meas. Point	Yes	Yes
Ventilator	No	No
Respiration List	No	No
ST Trend	No	No
Vigilance/Vigileo List	No	No
System Configuration		
Tone/Volume		
Pulse Sound	No	No
Key Sound	No	No
Alarm Sound	No	No
Other Bed Sound	No	No
Other Sound	No	No
Ventilator Alarm Sound	No	No
Manual Recording Setup		
Recorder Selection	Yes	No
Waveform	Yes	No
Recording Duration	Yes	No
Delay Time	Yes	No
Alarm Recording Setup		
ON/OFF	Yes	No
Recorder Selection	Yes	No
Waveform	Yes	No
Recording Duration	Yes	No
Alarm Factor	Yes	No
Arrhythmia Factor	Yes	No
Periodic Recording Setup		
ON/OFF	Yes	No
Recorder Selection	Yes	No
Waveform	Yes	No
Periodic Interval	Yes	No
Interval	Yes	No
Timer	Yes	No
Recording Duration	Yes	No
Recorder Setup		
QRS Classification	No	No
Graphic Recording Output Recorder	No	No
HS Recorder	No	No
8ch Recorder	No	No
Recall Recording	No	No
HS Recorder	No	No
Sweep Speed		
ECG, BP, SpO_2	No	No
RESP	No	No
Night Mode Setup		
Manual/Auto	No	Yes
Auto Start Time	No	No
Auto End Time	No	No
Volume	No	No
Display	No	No
ON/OFF of Alarm Pole	No	No

Setup Item	Synchronize within the Same Network	
	DS-LANII	DS-LANIII
System Configuration		
Color, Brightness Setup		
Color	No	No
Brightness	No	No
ST Disp. Lead Setup		
All Settings	No	No
Other Bed Setup		
Other Bed Alarm Setup	No	No
BP User Label		
Label 1, 2	No	No
TEMP User Label		
Label 1, 2, 3, 4	No	No
Telemetry Wave Setup		
All Setup	No	No
Stop Watch Label		
Label 1, 2	No	No
Preset		
Display Mode		
Mode 1-5 Setup Items	No	No
Alarm Mode		
Mode 1-5 Setup Items	No	No
Preset / Hospital Setup		
Date Format	No	No
Alarm Mute	No	No
Arrhythmia Analysis Filter	No	No
Trend Clip	No	No
BP Recording Scale	No	No
Suspend Arrhy. Analysis during Noise Interference	No	No
MEAN Calculation	No	No
Night Mode Cancel	No	No
Asystole, VF, VT	No	No
DS-LAN Patient ID Tx	No	No
Admit/Discharge Key Setup	No	No
Mixed Agents Alarm Level	No	No
Serial Communication Setup	No	No
NIBP Data Erase Time	No	No
Status Output Setup	No	No
Unit	No	No
Telemeter Setup	No	No

Setup Item	Synchronize within the Same Network	
	DS-LANII	DS-LANIII
Preset /Monitor Setup		
Message Icon	No	No
Check discharge at power ON	No	No
Set Password	No	No
Discharge Mode	No	No
Event Key	No	No
Drift Filter display/Exp clock display	No	No
HR/PR Alarm Source	No	No
Input Box (IB-7300)	No	No
Freeze Mode Cursor	No	No
Device Configuration Icon	No	No
Parameter Key Operation	No	No
BP Alarm Increment	No	No
CO_2 (mmHg) upper limit for LAN, telemetry	No	No
AU-5500N Administrator Mode	No	No
NIBP measurement interval at power ON	No	No
NIBP measurement at power ON	No	No
Built-in Rec. Status Display	No	No
Vigilance/Vigileo SVR, SVRI Calculation	No	No
DS-LAN Setup	No	No
Super Module Setup	No	No
Multiport Connection	No	No
Serial Connection	No	No
Key Mask	No	No
User Key	No	No
Alarm Pole Setup	No	No
Menu Setup	No	No
Display Optimization Setup	No	No
Input Box Setup	No	No
Mouse Setup	No	No
R.C. Setup		
ID	No	No
Section	No	No
Key	No	No
Backup at Discharge		
Display Configuration	No	No
Alarm	No	No
ECG1, ECG2 Lead	No	No
CVA Set	No	No
Impedance Resp. ON/OFF	No	No
BP Scale	No	No
NIBP Auto Mode	No	No
CO_2 Averaging	No	No
CO_2 Scale	No	No

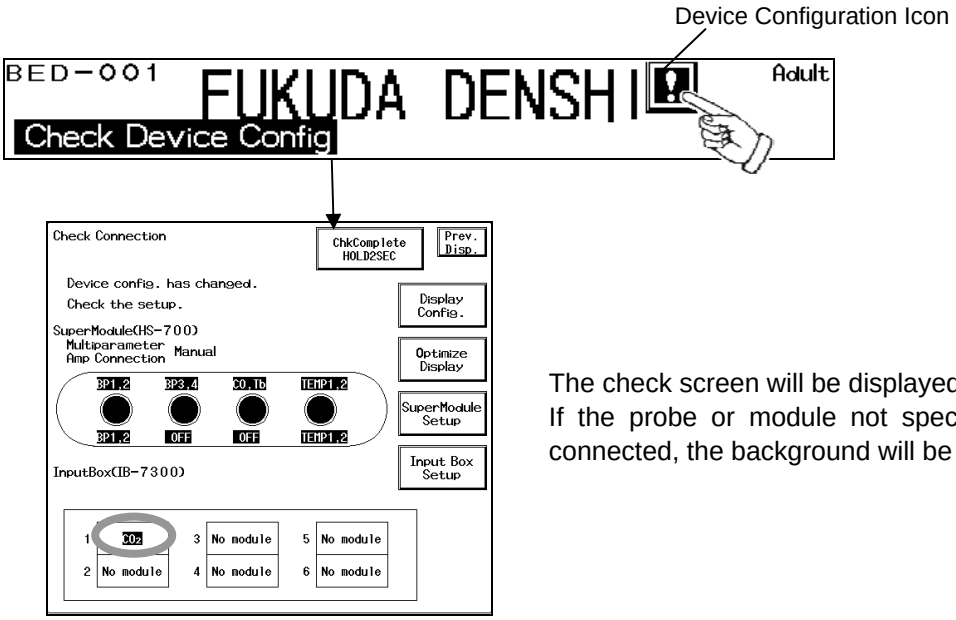
Device Configuration Icon

The Device Configuration Icon will be displayed on the home display for the following case.
- If the parameter not displayed is measured.
- If the probe not specified on the setup is connected to the Super Module.
- If the module not specified on the setup is inserted to the Input Box.

Pressing this Device Configuration Icon will display the check screen.

NOTE	If [OFF] is set for "Device Configuration Icon" (Monitor Setup), the equipment information will not be displayed. (Default: OFF) For setup procedure, refer to "8. System Configuration Monitor Setup ●Device Configuration Icon".

1 Press the Device Configuration Icon on the home display.



The check screen will be displayed.
If the probe or module not specified on the setup is connected, the background will be displayed in red.

2 Check / change the setup according to the displayed message.

If "Parameter not displayed. Check display configuration." message is displayed;

Press the [Display Config.] key, and check / change the display configuration.
Pressing the [Optimize Display] key will automatically configure the display based on the currently measured parameters.

Reference Refer to "4. Monitoring Setup Optimizing the Display Configuration".

If "Wrong probe is connected. Check the setup" message is displayed;

Press the [Super Module Setup] key, and check / change the setup.

Reference Refer to "3. Vital Application Super Module Setup for BP, TEMP, CO Measurement".

If "Device config. has changed. Check the setup." message is displayed;

Press the [Input Box Setup] key, and check / change the setup.

Reference Refer to "3. Vital Application Input Box Setup".

3 Press the [Chk Complete] key for more than 2 seconds.

The Device Configuration Icon will disappear if the current Device Configuration is properly set.

Ventilator Connection

The DS-7300 system can be connected to a ventilator via multiport relay cable connected to the Super Module or via serial connector on the Super Module. 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 and wired network.
This section describes the procedure to connect the DS-7300 system and ventilator, and to input the ventilator measurement and alarm.

⚠WARNING	For PURITAN-BENNETT Ventilator, only ventilator measurements can be monitored. Ventilator alarm cannot be notified to the central monitor. • "Vent. Invalid" alarm will not be generated. • Check external alarm" display will not be displayed.

Ventilator	***Ventilator Cable***	
	via multiport relay cable	***via Super Module serial connector***
Servo Ventilator 300/300A	CJ-514 (Qty. 1)	CJ-501
Servo-i /s Ventilator	CJ-584 (Qty. 1)	CJ-502
PURITAN-BENNETT Ventilator 7200ae/7200e	CJ-518, CJ-525A (Qty. 1 each)	(Connection not possible)
PURITAN-BENNETT Ventilator 740/760	CJ-527, CJO-02RR4 (Qty. 1 each)	CJ-504
PURITAN-BENNETT Ventilator 840	CJ-527, CJO-02RR4 (Qty. 1 each)	CJ-504
Dräger Medical® Ventilator Evita 2 dura, Evita 4, Evita XL, Savina	CJ-583 (Qty. 1)	CJ-502

NOTE	Only one ventilator can be connected to each DS-7300 system.

When connecting to a ventilator, check the corresponding software version of the ventilator.

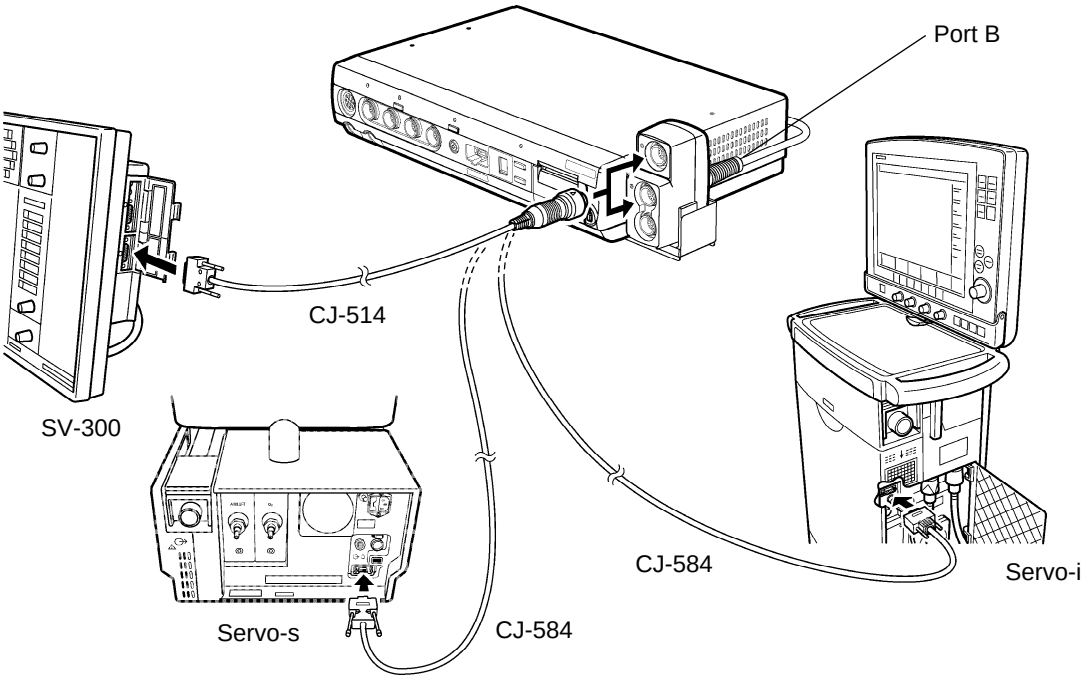
Ventilator	***Corresponding Software Version***
SV300	Not specified
Servo-i	v1.5 / v2.0 / v3.0
Servo-s	v2.0 / v3.0
PB7200	26300-85-V
PB740	M
PB760	H
PB840	K
Evita 2 dura	04.14
Evita 4	04.14
Evita XL	05.10
Savina	03.01

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

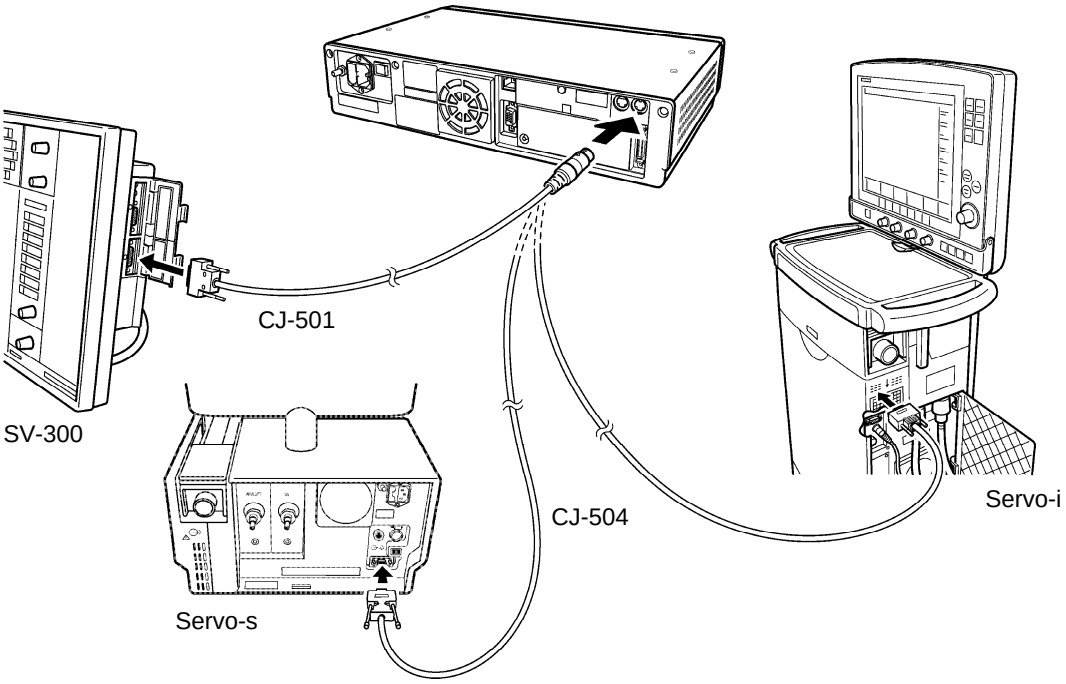
⚠CAUTION	● The ventilator operation should be performed by well-trained and authorized personnel. ● For connecting the DS-7300 system and ventilator, use only the specified connection cable. ● Verify that the DS-7300 system and the ventilator are properly connected. ● When connecting the cable, verify that the main power of the DS-7300 system and the ventilator is OFF.

【Connection of SV-300, Servo-i/s via Multiport Relay Cable】

The SV-300 and Servo-i/s can be connected to either port A or B of the multiport relay cable.

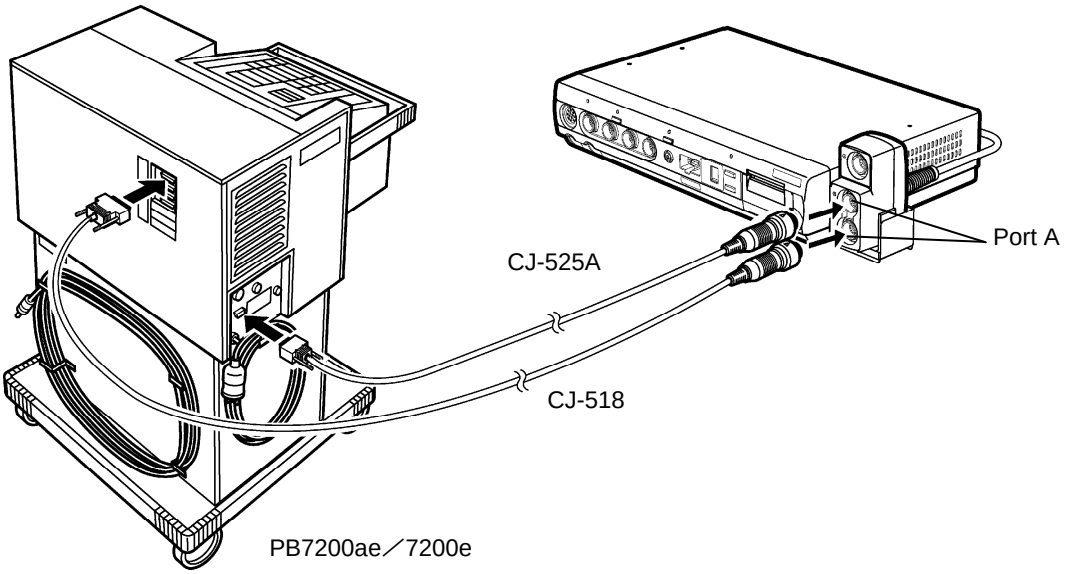


【Connection of Servo Ventilator via Super Module Serial Connector】



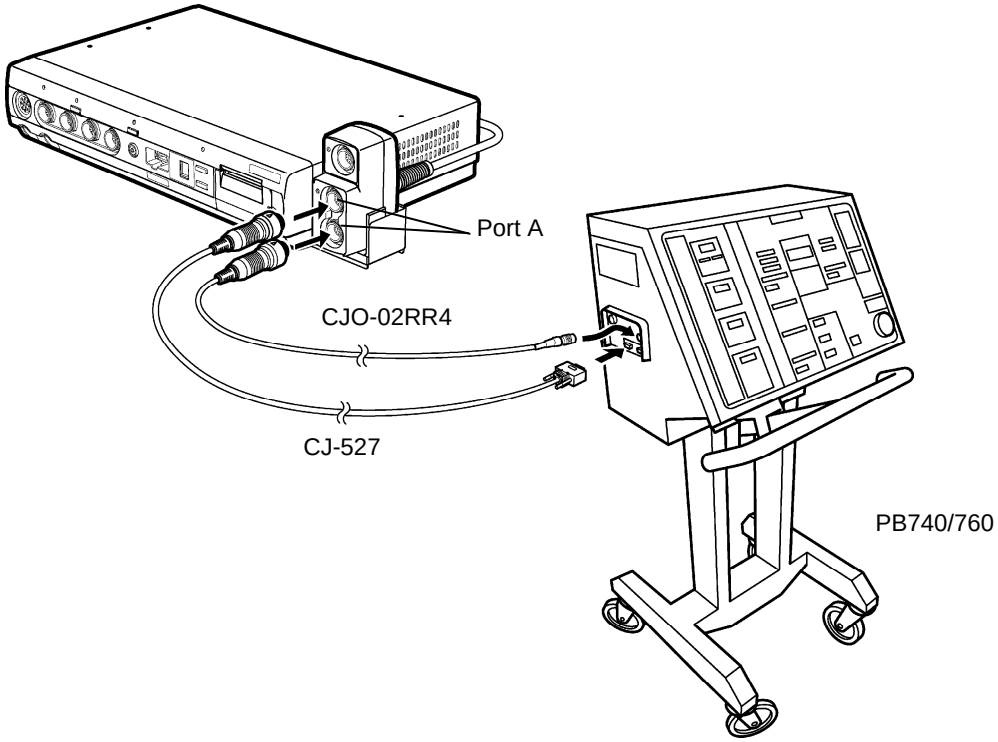
【Connection of PB7200ae/7200e Ventilator via Multiport Relay Cable】

The PB7200ae/7200e can be connected to port A of the multiport relay cable.



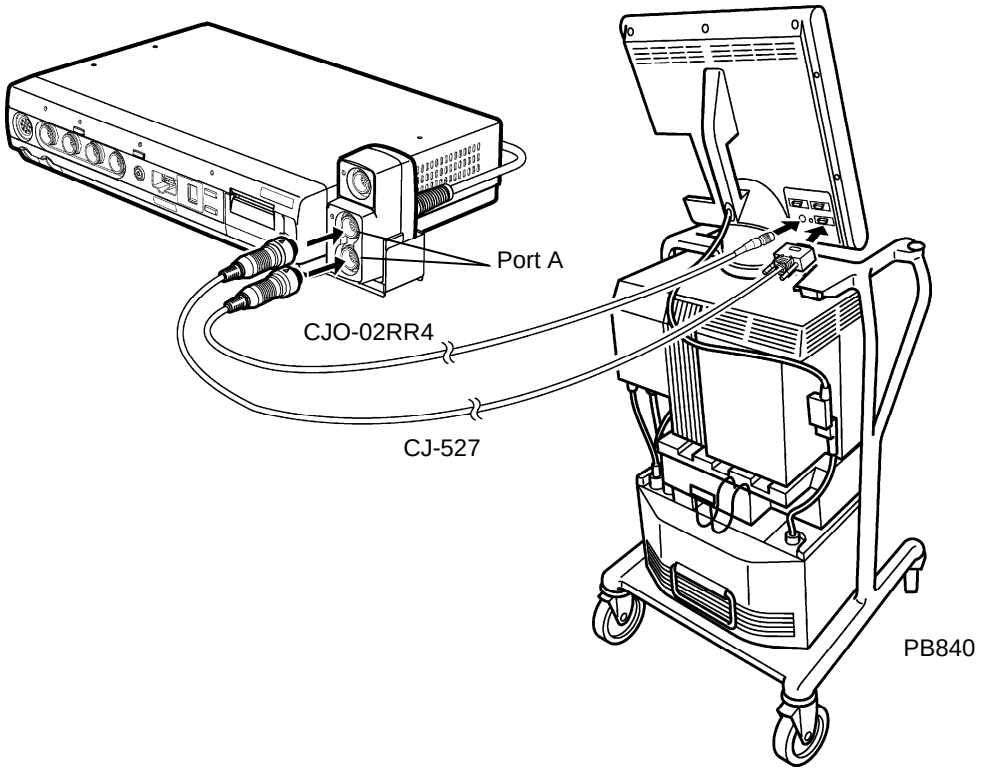
【Connection of PB740/760 Ventilator via Multiport Relay Cable】

The PB740/760 can be connected to port A of the multiport relay cable.

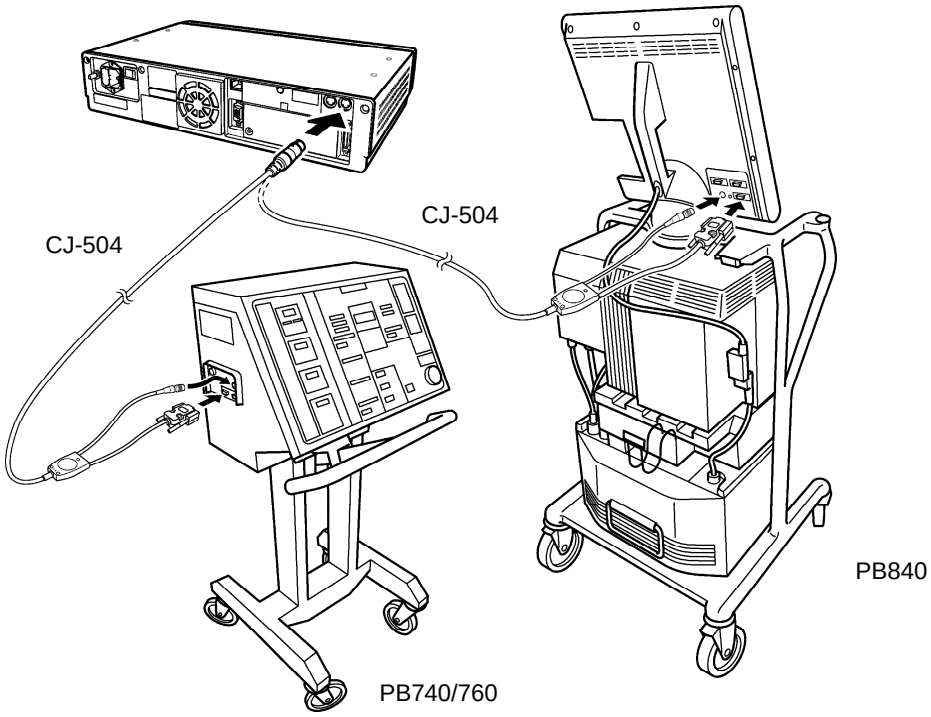


【Connection of PB840 Ventilator via Multiport Relay Cable】

The PB840 can be connected to port A of the multiport relay cable.

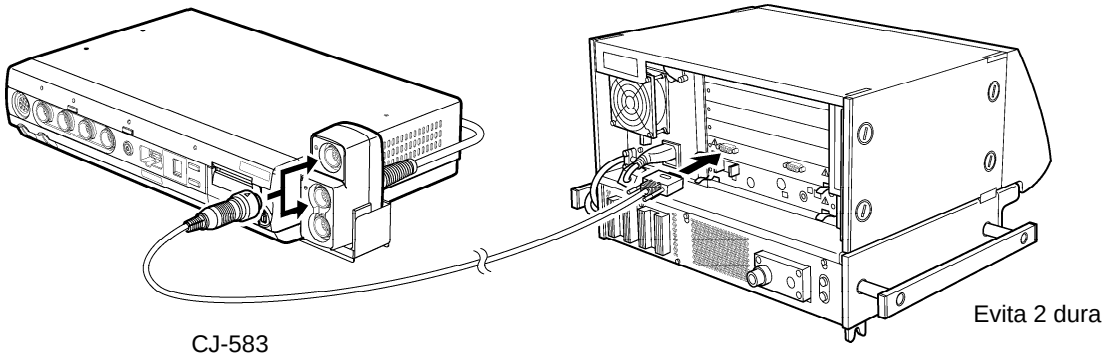


【Connection of PURITAN-BENNETT Ventialtor via Super Module Serial Connector】

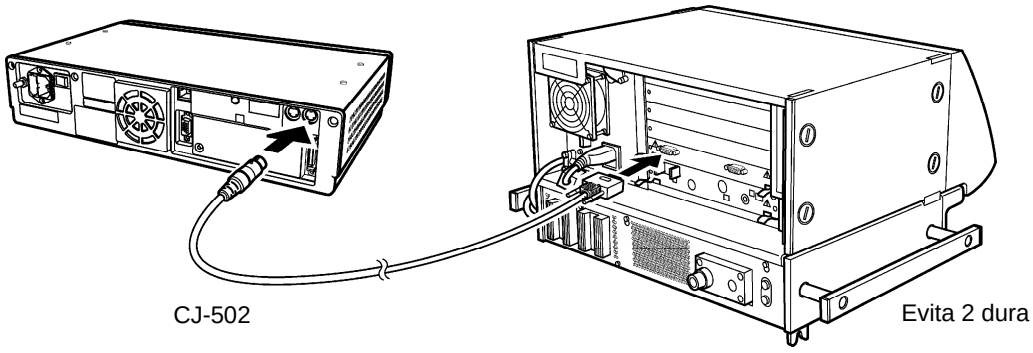


⚠CAUTION	● When connecting the PURITAN-BENNETT ventilator, follow the precautions below. • The serial port (RS-232C) of the ventilator should be set as follows. Refer to the service representative of the ventilator manufacturer. Baud Rate : 9600bit/s Data Bit : 8bit Parity Bit : none (Stop Bit) : (1bit) • The DS-7300 system detects the “ventilator alarm” when the nurse call port on the ventilator outputs the alarm signal. For details of ventilator setup and alarm signal output condition from the nurse call port, refer to the service representative of the ventilator manufacturer.

【Connecting the Evita / Savina Ventilator via Multiport Relay Cable】



【Connection of Evita / Savina Ventilator via Super Module Serial Connector】



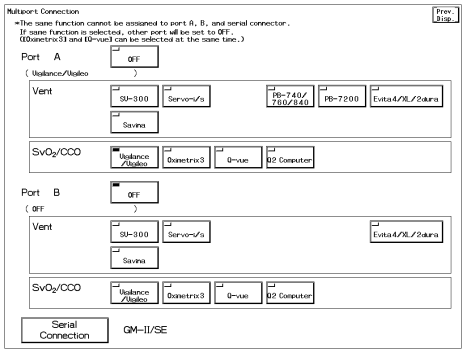
⚠WARNING	The Evita2dura / Evita4 / EvitaXL / Savina acquires alarm information from the serial port. The ventilator alarm that cannot be acquired from the serial port is not guaranteed. For corresponding alarm, refer to the service representative of the ventilator manufacturer.

⚠CAUTION	When connecting the Evita 2 dura / Evita 4 / Evita XL / Savina, the serial port (RS-232C) setup of the ventilator should be as follows. Refer to the service representative of the ventilator manufacturer. • For Evita 2 dura / Evita 4 / Evita XL Protocol : Medibus Baud Rate : 19200bps Data Bit : 8bit Parity Bit : Even Stop Bit : 1bit • For Savina Protocol : Medibus Baud Rate : 9600bps Data Bit : 8bit Parity Bit : None Stop Bit : 1bit

Ventilator Selection

To monitor the ventilator alarm, it is necessary to select the ventilator to be connected.

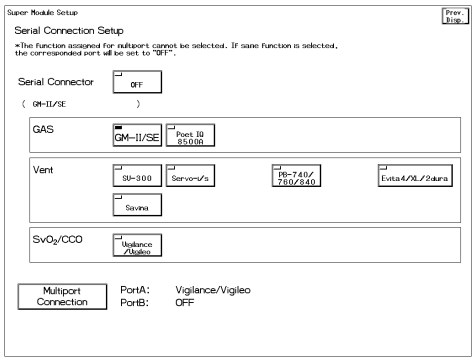
1 Press the [Menu] → [System Configuration] → [Pre-Set] → [Monitor Setup] → [Multiport Connection] keys.



The multiport connection setup menu to select the ventilator will be displayed.
Select the ventilator from [SV-300], [Servo- i/s], [PB-740/760/840], [PB-7200]. [Evita4/XL/2dura], [Savina].

NOTE	● The PURITAN-BENNETT ventilator can be connected to only port A of multiport relay cable. ● If communication with ventilator is already established through the corresponding port, it is necessary to disconnect the communication in order to change the selection on this menu.

2 If connecting the ventilator to Super Module serial connector, press the [Serial Connection] key on the multiport connection setup menu.



The serial connection setup menu will be displayed. Select the connecting ventilator from [SV-300], [Servo-i/s], [PB-740/760/840], [Evita4/XL/2dura], [Savina].

NOTE	● The PB-7200 cannot be connected to serial connector. ● If communication with ventilator is already established through the serial connector, it is necessary to disconnect the communication in order to change the selection on this menu.

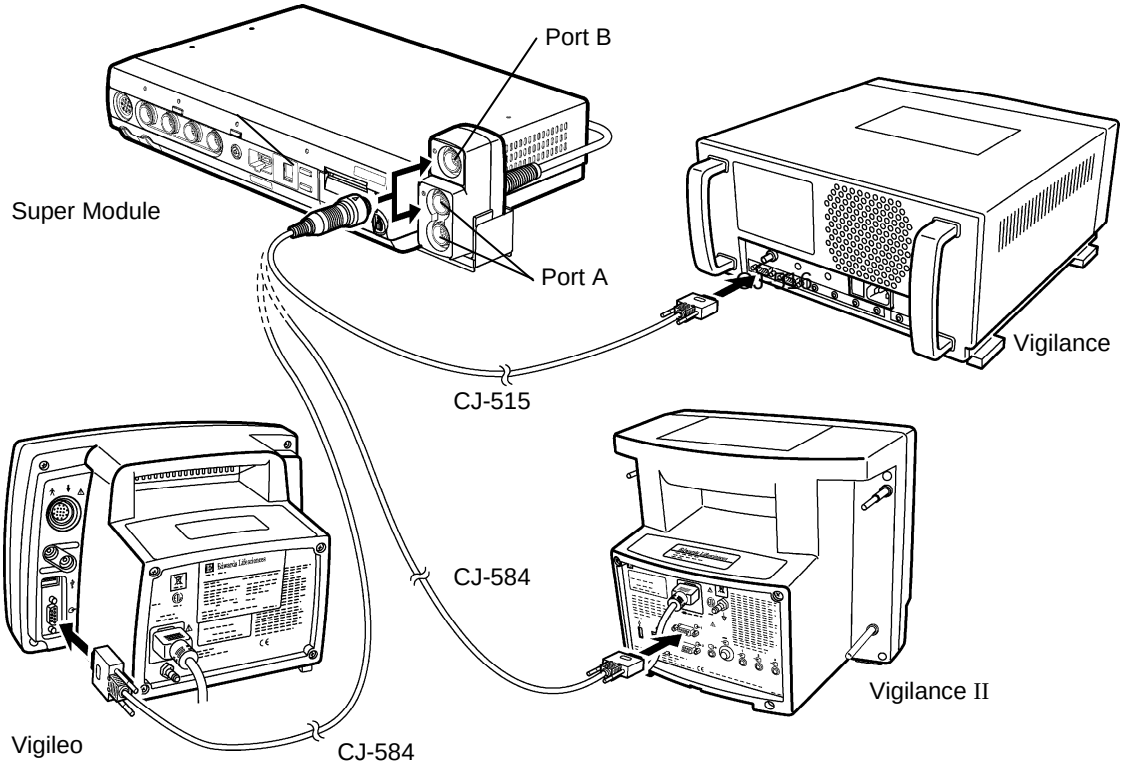
Oximeter Connection

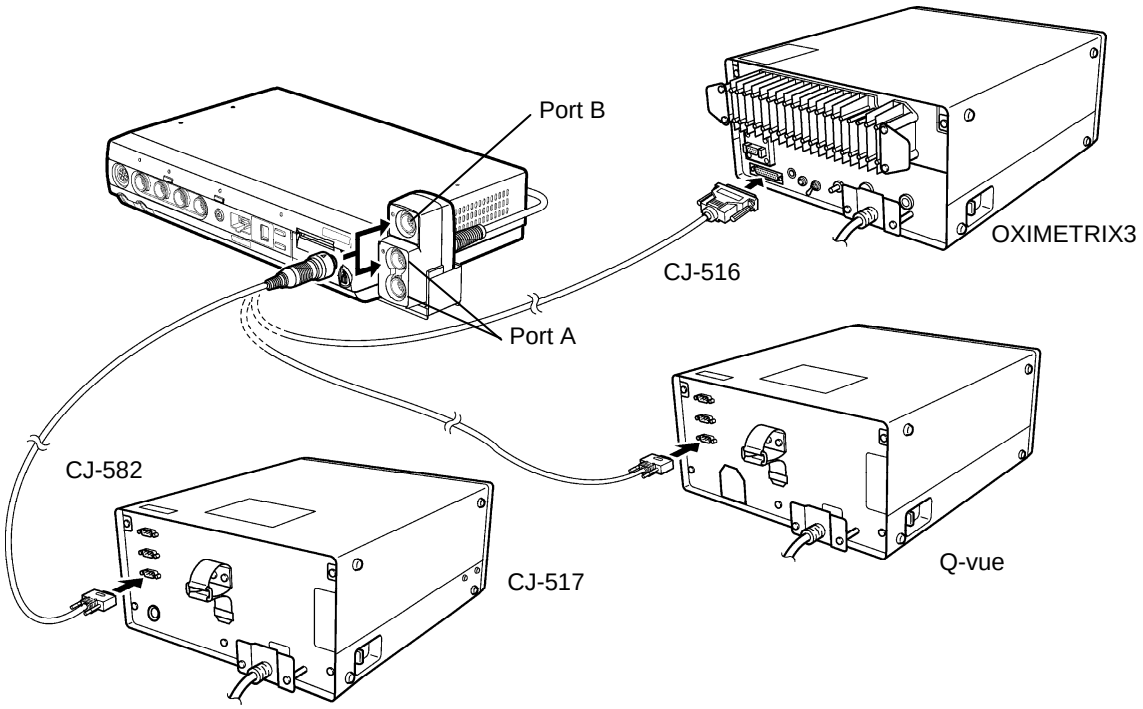
The DS-7300 system can be connected to oximeter and CCO measurement device via multiport relay cable connected to the Super Module or serial connector on the Super Module. By connecting the oximeter and CCO measurement device, oximeter data can be unified on the patient monitor. This section describes the procedure to connect the DS-7300 system and the oximeter.

The oximeter can be connected to either port A or B of the multiport relay cable.
The OXIMETRIX3 and Q-vue can be used in conjunction.

Oximeter, CCO measurement Device	***Oximeter Cable***	
	via multiport relay cable	***via Super Module serial connector***
Vigilance	CJ-515 (Q'ty: 1)	CJO-04RS4
Vigilance CEDV	CJ-515 (Q'ty: 1)	CJO-04RS4
VigilanceII	CJ-584 (Q'ty: 1)	CJ-502
Vigileo	CJ-584 (Q'ty: 1)	CJ-502
OXIMETRIX3	CJ-516 (Q'ty: 1)	(Connection not possible.)
Q-vue	CJ-517 (Q'ty: 1)	(Connection not possible.)
Q2 Computer	CJ-582 (Q'ty: 1)	(Connection not possible.)

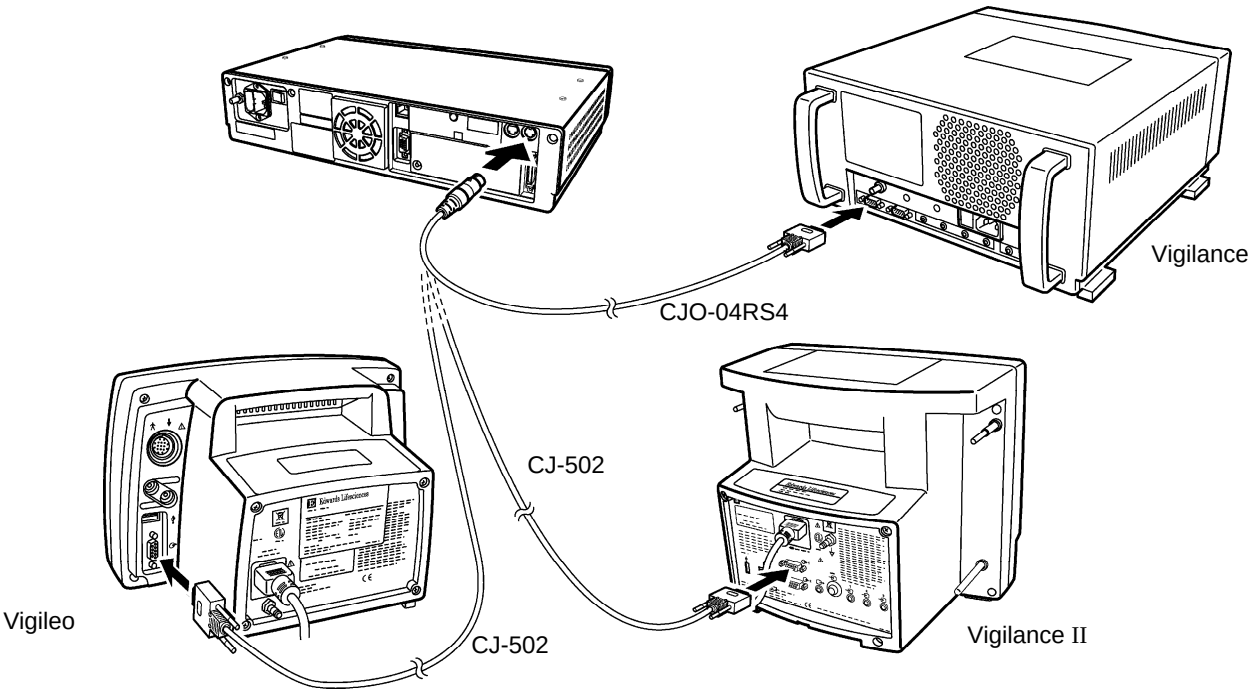
【Connection of Oximeter via Multiport Relay Cable】





Q2 Computer

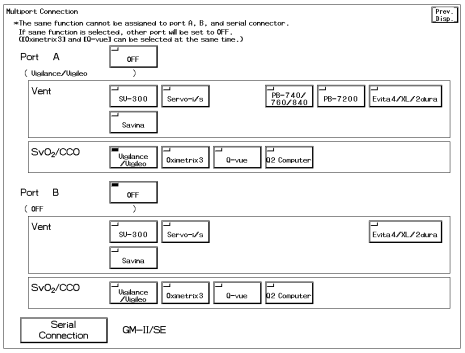
【Connection of Vigilance/Vigilance II/Vigileo via Serial Connector】



Oximeter Selection

To monitor the oximeter data, it is necessary to select the oximeter to be connected.

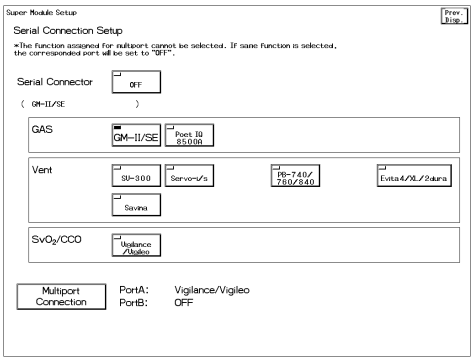
1 Press the [Menu] → [System Configuration] → [Pre-Set] → [Monitor Setup] → [Multiport Connection] keys.



The multiport connection setup menu to select the oximeter will be displayed.
Select from [Vigilance/Vigileo], [Oximetrix3], [Q-vue], [Q2 Computer].

NOTE	● The Oximetrix3 and Q-vue can be used in conjunction, but Vigilance (Vigilance CEDV, VigilanceII, Vigileo) and Q2 Computer cannot be used in conjunction with other oximeters. ● If communication with ventilator is already established through the corresponding port, it is necessary to disconnect the communication in order to change the selection on this menu.

2 If connecting the oximeter to the serial connector on the Super Module, press the [Serial Connection] key on the multiport connection setup menu.



The serial connection setup menu will be displayed.
Only Vigilance (Vigilance CEDV, VigilanceII, Vigileo) can be connected to the serial connector.
Press the [Vigilance/Vigileo] key.

NOTE	If communication with ventilator is already established through the serial connector, it is necessary to disconnect the communication in order to change the selection on this menu.

●Oximeter Network Setup

If the network setup on the Super Module and the oximeter is not corresponded, measured data will not be displayed on the patient monitor.
The network setup of Super Module is fixed to the default setting of each oximeter and cannot be changed. Make sure that the network setup of the connecting oximeter is in default setting.

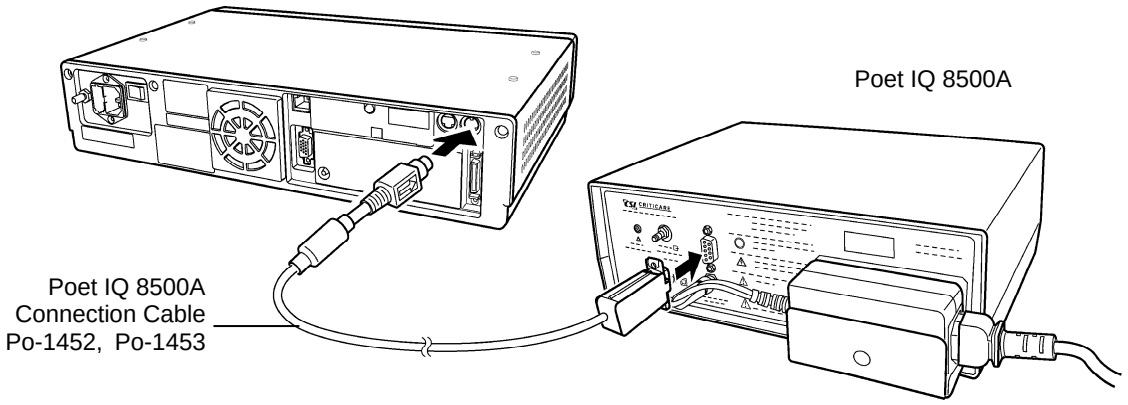
- For Vigilance/Vigileo
  The network setup for the Vigilance/Vigileo should be as follows.
  ・Device: IFM Out
  ・Baud Rate: 19200bps
  ・Parity Bit: None
  ・Stop Bit: 1
  ・Data Bit: 8
  ・Flow Control: 2 sec.
  For procedure to check the Vigilance/Vigileo network setup, refer to the operation manual for the Vigilance/Vigileo.

- For Q2 Computer
  The network setup for the Q2 Computer should be as follows.
  ・Baud Rate: 9600bps
  ・Parity Bit: ODD
  ・Stop Bit: 1
  ・Data Bit: 7
  For procedure to check the Q2 Computer network setup, refer to the operation manual for the Q2 Computer.

Poet IQ Connection

The gas module, Poet IQ 8500A (Criticare Systems Inc.) can be connected to the DS-7300 system via serial connector on the Super Module.
By connecting the Poet IQ 8500A, the measurement data of CO_2 concentration, anesthetic gas concentration, O_2 concentration, N_2O concentration can be monitored on the DS-7300.

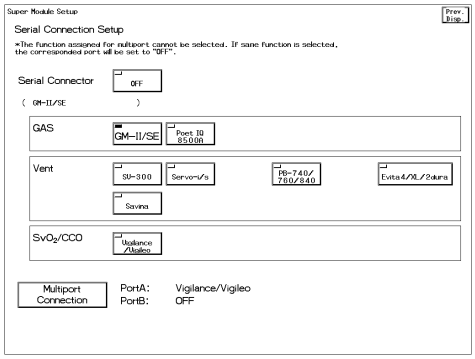
⚠CAUTION	If the Super Module and the gas module are simultaneously used, the CO_2 measurement will be performed by the gas module.



Gas Module Selection

To monitor the Poet IQ data, select the gas module type on the serial connection setup menu.

1 **Press the [Menu] → [System Configuration] → [Pre-Set] → [Monitor Setup] → [Super Module Setup] → [Serial Connection] keys.**



The serial connection setup menu will be displayed.
Select [Poet IQ 8500A] for the gas module type.

NOTE	If communication with ventilator is already established through the serial connector, it is necessary to disconnect the communication in order to change the selection on this menu.

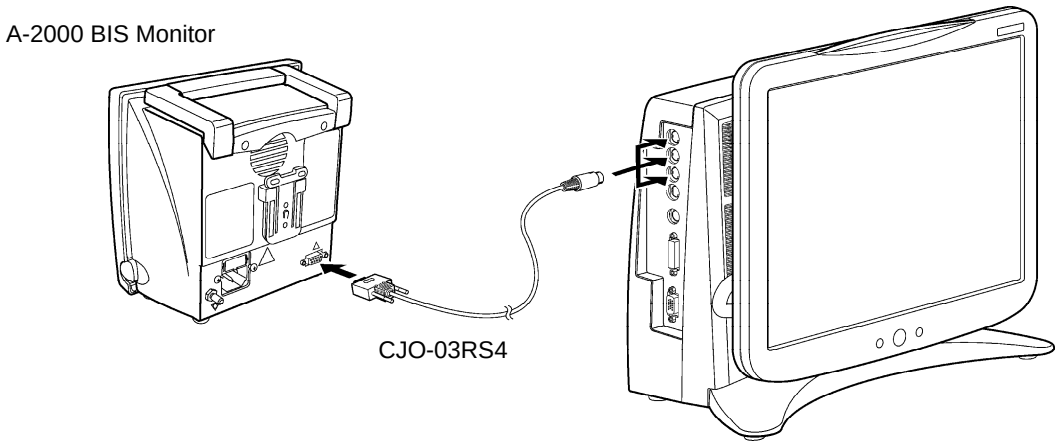
BIS Monitor Connection

By connecting the A-2000 BIS Monitor (ASPECT® MEDICAL SYSTEMS), the patient's recovery condition from anesthesia can be monitored by numeric data.

Connecting the BIS Monitor

⚠CAUTION	When connecting the cable, make sure that the power of the patient monitor and the BIS monitor is turned OFF.

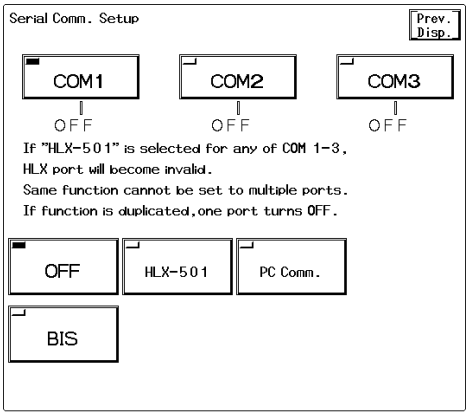
1 Connect the serial connector (COM1–3) on the DSC-7300 and serial port on the BIS monitor using the BIS connection cable (CJO-03RS4).



Serial Communication Setup

To display the BIS Monitor data, serial communication setup is required.

1 Press the [Menu] → [System Configuration] → [Pre-Set] → [Hospital Setup] → [Serial Comm. Setup] keys.



Select [BIS] for the serial connector (COM1–3) which the BIS Monitor is connected.

●BIS Monitor Network Setup

The BIS monitor network setup should be set to "ASCII".
For procedure to change the BIS monitor network setup, refer to the operation manual for the BIS monitor.

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Chapter 10
Maintenance

This section describes precautions for handling the equipment.

⚠CAUTION	If you accidentally wet the device, dry it completely and verify it operates safely before usage.

Handling After Use

- 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 and supply as necessary.

Handling the Touch Panel

- The touch panel utilizes exclusive fluorescent light for the backlight.
  As this fluorescent light tube has 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 few pixels which does 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.

Storage Device / Recording Paper

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
  Storage Humidity : 10 to 95% (at 60°C)
  Storage Atmospheric Pressure : 700 to 1060hPa

Storing the Recording Paper

The DS-7300 system utilizes heat sensitive recording paper. If placed in a high temperature for long period of time, the print may become indistinct, and unable to read. When storing, follow the precautions below.

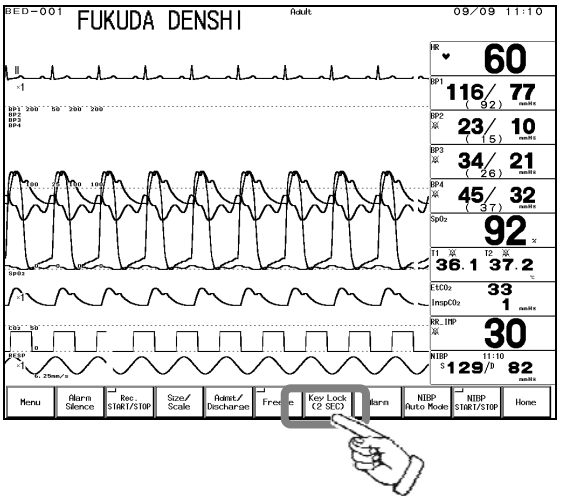
- Store in a place where light is shut off and avoid direct sunlight.
- Do not leave the paper in a high temperature (50 °C or 122 °F or above).
- Do not store the paper in polyvinyl chloride bag.
- Do not expose the paper to alcohol, hydrochloric acid, or ester ketone.
- Avoid using adhesive agents 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, finger prints and other stains are likely to appear on the touch panel.
Follow the procedure below to clean the touch panel.

1 Press the [Key Lock] key for more than 2 seconds.

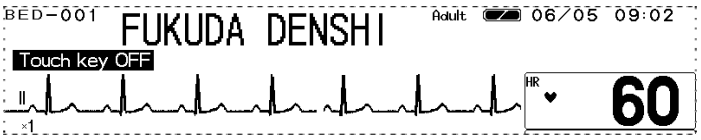


Reference

The [Key Lock] key needs to be preprogrammed as user key.
Refer to " 8. System Configuration Monitor Setup" for user key setup.

If the touch panel was not touched for 30 seconds, the key lock condition will be automatically cancelled. In such case, press the [Key Lock] key again.

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 2 seconds.

The message will disappear and the keys will activate again.

⚠CAUTION	● 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 device 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 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 monitor 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, 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.

Disinfecting the Blood Pressure Transducers

Disinfect the blood pressure transducers according to the manufacturer's guidelines.

Cleaning/Disinfecting the SpO_2 Sensor

- Do not soak the transducer in water or antiseptic solution.
- Wipe the DURASENSOR (DS-100A) with disinfectant such as 70% alcohol. Do not sterilize by applying radioactive rays, steam, or ethylene oxide.
- The OXISENSOR can be reused on the same patient as long as the adhesive tape attaches without slippage. Do not resterilize and reuse it on other patients. It is intended for single patient use only.

Cleaning/Disinfecting the Temperature Probe

- Disinfect the temperature probe according to the manufacturer's guidelines.
- When cleaning, follow the procedure below.
  (1) Wipe the probe using 70% isopropyl alcohol cotton.
  (2) Dry it completely with air before reusing.

Cleaning the Cardiac Output Relay Cable

- Disinfect the cardiac output relay cable according to the manufacturer's guidelines.
- When cleaning, follow the procedure below.
  (1) Wipe the cable using 70% isopropyl alcohol cotton.
  (2) Dry it completely with air before reusing.

Cleaning/Sterilizing the Airway Adapter for Capnostat 5

- Wash in lukewarm sudsy water. Then dip 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.

⚠CAUTION	● Do not sterilize the airway adapter using autoclave methods. ● Do not reuse / re-sterilize the disposable airway adapter.

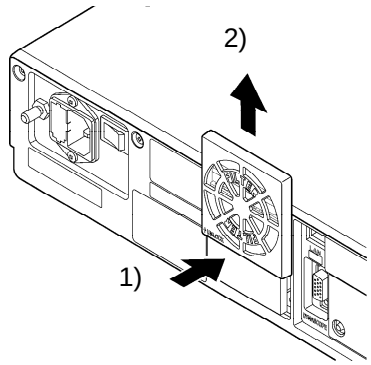
Replacing the Air Filter

The cooling fan air filter on the Super Module and Input Box 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 with a new air filter every 3 months.

⚠WARNING	● After washing the air filter with neutral detergent, dry it completely before reattaching. If the moisture is remained on the air filter, it may damage the equipment. ● The air filter must be attached after cleaning / replacing. If the equipment is used with the air filter detached, it may damage the equipment.

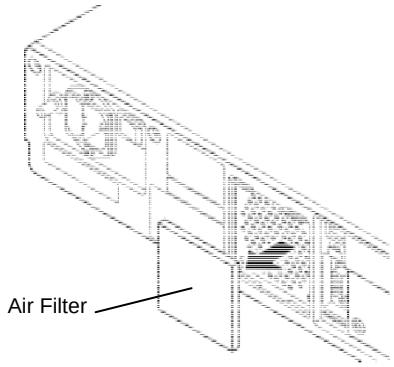
●Replacing the Air Filter of the Super Module

1 Remove the cooling fan cover located at the rear side of the Super Module.



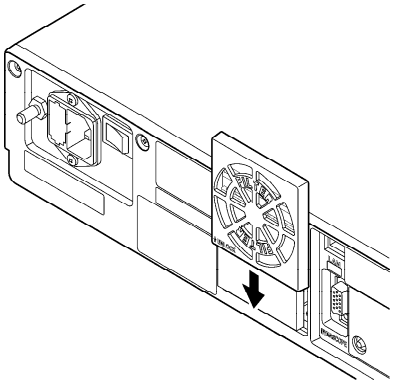
1) Lightly press the lower part of the fan cover.
2) Slide the cover upward.

2 Remove the air filter.



To clean the air filter, beat the dust off, or wash off with neutral detergent.

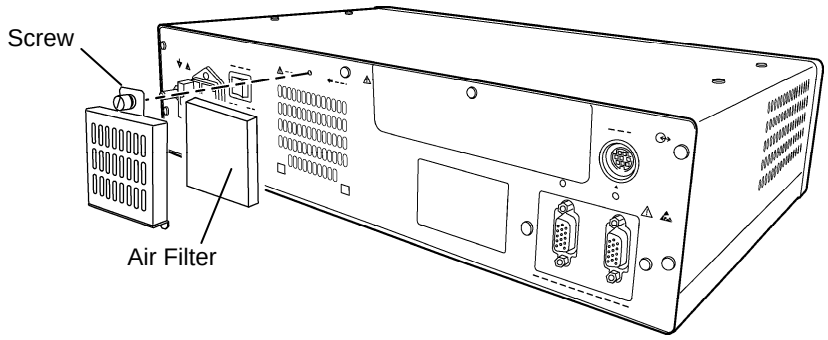
3 Reattach the cooling fan cover.



Slide the fan cover downward and fix it on.

●Replacing the Air Filter of the Input Box

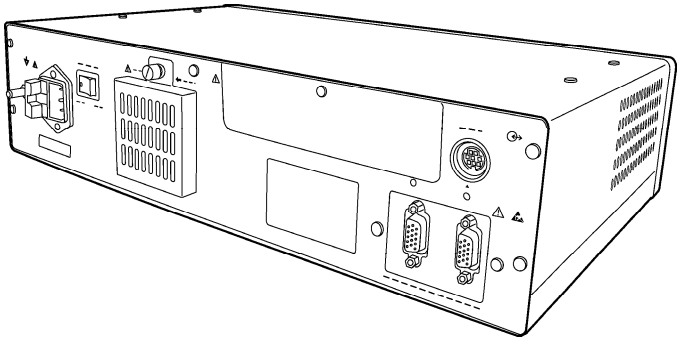
1 Detach the cooling fan cover by unscrewing, and take out the air filter.



2 Clean or replace the air filter.

To clean the air filter, beat the dust off, or wash off with neutral detergent.

3 Reattach the cooling fan cover.



This section explains the daily check and periodic check items of 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.

⚠CAUTION	● 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 must be performed at least once a year for this equipment.
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 of this device, the following components must be replaced periodically. When replacing, contact our service representative.

⚠CAUTION	The periodic replacement parts must be replaced at specified period.

The periodic replacement period for each part is as follows.

●DSC-7300 (Main Unit)

Short Term Backup Battery 3 years

●HS-700 (Super Module)

$EtCO_2$ Unit (Mini$MediCO_2$)	20,000 hours ($EtCO_2$ meas. accumulated time)
NIBP Unit	100,000 times of measurement
Recorder Unit	350 hours (Recording accumulated time)

⚠CAUTION	The O_2 sensor needs to be replaced every 4 months. Replace within 4 months after opening the package even if it is not used. When the “Replace O_2 sensor” message is displayed, O_2 measurement cannot be performed.

●LC-7315T (15-inch Display Unit) / LC-7319T (19-inch Display Unit)

LCD Unit, Inverter Unit 50,000 hours (approx. 6 years if continuously used for 24 hours, 365 days)

NOTE	The display panel utilizes exclusive fluorescent light for the backlight. As this fluorescent light tube has product life cycle, it needs to be replaced periodically. If the display becomes dark, flickers, or does not light, contact your nearest service representative.

Daily Check List

No. _____

Inspected Date _____ Inspected by _____ Location _____

Device Type (Main Unit) _____ Serial No. _____ _____

Device Type (Super Module) _____ Serial No. _____ _____

Device Type (Display Unit) _____ Serial No. _____ _____

Device Type (Input Box) _____ Serial No. _____ Date of Purchase _____

Item	***Details***	***Criteria***	***Judgment***
Appearance	Visually check the exterior for scratches, cracks, deformation, and rust.	No abnormality should be found.	☐OK / ☐NG
Installation	Check whether the unit is installed on a level surface.	The installation area must be level and free from vibration and shock.	☐OK / ☐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.	☐OK / ☐NG
Functions	Turn ON the monitor, and check whether it operates normally.	The home display appears, and the lamp located at the right side of the display panel lights.	☐OK / ☐NG
		The date and time should be correct.	☐OK / ☐NG
	Turn ON the Super Module, and check whether it operates normally.	The power indicator should light.	☐OK / ☐NG
Cables	Visually check all cables for any damage.	No damage should be found.	☐OK / ☐NG
Periodic Inspection	Check the date of previous periodic inspection.	Should be within 1 year.	☐OK / ☐NG
Air Filter (Super Module)	Check the date, which the air filter was first used (cleaned, replaced). Used from: Day____Month____Year____	Should be within 3 months.	☐OK / ☐NG
Air Filter (Input Box)	Check the date, which the air filter was first used (cleaned, replaced). Used from: Day____Month____Year____	Should be within 3 months.	☐OK / ☐NG
CO_2 Calibration (HS-710E, 720E, 702E)	Check the date of previous calibration date. Previous Date: Day____Month____Year____	Should be within 1 year.	☐OK / ☐NG

Comment

Troubleshooting

This section explains the troubleshooting for each case.

ECG

The “LEAD OFF” message is displayed.

Cause 1 : 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.

Cause 2 : Even though the “3-lead Override” (ECG configuration) is set to ON, electrodes other than LA, RA, LL are connected.
Solution : Set the “3-lead Override” to OFF.
Or, detach the electrodes other than LA, RA, LL.

The “ECG failed” message is displayed.

Cause 1 : The ECG amplitude is 0.25mV or below for the waveform size of x1, x1/2, x1/4, and 0.150mV or below for the waveform size of x2, x4.
Solution : Change the electrode attachment site, or select the lead with higher QRS amplitude.
Note : Using 4-electrode or 5-electrode/10-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.

Cause 3 : Even though the “3-lead Override” (ECG configuration) is set to ON, electrodes other than LA, RA, LL are connected.
Solution : Set the “3-lead Override” to OFF.
Or, detach the electrodes other than LA, RA, LL.

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.

Cause 3 : Even though the “3-lead Override” (ECG configuration) is set to ON, electrodes other than LA, RA, LL are connected.
Solution : Set the “3-lead Override” to OFF.
Or, detach the electrodes other than LA, RA, LL.

The “Check electrode” message is displayed.

Cause 1 : The electrode contact with the skin is poor. There is substantial contact resistance between the electrodes.
Solution : Replace all the electrodes.
Use the electrodes of the same type.

Cause 2 : Even though the “3-lead Override” (ECG configuration) is set to ON, electrodes other than LA, RA, LL are connected.
Solution : Set the “3-lead Override” to OFF.
Or, detach the electrodes other than LA, RA, LL.

The “ECG unit error” message is displayed.

Cause : A communication error with the ECG measuring unit exists.
Solution : The breakage of 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.

Cause 2 : Even though the “3-lead Override” (ECG configuration) is set to ON, electrodes other than LA, RA, LL are connected.
Solution : Set the “3-lead Override” to OFF.
Or, detach the electrodes other than LA, RA, LL.

Artificial pacemaker pulse is not displayed.

Cause 1 : On the admit / discharge menu, [Not used] is selected for the pacemaker use.
Solution : Select [Used] for the pacemaker use.

Cause 2 : In the ECG configuration menu, “Pacemaker Pulse” is set to [OFF].
Solution : Select [ON] for “Pacemaker Pulse”.

The “Pacemaker detection error” message is displayed.

Cause : The pacemaker pulse is detected 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, set to [Not used] for the pacemaker use in the patient admit/discharge 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 cease monitoring, press the [Alarm Silence] key to clear the message and silence the alarm.
Solution 2 : To continue monitoring, plug in the ECG relay cable. This will clear the message and silence the alarm.

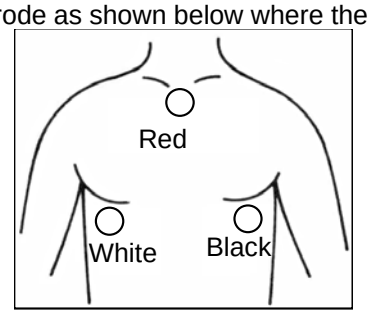
The "Cannot analyze" message is displayed.

Cause : When "Suspend Arrhy. Analysis during Noise Interference" under Hospital Setup is set to ON, and arrhythmia analysis has been continuously suspended for more than 30 seconds due to continuous noise interference or EMG, this message will be displayed.
Solution : Check the electrode attachment, and remove the noise source.
- Check if electrodes and lead cables are properly attached.
- Replace the electrode, lead cable if defective.
- If any noise source is near the patient, locate it away from the patient as much as possible.
- If EMG is interfering, change the electrode site to a location where EMG will less likely to interfere.

Respiration

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 (0.2Ω).
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 is ceased.
Solution : Turn ON the impedance respiration measurement on the admit / discharge menu or RESP configuration 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

The IABP value is displayed as "– – –".

Cause : The BP measured by the HB-500 module is labeled as "IAP".
Solution : The IABP value cannot be measured on the HB-500. PDP will not be calculated if BP label of HB-500 is set to "IAP". The data will be displayed as "– – –", and S/D/M will not be displayed. When using the HB-500, do not set the BP label to IAP.
When monitoring IABP, set the BP label of Super Module to "IAP".

The "BP＊ Transducer OFF" message is displayed.

Cause : The BP (one of 1 to 8) transducer is not connected.
Solution : Connect the transducer.

The "BP＊ not zero balanced" message is displayed.

Cause : The BP zero balance has not been performed since the power is turned ON.
Solution : Open the three-way valve of the transducer to air and perform zero balance.

The measured data is displayed as "– – –".

Cause : The BP zero balance has not been performed since the power is turned ON.
Solution : Open the three-way valve of the transducer to air and perform zero balance.

BP value and waveform are not displayed properly.

Cause : Blood pressure line has not been zero balanced.
Solution : Open the three-way valve of the transducer to air and perform zero balance.

The measured data is displayed as "xxx".

Cause : The BP value is outside the measurement range.
Solution : Perform zero balance again.

The "BP not connected" message is displayed.

Cause : When the BP interface cable or 2ch BP conversion cable is disconnected during BP monitoring, this message will be displayed.
Solution 1 : To cease monitoring, press the [Alarm Silence] key to clear the message and silence the alarm.
Solution 2 : To continue monitoring, plug in the BP interface cable or 2ch BP conversion cable. This will clear the message and silence the alarm.

SpO_2 (HS-710, 710E, 720, 720E, 720C, 702C, 702E)

The "Check SpO_2 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 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 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 of the patient.
Solution : Change the sensor position where the body motion will have less effect.

The pulse waveform is not displayed, or interrupted.

Situation : "Check SpO_2 sensor" is displayed.
Cause 1 : The amplitude of the pulse waveform is 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_2 sensor is not firmly connected to the SpO_2 input connector.
Solution : Make sure the SpO_2 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_2 measurement is unstable.

Cause : There is excessive body motion of the patient which disables correct measurement.
Solution : 1. Have the patient lie still as much as possible.
2. Relocate the sensor, or change the sensor to which the body motion will have less influence.

The "SpO_2 unit error" message is displayed.

Cause 1 : Sensor is defective.
Solution : Replace the sensor.

Cause 2 : There is a failure of communication with the SpO_2 measurement unit.
Solution : A defective cable or SpO_2 unit failure can be considered.
Contact our service representative.

The "SpO_2 sensor fault" message is displayed.

Cause 1 : The sensor is not connected securely.
Solution : Connect the sensor securely.

Cause 2 : Sensor is defective.
Solution : Replace the sensor.

Cause 3 : A wrong sensor is used.
Solution : Replace the sensor. For details of usable sensors, refer to P12-4 "Optional Accessories SpO_2 Measurement (HS-710, 710E, 720, 720E, 720C, 702C, 702E)".

The "SpO_2 disconnect" message is displayed.

Cause : When the SpO_2 relay cable is disconnected during SpO_2 monitoring, this message will be displayed.
Solution 1 : To cease monitoring, press the Alarm Silence key to clear the message and silence the alarm.
Solution 2 : To continue monitoring, plug in the SpO_2 relay cable. This will clear the message and silence the alarm.

Non-Invasive Blood Pressure

The cuff is not inflated 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 is not corresponded to the selected patient type.
Solution : Check if the cuff size is corresponded to 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 proper, and if the cuff size is corresponded to the selected patient type.

The "Check NIBP hose" message is displayed.

Cause : The applied pressure to the cuff has exceeded the maximum limit. The measurement time has exceeded the maximum limit.
Solution : Check if the cuff application is proper, if the cuff size is corresponded to the selected patient type, or if the air hose is not bent. After checking the above, perform the measurement again.
If the same message is displayed again, a failure of the equipment can be considered. Cease the measurement, and contact our service representative.

The "NIBP unit error" message is displayed.

Cause : The zero balancing has failed, and measurement could not be started.
Solution : The body movement or other artifact may cause zero balance failure. During the measurement, have the patient stay still as much as possible.
If the same message is displayed again, the failure of the equipment can be considered. Cease the measurement, and contact our service representative.

The "NIBP measurement failed." message is displayed.

Cause : The pressure applied to the cuff or the measurement time has exceeded the limit, and measurement could not be performed.
Solution : Check if the cuff is properly attached to the patient, or cuff size is correct. Also check if the air hose is not bent, and perform the measurement again.
If the same message is displayed again, equipment failure can be considered. Contact our service representative.

The time of measurement disappears and the numeric data is displayed as "– – –".

Cause : The NIBP data will be erased when the preprogrammed NIBP erase time has elapsed.
Solution : Select the appropriate time for NIBP data erase time from 10min, 30min, 60min, 24hrs which best fits the monitoring purpose.

Temperature

The "Wrong Temp Probe" message is displayed.

Cause 1 : The YSI-700 is used.
Solution : Use the YSI-400 temperature probe for measurement.

Cause 2 : There is a contact failure of the temperature probe.
Solution : Check if the temperature probe is properly inserted.

The numeric data is displayed as "×××".

Cause : The temperature measurement is outside the measurement range.
Solution : Check if the temperature probe is properly inserted.

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 cease monitoring, press the [Alarm Silence] key to clear the message and silence the alarm.
Solution 2 : To continue monitoring, plug in the temperature sensor. This will clear the message and silence the alarm.

The "TEMP auto check" message is displayed. The numeric data is displayed as "– – –".

Cause : The temperature is calibrated once every hour on this monitor. During calibration, the numeric data will be displayed as "– – –".
Solution : The calibration will complete in 10 seconds. If the calibration does not complete within 10 seconds, cease the measurement and contact our service representative.

The "TEMP unit check" message is displayed.

Cause : Error is detected during temperature calibration.
Solution : A unit failure can be considered. Cease the measurement and contact our service representative.

Cardiac Output

The CO value varies more than ±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.

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) is not correct.
Solution : Set the proper condition, CC value for the used catheter.

The blood temperature (Tb), injectate temperature (Ti) is not displayed on the monitor.

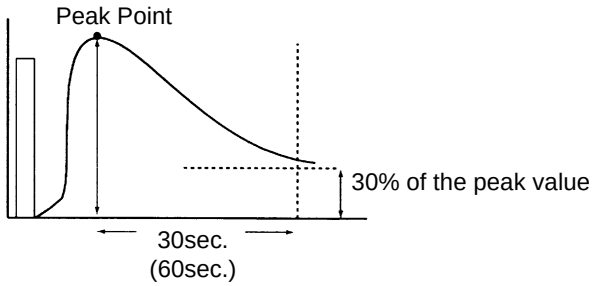
Cause : The catheter is not properly connected.
Solution : Securely connect the catheter.

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 stable condition after the measurement.

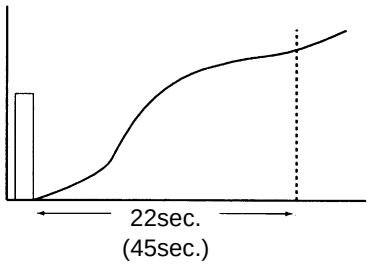


The thermodilution curve did not return to the cut off point soon enough. The temperature must return to a point that is 30% of the peak value within 30 seconds (or 60 seconds depending on the setup).

Solution : If performing continuous measurement, wait for 30 to 60 seconds and check the "Ready" display 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.

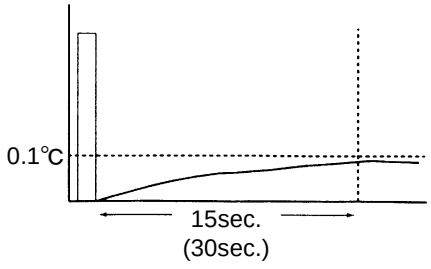


After injection, the peak of the thermodilution curve is not determined within 22 seconds (when the time scale is "30 sec") or 45 seconds (when the time scale is "60 sec").

Solution : The thermistor may be contacting 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 is not securely connected.
Solution : Correct measurement cannot be performed unless the thermistor connector and relay cable is 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 : When ceasing the monitoring, press the [Alarm Silence] key to erase the message and silencing the alarm sound.
Solution 2 : To continue monitoring, plug in the catheter relay cable. The message display and alarm sound will be cleared.

CO_2 Concentration (HS-710E, 720E, 702E)

The "Check filter line" message is displayed.

Cause : The sampling tube is clogged.
Solution : Replace the sampling tube.

The "Self-diag CO_2" message does not disappear.

Cause : An error has occurred to the self-check procedure at power ON.
Solution : The CO_2 unit failure can be considered.

The "Initializing CO_2" message does not disappear.

Cause : An error has occurred during the initialization at power ON.
Solution : The CO_2 unit failure can be considered.

The "Check CO_2 unit" message is displayed.

Cause 1 : The exhaust connector is clogged.
Solution : After checking the exhaust system and removing the clog, press the "Restart CO_2" key on the CO_2 configuration menu.

Cause 2 : The sampling tube or nasal prong is clogged.
Solution : After checking the inhalation system and removing the clog, press the "Restart CO_2" key on the CO_2 configuration menu.

Cause 3 : The CO_2 unit needs to be replaced.
Solution : Contact our service representative.

The "CO_2 unit error" message is displayed.

Cause : There is a communication error with the CO_2 unit.
Solution : The wire break or CO_2 unit failure can be considered.
Contact our service representative.

There is substantial measurement error.

Cause 1 : 20 minutes have not yet elapsed since the power is turned ON.

Solution : For 20 minutes from turning ON the power, there will be a substantial measurement error.

Cause 2 : The calibration is not properly performed.
Solution : Perform CO_2 calibration again.

The "CO_2 not connected" message is displayed.

Cause : When the filter line is disconnected during CO_2 monitoring, this message will be displayed.
Solution 1 : To cease monitoring, press the [Alarm Silence] key to clear the message and silence the alarm.
Solution 2 : To continue monitoring, plug in the filter line. This will clear the message and silence the alarm.

CO_2 Concentration (HS-720C, 702C: Capnostat 5)

The "CO_2 unit error" message is displayed.

Cause : There is a failure in the CO_2 unit.
Solution : Stop using the unit and contact our service representative.

The "CO_2 sensor failure" message is displayed.

Cause 1 : The CO_2 sensor temperature is higher than 50◦C.
Solution : Remove any heat generating source around the sensor.

Cause 2 : The CO_2 sensor is defective.
Solution : Replace the CO_2 sensor.

Note : If error persists, the CO_2 unit may be damaged. Stop using the unit and contact our service representative.

The "CO_2 cal required" or "CO_2 adapter check" message is displayed.

Cause : The CO_2 sensor is not zero balanced.
Solution : Perform the airway adapter calibration.

The "CO_2 adapter check?" 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.
If the error still persists, perform the calibration again in the order of zero calibration, reference calibration, and airway adapter calibration.

The "Wrong CO_2 sensor" message is displayed.

Cause : The connected CO_2 sensor is not applicable.
Solution : Connect the applicable CO_2 sensor.

Although Capnostat 5 is connected, CO_2 data and waveform are not displayed.

Cause 1 : GAS CO_2 is selected for waveform and numeric data for the display configuration.
Solution : Select CO_2 instead of GAS CO_2 for the waveform and numeric data for display configuration.

Cause 2 : There is a communication failure with the Capnostat 5.
Solution : Contact our service representative.

CO_2 Concentration (HC-500)

The "CO_2 hard error" message is displayed.

Cause : There is a failure in the HC-500 internal circuit.
Solution : Remove the HC-500 from the input box and do not use it. Contact our service representative for service.

The "Sensor Check" message is displayed.

Cause 1 : The CO_2 sensor is not properly connected to the HC-500.
Solution : Securely connect the CO_2 sensor to the HC-500.

Cause 2 : The ambient temperature of the CO_2 sensor is high.
Solution : Remove any heat generating source around the sensor.

Cause 3 : The CO_2 sensor is defective.
Solution : Replace the CO_2 sensor.

Note : If error persists, internal circuit of the HC-500 may be damaged. Immediately remove the HC-500 from the Input Box and contact our service representative for service.

The "CO_2 zero cal? " message is displayed.

Cause : The CO_2 sensor is not zero balanced.
Solution : Perform the calibration again in the order of zero calibration, reference calibration, and airway adapter calibration.

The "CO_2 adapter cal? " 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.
If the error still persists, perform the calibration again in the order of zero calibration, reference calibration, and airway adapter calibration.

The zero calibration indicator on the HC-500 is flashing.

Cause : The zero calibration process has failed.
Solution : Perform the zero calibration again.

The airway adapter calibration indicator on the HC-500 is flashing.

Cause : The airway adapter calibration process has failed.
Solution : Perform the airway adapter calibration again.

Recorder (HS-720, 720E, 720C, 702C, 702E)

No recording is performed.

Situation : The "Paper Out" message is displayed on the upper left of the screen.
The "Paper Out" message is displayed inside the [Record START/STOP] key.
Cause : There is no recording paper in the Super Module recorder magazine.
Solution : Install a new pad of paper into the paper magazine.

Situation : The "Magazine Open" message is displayed.
The "MAGAZINE" message is displayed inside the [Record START/STOP] key.
Cause : The paper magazine of the Super Module recorder is open.
Solution : Close the magazine firmly.

Situation : The “Paper out (Cent.)” message is displayed.
The “PAPER OUT” message is displayed inside the Record START/STOP key.
Cause : There is no recording paper in the central recorder.
Or, central recorder (DS-5700) magazine is open.
Solution : Install a new pad of paper into the paper magazine.
Close the recorder magazine if it is open.

Situation : The “Check magazine (Cent.)” message is displayed.
The “MAGAZINE” message is displayed inside the Record START/STOP key.
Cause : The central recorder (DS-7600) magazine is open.
Solution : Close the central recorder (DS-7600) magazine.

Situation : The “Paper Out (8ch)” message is displayed.
The “PAPER OUT” message is displayed inside the Record START/STOP key.
Cause : There is no recording paper in the 8ch recorder.
Solution : Install a new pad of paper into the paper magazine.

Situation : The “Check magazine (8ch)” message is displayed.
The “MAGAZINE” message is displayed inside the Record START/STOP key.
Cause 1 : The 8ch Recorder magazine is open.
Solution : Close the magazine firmly.

Cause 2 : The paper is jammed inside the 8ch Recorder.
Solution : Open the magazine 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 magazine.

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.
The “CHECK?” message is displayed inside the Record START/STOP key.

Cause 1 : The paper is jammed inside the Super Module recorder.
Solution : Open the magazine, and install the paper properly.

Cause 2 : The thermal head temperature increase or other failure of the Super Module recorder has occurred.
Solution : A damage to the thermal head or other failure can be considered. Contact our service representative.

The “Recorder error (Cent.)” message is displayed.
The “CHECK?” message is displayed inside the Record START/STOP key.

Cause : The thermal head temperature increase or other failure of the Central Recorder has occurred.
Solution : A damage to the thermal head or other failure can be considered. Contact our service representative.

The “Recorder error (8ch)” message is displayed.
The “CHECK?” message is displayed inside the Record START/STOP key.

Cause : The thermal head temperature increase or other failure of the 8ch recorder has occurred.
Solution : A damage to the thermal head 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^{MB}
- DS-7600/7600W with software version V05 and prior

When using these central monitors, all monitors in the same network should be set to DS-LANII.

Cause 3 : Inappropriate HUB is used.
Solution : Use a repeater HUB for DS-LANII network and a switching HUB 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 : [BP] is selected for ”HR/PR Alarm Source” in the ECG configuration menu.
Or, [Auto] is selected and BP has become the HR/PR source due to reason such as lead-off condition.
Solution 1 : Select [ECG] or [SpO_2] for ”HR/PR Alarm Source”.
Solution 2 : Select [ECG/SpO_2] for “HR/PR Alarm Source” in the monitor setup menu.
BP will not become the HR/PR source if this selection is made.

The CO_2 waveform is not displayed on the central monitor although the CO_2 numeric data is displayed.

Cause 1 : [Impedance] is selected for “RR/APNEA Alarm Source” in the Respiration configuration menu.
Cause 2 : [Ventilator] is selected for “RR/APNEA Alarm Source” in the Respiration configuration menu.
Solution : Select [CO_2] for “RR/APNEA Alarm Source” in the Respiration configuration menu.
In this case, RR and apnea alarm will be generated based on CO_2 measurement.

The impedance respiration waveform is not displayed on the central monitor although the RR numeric data is displayed.

Cause 1 : [CO_2] is selected for “RR/APNEA Alarm Source” in the Respiration configuration menu.
Cause 2 : [Ventilator] is selected for “RR/APNEA Alarm Source” in the Respiration configuration menu.
Solution : Select [Impedance] for “RR/APNEA Alarm Source” in the Respiration configuration menu.
In this case, RR and apnea alarm will be generated based on impedance measurement.

NOTE	● The impedance respiration waveform will not be displayed if [CO_2] is set for "RR/APNEA Alarm Source". AWF, AWP waveform will be displayed. ● The CO_2 respiration waveform will not be displayed if [Impedance] is set for "RR/APNEA Alarm Source". AWF, AWP waveform will be displayed. ● Both the CO_2 and impedance respiration waveform will not be displayed if [Ventilator] is set for "RR/APNEA Alarm Source".

Although the PR alarm is set on the central monitor, it returns to previous setting after a short time.

Cause 1 : [ECG] is selected for "HR/PR Alarm Source" in the SpO_2 configuration menu.
Cause 2 : [BP] is selected for "HR/PR Alarm Source" in the SpO_2 configuration menu.
Solution : Select [SpO_2] for "HR/PR Alarm Source".
In this case, HR and PR alarm will be generated based on SpO_2 measurement.

Although the HR alarm is set on the central monitor, it returns to previous setting after a short time.

Cause : [SpO_2] is selected for "HR/PR Alarm Source".
Solution : Select [ECG] for "HR/PR Alarm Source".
In this case, HR and PR alarm will be generated based on ECG measurement.

⚠CAUTION	On the DS-7300 system, HR and PR alarm cannot be set to ON simultaneously.

Telemetry

There is no reception at the telemetry center.

Cause : The channel ID or group ID is not corresponded with the telemetry receiver.
Solution : Set the correct channel ID and group ID.

The impedance respiration waveform cannot be received at the telemetry center.

Cause 1 : On the respiration configuration menu, "RR/APNEA Alarm Source" is set to [CO_2].
Cause 2 : On the respiration configuration menu, "RR/APNEA Alarm Source" is set to [Ventilator].
Solution : Set the "RR/APNEA Alarm Source" to [Impedance].

The BP waveform of 100mmHg or above cannot be properly received.

Cause : The BP waveform and scale is not corresponded.
Solution : When the BP waveform is above 100mmHg, set the BP scale above 100mmHg.

General

Nothing is displayed but the main power indicator is lighted.

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 display.

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.
Turn off the DIP switch No.1.

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. 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 screen not intended is displayed.

Cause : If [Store] is selected for "Parameter Key Operation" (Monitor Setup), the last screen displayed from the parameter key will be stored. The next time the parameter key is pressed, the stored screen will be directly displayed.
Solution : Press the [Prev. Disp] key on the displayed screen to return to the top screen of the parameter setup menu. Or, select [Not Store] for "Parameter Key Operation".

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 "DSC-7300 hardware error" message is displayed.

Cause : The main unit hardware failure can be considered.
Solution : Immediately turn off the power and stop using the device. Contact our service representative for service.

The "Display unit hardware error" message is displayed.

Cause : The display unit hardware failure can be considered.
Solution : Immediately turn off the power and stop using the device. Contact our service representative for service.

"Check DSC-7300 Rotary SW.", "Check Super Module Rotary SW.", "Check IB-7300 Rotary SW." 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.

Super Module (HS-700 series)

The "Check Super Module connection" message is displayed.

Cause 1 : The module connection cable is not properly connected.
Solution : Securely connect the module connection cable.

Cause 2 : The power supply cable of the Super Module or Input Box is not connected. Or, the power is not turned ON.
Solution : Check each device if the power supply cable is connected and if the power is turned ON. Connect the cable if not connected, and turn ON the power if not turned ON.

The "SUB CPU error" message is displayed.

Cause : The Super Module hardware is malfunctioning.
Solution : Immediately turn off the power and stop using the device. Contact our service representative for service.

The "Analog board error" message is displayed.

Cause : The analogue board failure can be considered.
Solution : Immediately turn off the power and stop using the device. Contact our service representative for service.

The "Check HS-700 cooling fan" message is displayed.

Cause : The cooling fan is unclean reducing the cooling effect.
Solution : Clean or replace the air filter.

The "HS-700 hardware error" message is displayed.

Cause : The Super Module hardware is malfunctioning.
Solution : Immediately turn off the power and stop using the device. Contact our service representative for service.

The "Check HS-700 software version" message is displayed.

Cause : The HS-700 software version is not corresponded to that of the DSC-7300 main unit.
Solution : It is necessary to update the software version of the HS-700 or DSC-7300. Contact our service representative.

IB-7300 Input Box

The input box data is not displayed.
The "Check IB-7300 connection" message is displayed on the monitor.

Cause : The input box is not selected for use.
Solution : Select [Yes] for "Input Box (IB-7300)" of the monitor setup menu.

The input box data is not displayed.
The "IB-7300 not configured." message is displayed.

Cause : The input box setup is not properly performed.
Solution : On the input box setup (Monitor Setup), set the corresponded module for each slot.

The "Check IB-7300 cooling fan" message is displayed.

Cause : The cooling fan is unclean reducing the cooling effect.
Solution : Clean or replace the air filter.

Ventilator

The "VENT alarm" message is displayed.

Cause : The following alarm has generated on the ventilator.
- Parameter alarm such as AWP, MV, FiO_2
- Technical alarm such as battery replacement

Solution : Check the alarm cause of the ventilator, and take appropriate action.

The "Vent. Disable", "Vent. Invalid" message is displayed. The ventilator screen is also displayed.

Cause 1 : The cable is not properly connected.
Solution : Securely connect the ventilator cable to appropriate connector.

Cause 2 : The power of the ventilator is turned OFF.
Solution : Turn ON the power of the ventilator.

Cause 3 : The ventilator is in standby mode.
Solution : Start the ventilation on the ventilator.

Cause 4 : The communication setup of the DS-7300 system and ventilator is not corresponded.
Solution : The communication setup of the DS-7300 system and ventilator is fixed as follows.
Check the communication setup of the ventilator.
For procedures, refer to the operation manual of the ventilator.

Servo-300 / i / s
No communication setup

PB-7200 / 740 / 760 / 840

Baud Rate	: 9600bps
Parity Bit	: None
Data Bit	: 8 bit
Stop Bit	: 1 bit

Evita 2dura / 4 / XL

Baud Rate	: 19200bps
Parity Bit	: EVEN
Data Bit	: 8 bit
Stop Bit	: 1 bit
Communication	: MEDIBUS

Savina

Baud Rate	: 9600bps
Parity Bit	: None
Data Bit	: 8 bit
Stop Bit	: 1 bit
Communication	: MEDIBUS

Gas Module (Poet IQ 8500A)

The "WRONG AGENT" message is displayed.

Cause : The primary agent selected by the user does not match the highest concentration agent detected by the gas module.
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 AGENT" 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 "AGT: OCCLUSION" message is displayed.

Cause : The sampling line or water trap to the gas module is completely blocked. The gas module is attempting to clear the blockage by drawing the occlusion to the water trap.
Solution : Replace the sampling line as necessary.

The "AGT: INSERT TRAP" message is displayed.

Cause : The water trap of the gas module is not inserted. The water trap is partly blocked. The water trap type is wrong or defective.
Solution : Replace the trap.

The "AGT: NO EXHAUST" message is displayed.

Cause : The scavenging line of the gas module is blocked, or the scavenging system is defective.
Solution : Remove the blockage, or correct the gas scavenging system.

The "AGT: BENCH FAIL" message is displayed.

Cause : The gas module detected a hardware failure.
Solution : Contact our service representative.

The "AGT: IR FAIL" message is displayed.

Cause : The gas module detected a hardware failure.
Solution : Contact our service representative.

The "AGT: PNEUMATICS" message is displayed.

Cause : The gas module detected a hardware failure.
Solution : Contact our service representative.

The "AGT: BADCAL" message is displayed.

Cause : The gas module failed to calibrate the anesthetic agent detector.
Solution : Contact our service representative.

The "AGT: WARMING" message is displayed.

Cause : The gas module has not reached the full accuracy for anesthetic agent concentration.
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 "O2: SENSOR" message is displayed.

Cause : The O_2 cell of the gas module has been consumed and needs replacement.
Solution : Contact our service representative.

Oximeter

The measurement data is not displayed.

Cause 1 : The cable is not properly connected.
Solution : Securely connect the following cable to multiport relay cable and each corresponded device.

Device	*Oximeter Cable*	
	Multiport Relay Cable	*Super Module Serial Connector*
Vigilance	CJ-515 (Q'ty. 1)	CJO-04RS4
Vigilance CEDV	CJ-515 (Q'ty. 1)	CJO-04RS4
VigilanceII	CJ-515 (Q'ty. 1)	CJ-502
Vigileo	CJ-515 (Q'ty. 1)	CJ-502
OXIMETRIX3	CJ-516 (Q'ty. 1)	(Connection not possible.)
Q-vue	CJ-517 (Q'ty. 1)	(Connection not possible.)
Q2 Computer	CJ-582 (Q'ty. 1)	(Connection not possible.)

Cause 2 : The multiport connection is not properly set.
Solution : Select [Vigilance/Vigileo], [Oximetrix3], [Q-vue] or [Q2Computer] on the multiport connection setup menu.

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. When CCO is in wait or failure condition and CO AVG data is stored in Q-vue or OXIMETRIX3, CO AVG data will be displayed.

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 network setup of Super Module and the oximeter is not corresponded.
Solution : The network setup of Super Module is fixed to the default setting of each oximeter and cannot be changed. Check if the network setup of connecting oximeter is in default setting.
In case of Vigilance/Vigileo, check if the network 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 network setup, refer to the operation manual for the Vigilance/Vigileo.
In case of Q2 Computer, check if the network is set as follows.
- Baud Rate: 9600bps
- Parity Bit: ODD
- Stop Bit: 1
- Data Bit: 7

For procedure to check the Q2 Computer network setup, refer to the operation manual for the Q2 Computer.

Cause 7 : The software version of Vigilance is not corresponded.
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 monitor data may be delayed due to transmission delay which causes the difference of value between the Q2 Computer.

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 multiport relay cable.

BIS Monitor

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 DSC-7300.
Check the communication setup and verify that it is set to ASCII.
Refer to the BIS operation manual for procedures.

Chapter 11
Technical Information

Specification / Performance

This section states the specification and performance of this equipment.

Specification (DSC-7300 Main Unit)

Size

370mm (W) × 197mm (D) × 271mm (H) (not including the protrusion)

Weight

3.5kg (not including the accessory)

Environmental Condition

Operating Temperature	: 10 to 40°C
Operating Humidity	: 30 to 85% (non-condensing)
Operating Atmospheric Pressure	: 700 to 1060hPa
Transport / Storage Temperature	: –10 to 60°C
Transport / Storage Humidity	: 10 to 95% (at 60°C)
Transport / Storage Atmospheric Pressure	: 700 to 1060hPa

Safety

General Standard	: IEC60601-1:1988 (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	: IEC60601-1-2：2001 (Medical electrical equipment – Part 1: General requirements for safety – 2. Collateral standard: Electromagnetic compatibility – Requirements and tests)
The type of protection against electric shock	: Class I
Waterproof Level	: IPX0 (no protection)
Disinfection Method	: Cleaning only
Usage in Presence of Flammable Gas	: Equipment inappropriate to use in presence of air/flammable anesthetics, or oxygen or nitrous oxide/flammable anesthetics.
Operation Mode	: Continuous Operating Equipment

Power Requirements

Voltage	: AC 100–240V
Frequency	: 50Hz or 60Hz
Power Consumption	: 150VA

Usable Life

6 years (according to self-certification)

Refer to “10. Maintenance Periodic Replacement Parts” for components requiring periodic replacement.

Specification (LC-7315T / LC-7319T Display Unit)

Size

LC-7315T : 350mm (W) × 51.5mm (D) × 300mm (H) (not including the hinge and protrusion)
LC-7319T : 440mm (W) × 70mm (D) × 400mm (H) (not including the hinge and protrusion)

Weight

LC-7315T : 4.5kg (not including the accessory)
LC-7319T : 7.0kg (not including the accessory)

Environmental Condition

Operating Temperature	: 10 to 40°C
Operating Humidity	: 30 to 85% (non-condensing)

Operating Atmospheric Pressure : 700 to 1060hPa
Transport / Storage Temperature : –10 to 60°C
Transport / Storage Humidity : 10 to 95% (at 60°C)
Transport / Storage Atmospheric Pressure : 700 to 1060hPa

Safety

General Standard : IEC60601-1:1988
(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 : IEC60601-1-2：2001
(Medical electrical equipment – Part 1: General requirements for safety – 2. Collateral standard: Electromagnetic compatibility – Requirements and tests)
The type of protection against electric shock : Class I
Waterproof Level : IPX0 (no protection)
Disinfection Method : Cleaning only
Usage in Presence of Flammable Gas : Equipment inappropriate to use in presence of air/flammable anesthetics, or oxygen or nitrous oxide/flammable anesthetics.
Operation Mode : Continuous Operating Equipment

Power Requirements (Supplied from DSC-7300)

Voltage : DC18V

Usable Life

6 years (according to self-certification)
Refer to “10. Maintenance Periodic Replacement Parts” for components requiring periodic replacement.

Specification (Super Module)

Size

382mm (W) × 255mm (D) × 87mm (H) (not including the protrusion)

Weight

6 ± 1kg (not including the accessory)

Environmental Condition

Operating Temperature : 10 to 40°C
Operating Humidity : 30 to 85% (non-condensing)
Operating Atmospheric Pressure : 700 to 1060hPa
Transport / Storage Temperature : –10 to 60°C
Transport / Storage Humidity : 10 to 95% (at 60°C)
Transport / Storage Atmospheric Pressure : 700 to 1060hPa

Safety

General Standard : IEC60601-1:1988
(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 : IEC60601-1-2：2001
(Medical electrical equipment – Part 1: General requirements for safety – 2. Collateral standard: Electromagnetic compatibility – Requirements and tests)

Classification

The class of protection against electric shock	:	Class I
The type of protection against electric shock	:	ECG Input Connector : Type CF
		Multiparameter Amplifier Input Connector : Type CF
		NIBP Cuff Connector : Type CF
		SpO_2 Input Connector : Type CF
		CO_2 Measurement Connector : Type CF
		Serial Communication Connector (RGM) : Type CF
Waterproof Level	:	IPX0 (no protection)
Disinfection Method	:	Cleaning only
Usage in Presence of Flammable Gas	:	Equipment inappropriate to use in presence of air/flammable anesthetics, or oxygen or nitrous oxide/flammable anesthetics.
Operation Mode	:	Continuous Operating Equipment

Power Requirements

Voltage	:	AC 100 – 240V ± 10%
Frequency	:	50Hz or 60Hz
Power Consumption	:	100VA

Usable Life

6 years (according to self-certification)

Refer to “10. Maintenance Periodic Replacement Parts” for components requiring periodic replacement.

Specification (Input Box)

Size

380 (W) ± 10mm × 230 (D) ± 10mm × 90 (H) ± 5mm (not including the protrusion)

Weight

3.0 ± 0.5kg (not including the accessory)

Environmental Condition

Operating Temperature	:	10 to 40◦C
Operating Humidity	:	30 to 85% (non-condensing)
Operating Atmospheric Pressure	:	700 to 1060hPa
Transport / Storage Temperature	:	–10 to 60◦C
Transport / Storage Humidity	:	10 to 95% (60◦C)
Transport / Storage Atmospheric Pressure	:	700 to 1060hPa

Safety

General Standard	:	IEC60601-1:1988 (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	:	IEC60601-1-2：2001 (Medical electrical equipment – Part 1: General requirements for safety – 2. Collateral standard: Electromagnetic compatibility – Requirements and tests)

Power Requirements

Voltage	:	AC 100 – 240V ± 10%
Frequency	:	50Hz or 60Hz
Power Consumption	:	100 VA

Usable Life

6 years (according to self-certification)

Performance (DS-7300 System)

Display

Device	:	15 inch TFT Color LCD (LC-7315T) 19 inch TFT Color LCD (LC-7319T)
Control	:	Touch Screen Type
Waveform Trace	:	Stationary Trace
Waveform Speed	:	ECG / SpO_2 / BP (6.25mm/s, 12.5mm/s, 25mm/s, 50mm/s) RESP / CO_2 (6.25mm/s, 12.5mm/s, 25mm/s)
Waveform Speed Accuracy	:	Less than ± 10%
Parameter	:	ECG, RESP, TEMP, SpO_2 (Arterial Oxygen Saturation), BP, NIBP, CO_2/O_2/N_2O/anesthetic agent concentration, CO
Measurement Updating Interval	:	Every 1 second

Operation

Touch Screen	:	Eight-Wire Resistive Analog Touch Screen

ECG

Lead Type	:	Wired 3-electrode, 4-electrode, 5-electrode, 10-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	:	80 dB or above
Lead-off Sensing DC Current	:	Less than 0.1μA
HR Meas. Range	:	Adult 0, 12 to 300bpm Neonate 0, 30 to 300bpm
HR Meas. Accuracy	:	± 3bpm
HR Display 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	:	1.2mV T-wave can be removed.

Heart rate meter accuracy and response to irregular rhythm

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

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

Ventricular Tachycardia 1mVpp, 206bpm : Range 7.8 to 8.5 sec. Average 8.1 sec.

Ventricular Tachycardia 2mVpp, 206bpm : Range 8 to 8.8 sec. Average 8.5 sec.
Ventricular Tachycardia 0.5mVpp, 206bpm : Range 10.1 to 10.4 sec. Average 10.4 sec. (at ×2)

Ventricular Tachycardia 2mVpp, 195bpm : Range 6.7 to 7.3 sec. Average 7.0 sec.

Ventricular Tachycardia 4mVpp, 195bpm : Range 6.8 to 7.4 sec. Average 7.0 sec.
Ventricular Tachycardia 1mVpp, 195bpm : Range 8.6 to 9.5 sec. Average 8.9 sec.

Pacemaker Pulse Display Capability

3-electrodes : Detects with the selected lead.
4, 5, 10-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 0.5 to 2ms, amplitude ± 2 to ± 700mV

Rejection of Pacemaker Pulse

a) Pacemaker Pulse without Over/Undershoot:
Capable to reject pulses of pulse width 0.1 to 2ms, amplitude ±2 to ±700mV
b) Pacemaker Pulse with Over/Undershoot:
Rejection is not possible.

Respiration

Method	: Impedance Method
Frequency Characteristic	: 1.5Hz (adult, child) / 2.5Hz (neonate)
Transient Characteristic	: Time Constant 1.5 sec.
Current	: 100μA or lower, 66.7kHz ± 5%
Measurement Range	: 0, 4 to 150Bpm
Accuracy	: ± 3 Bpm
Base Impedance	: 500Ω to 2kΩ
Max. Input Delta Impedance	: Base Impedance ±5Ω

Waveform Size Selection/
Detectable Delta Impedance : ×1/4 (2.5mm/Ω) / 1.6–10Ω
×1/2 (5mm/Ω) / 0.8–10Ω
× 1 (10mm/Ω) / 0.4–10Ω
× 2 (20mm/Ω) / 0.2–10Ω
× 4 (40mm/Ω) / 0.1–10Ω
Waveform Display Accuracy : Less than ±20%

Temperature

Method : Thermistor Method
Probe : only YSI-400 series
Measurement Range : 0 to 50°C
Accuracy : ± 0.2°C
No. of Channels : Max. 8 channels
Measurement
Response Time : Less than 150 sec.

SpO_2 (Arterial Oxygen Saturation)
Nellcor (HS-710, HS-710E, HS-720, HS-720E, HS-720C, HS-702C, HS-702E)

Method : 2 Wavelength Pulse Wave Method
Measurement Range : 1–100%
Resolution : 1%
Accuracy : Adult 70 to 100% ±2%
Neonate 70 to 100% ±2%
The accuracy depends on the used sensor. Refer to the operation manual of the used sensor for details.
PR Measurement Range : 20–300bpm
PR Accuracy : ± 3bpm for 20–250bpm

Blood Pressure

Transducer Sensitivity : 5μV / V / mmHg
Measurement Range : -50–300 mmHg
Frequency Characteristic : DC–6Hz / 8Hz / 12Hz / 40Hz
Accuracy : ± 2% of full scale or within ± 1mmHg
Zero Balance Range : Less than ± 150mmHg
Measurement Range : Adult 20–300bpm
Neonate 30–300bpm
Accuracy : The larger of ± 3% or 1bpm
No. of Channels : Max. 8 channels

NIBP (Non-Invasive Blood Pressure)

Method : Oscillometric Method
Measurement Range : Adult Systolic BP: 30–280mmHg
Mean BP: 15–260mmHg
Diastolic BP: 10–240mmHg
Child Systolic BP: 30–180mmHg
Mean BP: 15–160mmHg
Diastolic BP: 10–150mmHg
Neonate Systolic BP: 30–120mmHg
Mean BP: 15–110mmHg
Diastolic BP: 10–100mmHg
Resolution : 1mmHg
Static Pressure Accuracy : ±4mmHg
PR Measurement Range : 40–240bpm
PR Measurement
Accuracy : Less than ±5%
Inflation Target Value
(Default) : Adult 180mmHg
Child 140mmHg
Neonate 110mmHg
Inflation Target Value
(After normal completion) : Previous systolic value + 40mmHg
Deflation Speed : 5±1mmHg/sec.

Safety Mechanism	:	Adult	310mmHg and below
		Child	210mmHg and below
		Neonate	160mmHg and below
Measurement Duration	:	Adult	less than 120 sec. (15mmHg and above)
		Child	less than 90 sec. (15mmHg and above)
		Neonate	less than 60 sec. (10mmHg and above)
Accuracy	:	When compared with auscultation of representative patient population, standard deviation and mean error is less than 8mmHg and ±5mmHg respectively.	

CO_2 Concentration

Oridion® Unit (HS-710E, HS-720E, HS-702E)
The performance is according to the Oridion Medical 1987 Ltd. MiniMediCO2 Microstream® CO_2 Module specification.

Method	:	Infra-Red Solid-State, Microstream
CO_2 Measurement Range	:	0 to 99mmHg (at sea level)
CO_2 Resolution	:	1mmHg
CO_2 Accuracy	:	0 to 38mmHg: ± 2mmHg 39 to 99mmHg: ± (5% of reading + 0.08% for every 1 mmHg above 38 mmHg)
Flow Rate	:	50ml/min (+15ml/min, -7.5ml/min) flow measured by volume
Initialization Time	:	Typically 30 seconds (maximum 180 seconds). At full accuracy when value appears.
RR Measurement Range	:	0 to 150bpm
RR Measurement Accuracy	:	0 to 70Bpm:±1Bpm 71 to 120Bpm:±2Bpm 121 to 150Bpm: ±3Bpm
Response Time	:	2.9 seconds (Typical)
Calibration Interval	:	Initial calibration after 1,200 operating hours, then once a year or after 4,000 operating hours, whichever comes first.

RESPIRONICS® Capnostat 5 (1015928) (HS-720C, HS-702C)

Method	:	Infra-Red Solid-State Method, Mainstream Method
Measurement Range	:	0–150mmHg
Warm-up Time	:	Less than 15 sec. until measurement can be performed. 2 min. until maximum accuracy is achieved.
Accuracy (After warm-up time when maximum accuracy is achieved) :		
		0–40mmHg: ± 2mmHg 41–70mmHg: ± 5% 71–100mmHg: ±8% 101–150mmHg: ±10%
Initialization Time	:	Full specifications within 60 seconds, waveform data in less than 15 seconds at an ambient temperature of 25°C
Response Time	:	Adult Airway Adapter: Less than 60ms. Infant Airway Adapter: Less than 50ms
RR Measurement Range	:	0–150Bpm
RR Measurement Accuracy	:	±1Bpm

Cardiac Output

Measurement Method	:	Thermodilution Method
Measurement Range	:	0.1–20L/min
Measurement Accuracy	:	0.1–10L/min: less than ± 10% 10–20L/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 (HS-720, HS-720E, HS-720C, HS-702C, HS-702E)

Recording Speed	:	50mm/s, 25mm/s (Error: less than ± 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, List Recording, Graphic Recording
Detection	:	Paper out, page mark, paper cassette error, printhead temperature
Protective Circuit	:	Printhead overcurrent, printhead overheating, motor overcurrent, surge current

Input Box (IB-7300)

No. of Modules	:	Max. 6 modules

Setup Item Default and Backup

This section lists selection, default setting, and backup status for each setup item.

Backup Item

"○" : Setup item will be retained even when the power is turned OFF.
"△" : Setup item will be retained even when the power is turned OFF. When discharging procedure is performed, the value will be reset to initial setting.
"—" : Setup item will be reset to initial setting when the power is turned OFF.
○/△ : Setup item will be retained even after the discharge procedure if [Backup] is selected for "Backup at Discharge" in the monitor setup menu. If [Initial] is selected, the setup item will be initialized after the discharge procedure.
Alarm setup will be initialized with the selected alarm mode.
Display configuration will be initialized with the selected display mode.

Refer to "8. System Configuration Monitor Setup" for "Backup at Discharge" setup.

Patient Admit / Discharge

Item		*Selection*	*Default*	*Backup*
Patient Name		Numeric, Alphabet, Symbol (16 characters)	Blank	△
Sex		Male, Female	Undetermined	△
Age		0–150 years or 0–999 days	0 year	△
Height		0.0–300.0cm	0.0cm	△
Weight		0.0–350.0kg	0.0kg	△
BSA		0.00–9.99m^2	0.00 m^2	△
Blood Type		A, B, O, AB Rh +/-	Blank	△
Birth Date		Year, Month, Day	Blank	△
ID		Numeric, Alphabet, Symbol (20 characters)	Blank	△
Patient Type		Adult, Child, Neonate	Adult	○
Pacemaker		Used, Not used	Not used	△
Impedance Measurement		ON, OFF	ON	○/△
Filter Mode		Monitor, Diagnosis, ESIS	Monitor	○
Admit Date		Year, Month, Day	Blank	△
Room/Bed ID	Bed ID	0–999	0	○
	Room ID	Numeric, Alphabet, Symbol (4 characters)	BED—	○

Alarm Setup

Item	*Selection*	*Default*	*Backup*
System Alarm	Suspend, ON	Suspend	—
HR PR_SpO_2 PR _IBP	ON, OFF 20–300bpm	ON 40–120	○/△
ASYSTOLE	ON, OFF 3–10 sec.	ON 5 sec.	○/△
VF	ON, OFF	ON	
VT	ON, OFF	ON	
SLOW_VT	ON, OFF	ON	
RUN	ON, OFF 2–8 beats	ON 3 beats	
COUPLET	ON, OFF	OFF	
PAUSE	ON, OFF 1.5–5 sec.	OFF 3.0 sec.	
BIGEMINY	ON, OFF	OFF	
TRIGEMINY	ON, OFF	OFF	
FREQUENT	ON, OFF 1–50 beats / min.	OFF, 10 beats	
TACHY	ON, OFF	ON	
BRADY	ON, OFF	ON	
HR Low Limit for VT	120, 140 beats / min.	120 beats / min.	
HR Low Limit for RUN	0–100	40 beats / min.	
ST1 to ST12 (mm)	ST All Alarm ON, OFF Indiv. Alarm ON, OFF −20 to +20mm	ST All Alarm OFF Indiv. Alarm OFF OFF–OFF	○/△
ST1 to ST12 (mV)	ST All Alarm ON, OFF Indiv. Alarm ON, OFF −2.0 to +2.0mV	ST All Alarm OFF Indiv. Alarm OFF OFF–OFF	○/△
BP1 (mmHg)	ON, OFF 0–300mmHg	ON SYS 80–180 DIA OFF–OFF MEAN OFF–OFF	○/△
BP1 (kPa)	ON, OFF 0–40.0kPa	ON SYS 10.0–24.0 DIA OFF–OFF MEAN OFF–OFF	
BP2–8 (mmHg)	ON, OFF 0–300mmHg	OFF SYS OFF–OFF DIA OFF–OFF MEAN OFF–OFF	○/△
BP2–8 (kPa)	ON, OFF 0–40.0kPa	ON SYS OFF–OFF DIA OFF–OFF MEAN OFF–OFF	
CVP (mmHg)	ON, OFF 0–300mmHg	OFF SYS OFF–OFF DIA OFF–OFF MEAN OFF–OFF	○/△
CVP (cmH_2O)	ON, OFF 0–40 cmH_2O	OFF SYS OFF–OFF DIA OFF–OFF MEAN OFF–OFF	
RR_IMP RR_CO_2 RR_VENT	ON, OFF 5–150Bpm	ON 5–30	○/△
RR_GAS (Adult)	ON, OFF 5–150Bpm	ON 5–30	○/△
RR_GAS (Child, Neonate)	ON, OFF 2–150Bpm	ON 5–30	○/△
APNEA	ON, OFF 5–20 sec.	ON 15 sec.	○/△
SpO_2	ON, OFF 50–100%	ON 90–OFF	○/△

Item		*Selection*	*Default*	*Backup*
NIBP (mmHg)		ON, OFF 10–300mmHg	ON SYS 80–180 DIA OFF–OFF MAP OFF–OFF	○/△
NIBP (kPa)		ON, OFF 1.5–40.0kPa	ON SYS 10.0–24.0 DIA OFF–OFF MAP OFF–OFF	
TEMP1–8 (°C)		ON, OFF 30–50°C	OFF OFF–OFF	○/△
TEMP1–8 (°F)		ON, OFF 86–122°F	OFF OFF–OFF	
Tb (°C)		ON, OFF 30–45°C	OFF OFF–OFF	
Tb (°F)		ON, OFF 86–113°F	OFF OFF–OFF	
$EtCO_2$ (mmHg)		ON, OFF 1–115mmHg	ON 30–45mmHg	○/△
$EtCO_2$ (kPa)		ON, OFF 0.1–15.0kPa	ON 4.0–6.0kPa	
$EtCO_2$ (%)		ON, OFF 0.1–15.0%	ON 4.0–6.0%	
$InspCO_2$ (mmHg)		ON, OFF 1–24mmHg	ON 3mmHg	○/△
$InspCO_2$ (kPa)		ON, OFF 0.1–3.0kPa	ON 0.4kPa	
$InspCO_2$ (%)		ON, OFF 0.1–3.0%	ON 0.4%	
Alarm Setup	Alarm Suspend	1, 3, 5 min.	3 min.	○
	Alarm Silence	1, 3, 5 min.	3 min.	○
	Alarm Limit	ON, OFF	OFF	○
	Status Alarm Control	Linked to alarm silence time, Linked to each new occurrence	Linked to alarm silence time	○
	Alarm Occurrence at NIBP Failure	ON, OFF	OFF	○

NOTE	If [Backup] is selected for “Backup at Discharge” on the monitor setup menu, the set value will be stored even after the discharge procedure is performed. If [Initial] is selected, the alarm setup will be initialized with the selected alarm mode.

Parameter Setup

Item		Selection	Default	Backup
ECG	Lead	I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6	ECG1 II ECG2 aVR ECG3 I ECG4 III ECG5 aVL ECG6 avF ECG7 V1 ECG8 V2 ECG9 V3 ECG10 V4 ECG11 V5 ECG12 V6	○/△
	Waveform Size	×1/4, ×1/2, ×1, ×2, ×4	×1	△
	Filter Mode	Monitor, Diagnosis, ESIS	Monitor	○
	HR Average	Instant, Average	Average	○
	Pulse Tone	ON, OFF, SpO_2	ON	○
	HR/PR Alarm Source	Auto, ECG, SpO_2, BP	Auto	○
	Automatic Lead Switch	ON, OFF	OFF	○
	Pacemaker Pulse	ON, OFF	OFF	○
	Pace Pulse Mask Time	Auto, 10ms, 20ms, 40ms, OFF	Auto	△
	AC Filter	ON, OFF	ON	○
	ECG Drift Filter	ON, OFF	OFF	○
	3-lead Override	ON, OFF	OFF	○
RESP	Waveform Size	×1/4, ×1/2, ×1, ×2, ×4	×1	△
	CVA	ON, OFF	OFF	○/△
	RR Source	Auto, Impedance, Ventilator, CO_2	Auto	○
	Impedance Meas.	ON, OFF	ON	○
	RR Sync. Indicator	ON, OFF	ON	○
SpO_2 (HS-710, 710E, 720, 720E, 720C, 702C, 702E)	Waveform Size	×1/4, ×1/2, ×1, ×2, ×4	×1	△
	SpO_2 SEC Alarm	OFF, 10, 25, 50, 100	OFF	○
	HR/PR Source	Auto, ECG, SpO_2, BP	Auto	○
	Ignore NIBP	ON, OFF	ON	○
NIBP	Auto Mode	ON, OFF	OFF	○/△*
	Quick SYS	3, 5, 10 min.	10 min.	○
	End Tone	ON, OFF	ON	○
	MEAN	ON, OFF	OFF	○
	NIBP Speed	Standard, Hi Speed	Standard	○
	Quick SYS List	ON, OFF	ON	○
	PR	ON, OFF	OFF	○

NOTE	∗ Whether to initialize or back up the NIBP auto mode can be set on the “NIBP Auto Mode” on “Backup at Discharge” menu (Monitor Setup). For details, refer to “8. System Configuration Monitor Setup ●Backup at Discharge”.

Item		*Selection*	*Default*	*Backup*
BP1–8	Scale * (∗ Selectable scale depends on the BP label.)	20, 50, 75, 100, 150, 200, 250, 300mmHg	200mmHg 50mmHg (BP2)	○/△
		4, 8, 12, 16, 20, 24, 32, 40kPa	24kPa 8kPa (BP2)	
	Label	BP ∗, ART, RAP, RVP, PAP, CVP, ICP, UAP, LAP, LVP, User 1, User 2	BP ∗ indicates BP1–8	○/△
	Filter	6, 8, 12, 40Hz	12Hz	○
	HR/PR Source (BP1 or ART)	Auto, ECG, SpO_2, BP	Auto	○
	Display Type	S/D/M, S/D, M	S/D/M	○
	Mean	ON, OFF	OFF	○
	Resp. Reject	ON, OFF	OFF	○
TEMP1–8	Label	T∗, Tsk, Tre, Tes, Tco, User 1, User 2, User 3, User 4	T∗ (T1–T8)	○/△
	∆T Display	ON, OFF	OFF	○/△
CO_2 (HS-710E, 720E, 702E)	Scale	50, 100mmHg	50mmHg	○/△
		4, 8, 10kPa	4kPa	
		4, 8, 10%	4%	
	$EtCO_2$ Peak Picking Duration	10, 20, 30 sec., OFF	10 sec.	○/△
	Meas. Unit	mmHg, kPa, %	mmHg	○
CO_2 (HS-720C, 702C, : Capnostat 5)	Scale	50, 100mmHg	50mmHg	○/△
		4, 8, 10kPa	4kPa	
		4, 8, 10%	4%	
	$EtCO_2$ Peak Picking Duration	10, 20sec, OFF	10sec	○/△
	Unit	mmHg, kPa, %	mmHg	○
	O_2 Comp.	0–100%	21%	○
	N_2O Comp.	ON, OFF	OFF	○
	Anesthetic Gas Comp.	0.0–20.0%	0.0%	○
	Set Atm. Pres.	400–850mmHg	760mmHg	○
CO_2 （HC-500）	Scale	50, 100mmHg	50mmHg	○/△
		4, 8, 10kPa	4kPa	
		4, 8, 10%	4%	
	Averaging	10, 20sec, OFF	10sec	○/△
	Unit	mmHg, kPa, %	mmHg	○
	CO_2 Filter	ON, OFF	OFF	○
	O_2 Comp. (>60%)	ON, OFF	OFF	○
	N_2O Comp.	ON, OFF	OFF	○
	Set Atm. Pres.	400–850mmHg	760mmHg	○
VENT	AWP Scale	10, 20, 30, 50, 120cmH_2O	50 cmH_2O	○/△
	AWF Scale	5, 10, 20, 50, 180 L/min	50L/min	○/△
Cardiac Output	Auto Start	ON, OFF	ON	○
	Time Scale	30 sec, 60 sec.	30 sec	○

Item			*Selection*	*Default*	*Backup*
Multigas (Poet IQ 8500A)	GAS_CO_2	Scale	50, 100mmHg	50mmHg	○
			4, 8, 10kPa	4kPa	
			4, 8, 10%	4%	
		Unit	mmHg, kPa, %	mmHg	○
	GAS_O_2	Scale	18-30, 18-60, 18-100, 0-30, 0-60, 0-100%	18-30%	○
	GAS_AGT	Label	ISO, HAL, ENF, SEV, DES, Auto	Auto	○
		Scale	4, 8, 16%	4%	○
	Setup	Flow Rate	100, 150, 200mL/min	100mL/min	○
		Wave Clip	ON, OFF	ON	○

Review Function Setup

Item		*Selection*	*Default*	*Backup*
Graphic Trend	Group A	HR, EVENT1, EVENT2, VPC, SpO_2, PR_ SpO_2, ST(I to V6), NIBP, TEMP1,2, TEMP3,4, TEMP5,6, TEMP7,8, Tb, BP1–8, PR_IBP, PDP, CPP, SvO_2, $ScvO_2$, CCO, CCI, BT, RR_IMP, APNEA, CO_2, RR_CO_2, RR_VENT, RR_GAS, GAS-O_2, ΔO_2, GAS-N_2O, GAS-AGT, GAS-CO_2, BIS	HR, BP1, BP2	○
	Group B		HR, RR_IMP, APNEA	○
	Group C		HR, EVENT1, EVENT2	○
	Duration	1, 2, 4, 8, 12, 24 hours	4 hours	○
	Scale	HR, PR_ SpO_2, PR_IBP: 100, 200, 300bpm ST: ±0.2, ±0.5, ±1.0, ±2.0mV ±2, ±5, ±10, ±20mm VPC: 20, 50, 100 beats BP1–8, PDP, CPP: 20, 50, 100, 150, 200, 300mmHg 4, 8, 16, 20, 24, 40kPa NIBP: 100, 150, 200, 300mmHg 16, 20, 24, 40kPa TEMP1–8, Tb: 20–45, 30–40 °C 68–113, 86–104 °F SpO_2: 0-100, 50-100, 80-100% RR_IMP, RR_VENT, RR_CO_2, RR_GAS: 50, 100, 150Bpm APNEA: 15, 30 sec. CO_2: 50, 100mmHg 4, 8, 10kPa 4, 8, 10% SvO_2: 0–100, 50–100, 80–100% $ScvO_2$: 0–100, 50–100, 80–100% CCO: 6, 12, 20L/min CCI: 6, 12, 20L/min/m^2 BT: 20–45, 30–40°C GAS_CO_2: 50, 100mmHg GAS-O_2: 50, 100% ΔO_2: 3, 4, 9% GAS-N_2O: 50, 100% GAS-AGT: 4, 8, 10%	HR: 100bpm ST: ±0.5mV ±5mm VPC: beats BP1–8: 150mmHg 20kPa NIBP: 150mmHg 20kPa TEMP1–8: 30–40 °C 86–104 °F SpO_2: 80–100% RR: 50Bpm APNEA: 15 sec. CO_2: 50mmHg 4.0kPa 4.0% SvO_2: 0–100% $ScvO_2$：0–100% CCO: 6L/min CCI: 6L/min/m^2 BT: 20-45°C GAS-CO_2: 50mmHg GAS-O_2: 50% ΔO_2: 3% GAS-N_2O: 50% GAS-AGT: 4% BIS: 0-100 fixed	○
Tabular Trend	Duration	1, 5, 10, 15, 30, 60 min.	10 min.	○
	List Setup	HR, VPC, SpO_2, PR_ SpO_2, ST (I to V6), NIBP-S/D/M, TEMP1–8, Tb, BP1–8, S/D/M, PR_IBP, PDP, CPP, PCWP, RR_IMP, APNEA, EtCO_2, InspCO_2, RR_CO_2, RR_VENT, CO, SvO_2, $ScvO_2$, CCO, CCI, BT, CO_2-E, CO_2-I, O_2-E, O_2-I, N_2O-E, N_2O-I, AGT-E, AGT-I, AGT2_E, AGT2_I, RR_GAS, BIS, BIS_SQI, BIS_EMG, BIS_SR	HR, VPC, ST(I), ST(II), BP1_S/D/M, BP2_S/D/M, SpO_2, RR_IMP, EtCO_2, RR_CO_2, APNEA, T1, T2	○
OCRG	Display Time	5, 10 min.	5 min.	○
	Waveform	Impedance Resp., CO_2	Impedance Resp.	○

Item		Selection	Default	Backup
Recall	Waveform	ECG1, ECG2, BP1–8, SpO_2, RESP, CO_2	ECG1, ECG2	○
	Recall Factor	HR (HR/SpO_2/IBP): ON, OFF ST: ON, OFF NIBP: ON, OFF BP1–8: ON, OFF RR (IMP/CO_2/VENT): ON, OFF APNEA: ON, OFF SpO_2: ON, OFF TEMP1–8: ON, OFF Tb: ON, OFF CO_2: ON, OFF ASYSTOLE: ON, OFF VF: ON, OFF VT: ON, OFF SLOW_VT: ON, OFF RUN: ON, OFF COUPLET: ON, OFF PAUSE: ON, OFF BIGEMINY: ON, OFF TRIGEMINY: ON, OFF FREQUENT: ON, OFF TACHY: ON, OFF BRADY: ON, OFF	HR (HR/SpO_2/IBP): ON ST: OFF NIBP: ON BP1–8: ON RR (IMP/CO_2/VENT): ON APNEA: ON SpO_2: ON TEMP1–8: ON Tb: ON CO_2: ON ASYSTOLE: ON VF: ON VT: ON SLOW_VT: ON RUN: ON COUPLET: ON PAUSE: ON BIGEMINY: ON TRIGEMINY: ON FREQUENT: ON TACHY: ON BRADY: ON	○
	Recall Display Selection	HR (HR/SpO_2/IBP): ON, OFF ST: ON, OFF NIBP: ON, OFF BP1–8: ON, OFF RR (IMP/CO_2/VENT): ON, OFF APNEA: ON, OFF SpO_2: ON, OFF TEMP1–8: ON, OFF Tb: ON, OFF CO_2: ON, OFF ASYSTOLE: ON, OFF VF: ON, OFF VT: ON, OFF SLOW_VT: ON, OFF RUN: ON, OFF COUPLET: ON, OFF PAUSE: ON, OFF BIGEMINY: ON, OFF TRIGEMINY: ON, OFF FREQUENT: ON, OFF TACHY: ON, OFF BRADY: ON, OFF	HR (HR/SpO_2/IBP): ON ST: OFF NIBP: ON BP1–8: ON RR (IMP/CO_2/VENT): ON APNEA: ON SpO_2: ON TEMP1–8: ON Tb: ON CO_2: ON ASYSTOLE: ON VF: ON VT: ON SLOW_VT: ON RUN: ON COUPLET: ON PAUSE: ON BIGEMINY: ON TRIGEMINY: ON FREQUENT: ON TACHY: ON BRADY: ON	○
ST Meas.	Meas. Point	0–560ms	120ms	○
	Ref. Point	0 to –240ms	–80ms	○
	HR Scale	0–100, 0–200, 0–300	0–100	○
	ST Scale	±2.0, ±5.0, ±10.0, ±20.0 (mm)	±5.0mm	○
		±0.2, ±0.5, ±1.0, ±2.0 (mV)	±0.5mV	○

Item		Selection	Default	Backup
Ventilator	P_V Curve	Volume (mL): 250, 500, 750, 1000	500mL	○
		Pressure(cmH_2O): 10, 20, 30, 50, 120	30cmH_2O	○
	F_V Curve	Flow (L/min): ±20, ±50, ±180	±180L/min	○
		Volume (mL): 250, 500, 750, 1000	500mL	○
Resp. List	Interval	1, 5, 10, 15, 30, 60 min.	10 min.	○
	List Selection	RR_IMP, APNEA, SpO_2, $EtCO_2$, RR_CO_2,RR_VENT, RR_GAS, E_TV, I_TV, MV, P_PEAK, P_PAUSE, PEEP, P_MEAN, E_RES, I_RES, COMP, FIO_2, SvO_2, $ScvO_2$, CCO, CCI, CO_2-E, CO_2-I, O_2-E, O_2-I, N_2O-E, N_2O-I, AGT-E, AGT-I, AGT2_E, AGT2_I, P_Min, S_RR	RR_IMP, APNEA, SpO_2, $EtCO_2$, RR_CO_2, RR_VENT, E_TV, I_TV, MV, P_PEAK, P_PAUSE, PEEP, P_MEAN, E_RES, I_RES, COMP, FIO_2	○
ST Graphic Trend	Group A	HR, ST(I), ST(II), ST(III), ST(aVR), ST(aVL), ST(aVF), ST(V1), ST(V2), ST(V3), ST(V4), ST(V5), ST(V6)	ST(I), ST(II), ST(III)	○
	Group B		ST(aVR), ST(aVL), ST(aVF)	○
	Group C		ST(V1), ST(V2), ST(V3)	○
	Group D		ST(V4), ST(V5), ST(V6)	○
	Time	1, 2, 4, 8, 12, 24 hours	4 hours	○
	Scale	±0.2, ±0.5, ±1.0, ±2.0mV, ±2, ±5, ±10, ±20mm	±0.5mV, ±5mm	○
Vigilance/ Vigileo List	List Setup	SvO_2, $ScvO_2$, SaO_2, O_2EI, DO_2, VO_2, 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, SVV	SvO_2, CCO, EDV, B_Temp, HR, EF, SV, CCI, EDVI, ESV, SVR, SaO_2, SVI, ESVI, SVRI, CCO_STAT, EDV_STAT	○

NOTE	● The data of graphic trend and tabular trend will be stored even when the power is turned OFF. ● The data of ST, OCRG, recall will be stored for 5 minutes even when the power is turned OFF.

System Configuration Setup

●Tone/Volume Setup

Item		Selection	Default	Backup
Tone/Volume	Pulse	Volume: 16 levels	Level 8 from left	○
		Tone: 8 types	Level 7 from left	
	Key	Volume: 16 levels	Level 10 from left	○
		Tone: 4 types	Level 3 from left	
	Alarm	Volume: 16 levels	Level 10 from left	○
		Tone: 8 types	Level 2 from left	
	Other Bed	Volume: 16 levels	Level 10 from left	○
		Tone: 9 types	Level 4 from left	
	Others	Volume: 16 levels	Level 10 from left	○
	Ventilator Alarm	ON, OFF	OFF	○

●Display Configuration (For LC-7315T)

Item		*Default Setting*	*Backup*
Display Mode		1	○
Mode 1	Display Mode	Standard	○
	Standard	Numeric: HR, BP1, BP2, SpO_2, TEMP1/2, RR-IMP, NIBP Wave: ECG1, BP overlap, SpO_2, RESP	
	12-lead	Numeric: HR, ST-A, ST-B, ST-C, BP1, BP2, SpO_2, CO_2, RR-IMP, NIBP Wave: ECG12, BP1, SpO_2, CO_2	
	Ext. 1	Numeric: HR, BP1, BP2, SpO_2, TEMP1/2, RR-IMP, NIBP, VPC+PACE, ST-A, NIBP_LIST Wave: ECG1, BP overlap, SpO_2, RESP	
	Ext. 2	Numeric: HR, BP1, BP2, BP3, BP4, SpO_2, TEMP1/2, TEMP3/4, CO_2, RR-IMP, NIBP Wave: ECG1, BP overlap, SpO_2, RESP, CO_2	
	Enlarged Display	Numeric: HR, SpO_2, RR-IMP, NIBP Wave: ECG1, SpO_2, RESP	
	BP Overlap	BP1, BP2, BP3, BP4	
	Block Cascade	ECG1, ECG2	
	Comment	CONFIG. 1	
	Short Trend	OFF	
	Grid	OFF	
	Wave Line	Medium	
	Clip Wave	OFF	
	GAS_CO_2 Waveform	Unfill	
Mode 2	Display Mode	Ext. 2	○
	Standard	Numeric: HR, BP1, BP2, SpO_2, TEMP1/2, RR-IMP, NIBP Wave: ECG1, BP overlap, SpO_2, RESP	
	12-lead	Numeric: HR, ST-A, ST-B, ST-C, BP1, BP2, SpO_2, CO_2, RR-IMP, NIBP Wave: ECG12, BP1, SpO_2, CO_2	
	Ext. 1	Numeric: HR, BP1, BP2, SpO_2, TEMP1/2, RR-IMP, NIBP, VPC+PACE, ST-A, NIBP_LIST Wave: ECG1, BP overlap, SpO_2, RESP	
	Ext. 2	Numeric: HR, BP1, BP2, BP3, BP4, SpO_2, TEMP1/2, TEMP3/4, CO_2, RR-IMP, NIBP Wave: ECG1, BP overlap, SpO_2, RESP, CO_2	
	Enlarged Display	Numeric: HR, SpO_2, RR-IMP, NIBP Wave: ECG1, SpO_2, RESP	
	BP Overlap	BP1, BP2, BP3, BP4	
	Block Cascade	ECG1, ECG2	
	Comment	CONFIG. 2	
	Short Trend	OFF	
	Grid	OFF	
	Wave Line	Medium	
	Clip Wave	OFF	
	GAS_CO_2 Waveform	Unfill	

Item		*Default Setting*	*Backup*
Mode 3	Display Mode	Standard	○
	Standard	Numeric: HR, BP1, BP2, BP3, BP4, SpO_2, TEMP1/2, CO_2, RR-IMP, NIBP Wave: ECG1, BP overlap, SpO_2, CO_2, RESP	
	12-lead	Numeric: HR, ST-A, ST-B, ST-C, BP1, BP2, SpO_2, CO_2, RR-IMP, NIBP Wave: ECG12, BP1, SpO_2, CO_2	
	Ext. 1	Numeric: HR, BP1, BP2, SpO_2, TEMP1/2, RR-IMP, NIBP, VPC+PACE, ST-A, NIBP LIST Wave: ECG1, BP overlap, SpO_2, RESP	
	Ext. 2	Numeric: HR, BP1, BP2, BP3, BP4, SpO_2 TEMP1/2, TEMP3/4, CO_2, RR-IMP, NIBP Wave: ECG1, BP overlap, SpO_2, RESP, CO_2	
	Enlarged Display	Numeric: HR, SpO_2, RR-IMP, NIBP Wave: ECG1, SpO_2, RESP	
	BP Overlap	BP1, BP2, BP3, BP4	
	Block Cascade	ECG1, ECG2	
	Comment	CONFIG. 3	
	Short Trend	OFF	
	Grid	OFF	
	Wave Line	Medium	
	Clip Wave	OFF	
	GAS_CO_2 Waveform	Unfill	
Mode 4	Display Mode	12-lead	○
	Standard	Numeric: HR, BP1, BP2, SpO_2, TEMP1/2, RR-IMP, NIBP Wave: ECG1, BP overlap, SpO_2, RESP	
	12-lead	Numeric: HR, ST-A, ST-B, ST-C, BP1, BP2, SpO_2, CO_2, RR-IMP, NIBP Wave: ECG12, BP1, SpO_2, CO_2	
	Ext. 1	Numeric: HR, BP1, BP2, SpO_2, TEMP1/2, RR-IMP, NIBP, VPC+PACE, ST-A, NIBP_LIST Wave: ECG1, BP overlap, SpO_2, RESP	
	Ext. 2	Numeric: HR, BP1, BP2, BP3, BP4, SpO_2, TEMP1/2, TEMP3/4, CO_2, RR-IMP, NIBP Wave: ECG1, BP overlap, SpO_2, RESP, CO_2	
	Enlarged Display	Numeric: HR, SpO_2, RR-IMP, NIBP Wave: ECG1, SpO_2, RESP	
	BP Overlap	BP1, BP2, BP3, BP4	
	Block Cascade	ECG1, ECG2	
	Comment	CONFIG. 4	
	Short Trend	OFF	
	Grid	OFF	
	Wave Line	Medium	
	Clip Wave	OFF	
	GAS_CO_2 Waveform	Unfill	

Item		*Default Setting*	*Backup*
Mode 5	Display Mode	Standard	○
	Standard	Numeric: HR, BP1, BP2, SpO_2, TEMP1/2, RR-IMP, NIBP Wave: ECG1, ECG2, BP overlap, SpO_2, Trend (6 rows)	
	12-lead	Numeric: HR, ST-A, ST-B, ST-C, BP1, BP2, SpO_2, CO_2, RR-IMP, NIBP Wave: ECG12, BP1, SpO_2, CO_2	
	Ext. 1	Numeric: HR, BP1, BP2, SpO_2, TEMP1/2, RR-IMP, NIBP, VPC+PACE, ST-A, NIBP_LIST Wave: ECG1, BP overlap, SpO_2, RESP	
	Ext. 2	Numeric: HR, BP1, BP2, BP3, BP4, SpO_2, TEMP1/2, TEMP3/4, CO_2, RR-IMP, NIBP Wave: ECG1, BP overlap, SpO_2, RESP, CO_2	
	Enlarged Display	Numeric: HR, SpO_2, RR-IMP, NIBP Wave: ECG1, SpO_2, RESP	
	BP Overlap	BP1, BP2, BP3, BP4	
	Block Cascade	ECG1, ECG2	
	Comment	CONFIG. 5	
	Short Trend	OFF	
	Grid	OFF	
	Wave Line	Medium	
	Clip Wave	OFF	
	GAS_CO_2 Waveform	Unfill	

NOTE	If [Backup] is selected for "Backup at Discharge" of the monitor setup menu, the set value will be stored even after the discharge procedure is performed. If [Initial] is selected, the display configuration will be initialized with the selected display mode.

●Display Configuration (For LC-7319T)

Item		*Default Setting*	*Backup*
Display Mode		1	○
Mode 1	Display Mode	Standard	○
	Standard	Numeric: HR, BP1, BP2, SpO_2+PR, TEMP1/2, RR-IMP, NIBP Wave: ECG1, BP overlap, SpO_2, RESP Width: Wide	
	12-lead	Numeric: HR, ST-A, ST-B, ST-C, BP1, BP2, SpO_2+PR, CO_2, RR-IMP, NIBP Wave: ECG12, BP overlap, SpO_2, RESP	
	Enlarged Display	Numeric: HR, BP1, BP2, SpO_2, PR, NIBP, RR_IMP, TEMP1/2 Wave: ECG1, BP overlap, SpO_2, RESP	
	BP Overlap	BP1, BP2, BP3, BP4	
	Block Cascade	ECG1, ECG2	
	Comment	CONFIG. 1	
	Short Trend	OFF	
	Grid	OFF	
	Wave Line	Medium	
	Clip Wave	OFF	
	GAS_CO_2 Waveform	Unfill	
Mode 2	Display Mode	Standard	○
	Standard	Numeric: HR, SpO_2+PR, RR-IMP, NIBP, NIBP LIST Wave: ECG1, SpO_2, RESP Width: Wide	
	12-lead	Numeric: HR, ST-A, ST-B, ST-C, BP1, BP2, SpO_2, RR-IMP, NIBP Wave: ECG12, BP overlap, SpO_2, RESP	
	Enlarged Display	Numeric: HR, BP1, BP2, SpO_2, PR, NIBP, RR_IMP, TEMP1/2 Wave: ECG1, BP overlap, SpO_2, RESP	
	BP Overlap	BP1, BP2, BP3, BP4	
	Block Cascade	ECG1, ECG2	
	Comment	CONFIG. 2	
	Short Trend	OFF	
	Grid	OFF	
	Wave Line	Medium	
	Clip Wave	OFF	
	GAS_CO_2 Waveform	Unfill	
Mode 3	Display Mode	Standard	○
	Standard	Numeric: HR, BP1, BP2, BP3, BP4, SpO_2+PR, TEMP1/2, CO_2, RR-CO_2, NIBP Wave: ECG1, BP overlap, SpO_2, CO_2 Width: Wide	
	12-lead	Numeric: HR, ST-A, ST-B, ST-C, BP1, BP2, SpO_2, RR-IMP, NIBP Wave: ECG12, BP overlap, SpO_2, RESP	
	Enlarged Display	Numeric: HR, BP1, BP2, SpO_2, PR, NIBP, RR_IMP, TEMP1/2 Wave: ECG1, BP overlap, SpO_2, RESP	
	BP Overlap	BP1, BP2, BP3, BP4	
	Block Cascade	ECG1, ECG2	
	Comment	CONFIG. 3	
	Short Trend	OFF	
	Grid	OFF	
	Wave Line	Medium	
	Clip Wave	OFF	
	GAS_CO_2 Waveform	Unfill	

Item		*Default Setting*	*Backup*
Mode 4	Display Mode	12-lead	○
	Standard	Numeric: HR, BP1, BP2, BP3, BP4, SpO_2+PR, TEMP1/2, VENT, CO_2, RR-CO_2, NIBP Wave: ECG1, BP overlap, SpO_2, AWP, AWF, CO_2 Width: Wide	
	12-lead	Numeric: HR, ST-A, ST-B, ST-C, BP1, BP2, SpO_2, RR-IMP, NIBP Wave: ECG12, BP overlap, SpO_2, RESP	
	Enlarged Display	Numeric: HR, BP1, BP2, SpO_2, PR, NIBP, RR_IMP, TEMP1/2 Wave: ECG1, BP overlap, SpO_2, RESP	
	BP Overlap	BP1, BP2, BP3, BP4	
	Block Cascade	ECG1, ECG2	
	Comment	CONFIG. 4	
	Short Trend	OFF	
	Grid	OFF	
	Wave Line	Medium	
	Clip Wave	OFF	
	GAS_CO_2 Waveform	Unfill	
Mode 5	Display Mode	Standard	○
	Standard	Numeric: HR, VPC+PACE, BP1, BP2, SpO_2+PR, TEMP1/2, ST-A, ST-B, ST-C, RR-IMP, NIBP Wave: ECG1–12, BP overlap, SpO_2, RESP Width: Wide	
	12-lead	Numeric: HR, ST-A, ST-B, ST-C, BP1, BP2, SpO_2, CO_2, RR-IMP, NIBP Wave: ECG12, BP overlap, SpO_2, RESP	
	Enlarged Display	Numeric: HR, BP1, BP2, SpO_2, PR, NIBP, RR_IMP, TEMP1/2 Wave: ECG1, BP overlap, SpO_2, RESP	
	BP Overlap	BP1, BP2, BP3, BP4	
	Block Cascade	ECG1, ECG2	
	Comment	CONFIG. 5	
	Short Trend	OFF	
	Grid	OFF	
	Wave Line	Medium	
	Clip Wave	OFF	
	GAS_CO_2 Waveform	Unfill	

NOTE	If [Backup] is selected for “Backup at Discharge” of the monitor setup menu, the set value will be stored even after the discharge procedure is performed. If [Initial] is selected, the display configuration will be initialized with the selected display mode.

●System Configuration Menu

Item		*Selection*	*Default*	*Backup*
Manual Recording	Rec. Select	HS, IB, Cent., 8ch	HS	○
	Wave Select	ECG1, ECG2, BP1–8, SpO_2, RESP, CO_2, AWF, AWP	ECG1	○
	Rec. Duration	24 sec., Cont., Page	24 sec.	○
	Delay Time	None, 8sec., 16 sec.	8 sec.	○
Alarm Recording	Alarm Record	ON, OFF	OFF	○
	Rec. Select	HS, IB, Cent., 8ch	HS	○
	Wave Select	ECG1, ECG2, BP1–8, SpO_2, RESP, CO_2, AWF, AWP, Alarm Factor	ECG1, Alarm Factor	○
	Rec. Duration	12, 24 sec., Page	12 sec.	○
	Alarm Factor	HR (HR/PR/BPR) Numeric Data, Arrhythmia	HR (HR/PR/BPR) Arrhythmia	○
	Arrhythmia Record	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	○
Periodic Recording	Periodic Record	ON, OFF	OFF	○
	Rec. Select	HS, IB, Cent., 8ch	HS	○
	Wave Select	ECG1, ECG2, BP1–8, SpO_2, RESP, CO_2, AWF, AWP	ECG1	○
	Periodic Interval	Inter., Timer	Timer	
	Interval	5, 10, 15, 30, 60 min.	120 min.	○
	Timer	0:00 to 23:00 (1:00 interval)	None	○
	Rec. Duration	6, 12, 24 sec., Page	12 sec.	○
Record Setup	QRS Classification	ON, OFF	OFF	○
	Graphic Output Recorder	HS, Cent.	HS	○
	HS Recorder	Feed: Both, Top, End, OFF	End	○
		Speed 50mm/s, 25mm/s	25mm/s	○
		12-lead Wave: 3 wave × 4, 2 wave × 6	3 wave×4	○
		Print Calibration: Top, Each Page, OFF	OFF	○
	8ch Recorder	Rec. No: 1 to 8	1	○
		Speed 50mm/s, 25mm/s, 10mm/s, 25mm/m, 10mm/m	25mm/s	○
	Recall Recording	Graphic Recording, Manual Recording	Graphic Recording	○
	HS Recorder	Yes, No	Yes	○
Sweep Speed	ECG, BP, SpO_2	50, 25, 12.5, 6.25mm/S	25mm/S	○
	RESP	25, 12.5, 6.25mm/S	6.25mm/S	○
Night Mode	Mode	Manual, Auto	Manual	○
	Start Time	00:00 to 23:59	21:00	○
	Complete Time	00:00 to 23:59	7:00	○
	Volume	No change, Quiet, Very quiet, Silence	Very quiet	○
	Display	No change, Time Disp. Only, Slightly Dark, Dark	Dark	○
	Alarm Pole	ON, OFF	OFF	○

Item		Selection	Default	Backup
Color	ECG/HR	32 colors	Green	○
	ST		Green	○
	VPC		White	○
	PACE		White	○
	BP1		Red	○
	BP2		Cyan	○
	BP3		Yellow	○
	BP4		Green	○
	BP5		Orange	○
	BP6		Mazenta	○
	BP7		Blue	○
	BP8		Light Green	○
	NIBP		Cyan	○
	SpO_2		Yellow	○
	TEMP1–8		Orange	○
	RESP		White	○
	CO_2		Cyan	○
	AWF		Cyan	○
	AWP		Orange	○
	SvO_2+CO		White	○
	STOPWATCH		White	○
	BIS		White	○
	Mouse		White	○
Brightness	Brightness	7 levels	Level 5 from left	○
ST Display Lead Setup	ST_A	I, II, III, aVR, aVL, aVF, V1–V6	I, II, III, aVR	○
	ST_B		aVL, aVF, V1, V2	○
	ST_C		V3, V4, V5, V6	○
Other Bed Alarm		1–48 beds ON/OFF	All Beds OFF	○
BP User Label	User 1	3 alphanumeric letters	US1	○
	User 2		US2	
TEMP User Label	User 1	3 alphanumeric letters	US1	○
	User 2		US2	
	User 3		US3	
	User 4		US4	
Telemetry Wave Setup		ECG1, ECG1+2	ECG1	○
STOP WATCH Label	1	8 alphanumeric letters	TIMER1	○
	2		TIMER2	○

●Hospital Setup

Item		*Selection*	*Default*	*Backup*
Date		07/19, Jul.19, 19.Jul	07/19	○
Alarm Mute		ON, OFF	OFF	○
Arrhy. Analysis Filter		Disp Waveform, Fixed	Disp Waveform	
Trend Clip		ON, OFF	ON	○
BP Record Scale		20, 40mm	40mm	○
Suspend Arrhy. Analysis during Noise Interference		ON, OFF	OFF	○
MEAN Calculation		Waveform, Calculation	Waveform	○
Night Mode Cancel		Any Key, Night Mode Key	Any Key	○
Asystole, VF, VT		ON, ON/OFF	ON	○
DS-LAN Pat. ID Tx		1st to 11th character	1st character	○
Admit/Disch Key Setup		Full, Light	Full	○
Password for Alarm Setup		ON, OFF	OFF	○
Serial Comm. Setup	COM1	OFF, HLX-501, BIS	OFF ＊	○
	COM2		OFF ＊	○
	COM3		OFF ＊	○
NIBP Data Erase Time		10, 30, 60 min, 24 min	60 min	○
Status Output Setup	Sync. Signal Output	HR, RR	HR ＊	○
		Positive Logic, Negative Logic	Positive Logic ＊	○
	Alarm Output	OFF, APNEA, Level 1, Level 1 and 2, Level 1, 2 and 3	Level 1 ＊	○
		Positive Logic, Negative Logic, Pulse	Positive Logic ＊	○
Unit	BP	mmHg, kPa	mmHg	○
	CVP	mmHg/kPa, cmH_2O	mmHg/kPa	
	TEMP	°C, °F	°C	○
	ST	mm, mV	mm	○
Telemeter	Channel	1001–1080, 2001–2120 3001–3040, 4001–4080 5001–5080, 6001–6080	Depends on the telemetry module	○
	Group	00–63	00 ＊	○

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.

●Monitor Setup

Item		*Selection*	*Default*	*Backup*
Message Icon		ON, OFF	OFF	○
Check Discharge at Power ON		ON, OFF	ON	○
Password		ON, OFF	OFF	○
Discharge Mode		Admit, Cease	Admit	○
Event Key		ON, OFF	ON	○
Drift Filter Display/Exp. clock display		Drift Filter Display/Exp. clock display	Drift Filter Display	○
HR/PR Alarm Source		ECG/SpO_2, ECG/SpO_2/BP	ECG/SpO_2	○
Input Box (IB-7300)		Yes, No	No*	○
Freeze Mode Cursor		ON, OFF	ON	○
Device Configuration Icon		ON, OFF	OFF	○
Parameter Key Operation		Store, Not Store	Not Store	○
BP Alarm Increment		Normal, Small	Normal	○
CO_2 (mmHg) Upper Limit for LAN, Telemetry		No limit, 99mmHg	99mmHg	○
AU-5500N Administrator Mode		OFF, ON	OFF	○
NIBP Measurement Interval at Power ON		According to setup, 2.5min. when OFF 5min. when OFF	According to setup	○
NIBP Measurement at Power ON		According to setup, Resume Manually	According to setup	○
Built-in Rec. Status Display		ON, OFF	ON	○
Vigilance/Vigileo SVR, SVRI Calc.		Vigilance, DSC-7300	Vigilance	○
DS-LAN Setup		DS-LANII (10Mbps), DS-LANIII (100Mbps)	DS-LANII (10Mbps) ＊	○
Auditory Alarm Signal		FUKUDA DENSHI, IEC	FUKUDA DENSHI	○
Super Module Setup		Fixed, Manual	Fixed	○
Multiport Connection	Port A	OFF, SV-300, Servo- i/s, PB-740/760/840, PB-7200, Evita4/XL/2dura, Savina, Vigilance/Vigileo, Oximetrix3, Q-vue, Q2 Computer	OFF	○
	Port B	OFF, SV-300, Servo- i/s, Evita4/XL/2dura, Savina, Vigilance/Vigileo, Oximetrix3, Q-vue, Q2 Computer	OFF	○
Serial Connection		OFF, Poet IQ 8500A, SV-300, Servo-i/s, PB-740/760/840, Evita4/XL/2dura, Vigilance/Vigileo	OFF	○
Key Mask	Menu	All Key (excluding function, system config.)	All Key	○
	Function	All Key	All Key	○
	System Config.	All Key (excluding pre-set)	All Key	○
	Pre-Set Menu	All Key	All Key	○

Item		Selection	Default	Backup
User Key	Selection	OFF, Other Key, Alarm Silence, Rec. START/STOP, Admit/Discharge, Cease, Freeze, Key Lock, Rapid Discharge, Graphic Trend, Tabular Trend, NIBP List, Recall, OCRG, ST Graphic, ST Tabular, ST Display, Resp. List, Hemodynamic, Cardiac Output, Ventilator, Night Mode, Other Bed, Vigilance List, Parameter, Size/Scale, HR Source, BP Zero, PCWP, NIBP Auto Mode, SpO_2 Disp ON/OFF, CO_2 Disp ON/OFF, GAS Disp ON/OFF, Suspend CO_2, Alarm, HR Alarm, Alarm Auto, Alarm Suspend, Recorder Setup, Manual Record, Record, Display Config., Optimize Display, Tone/Volume, Mode Select, Display 1, Display 2, Display 3	(from left) For LC-7315T Alarm Silence Record START/STOP Size/Scale Admit/Discharge Freeze Key Lock Alarm NIBP Auto Mode For LC-7319T (1/2) Admit/Discharge Alarm Size/Scale NIBP Auto Mode BP Zero OFF OFF Other Key Record START/STOP Alarm Silence (2/2) Display 1 Display 2 Display 3 Graphic Trend Tabular Trend NIBP List Recall Other Key Record START/STOP Alarm Silence	○
	Key Size	Large, Small	Small	○
Alarm Pole	Alarm Pole	ON, OFF, Pulse Tone	ON	○
	Alarm Level	Level 1, Level 1 and 2, Level 1, 2, and 3, Ventilator	Level 1	○
	Ventilator Alarm	ON, OFF	ON	○
	Pattern Setup	Pattern 1 to 10	Level 1: Pattern 1 Level 2: Pattern 10 Level 3: Pattern 4 Ventilator: Pattern 1	○
	Sync. with HR	ON, OFF	OFF	○
Menu Setup	Function	Graphic Trend, Tabular Trend, NIBP List, Recall, OCRG, ST Display, ST Graphic Trend, ST Tabular Trend, Resp. List, Hemodynamic, Cardiac Output, Ventilator, Night Mode, Other Bed Display, Vigilance/Vigileo List, OFF	Graphic Trend, Tabular Trend, NIBP List, Recall, OCRG, ST Display, ST Graphic Trend, ST Tabular Trend, Resp. List, Hemodynamic, Cardiac Output, Ventilator, Night Mode, Other Bed Display, OFF	○

Item		Selection	Default	Backup
Menu Setup	Configuration	Display Config., Sweep Speed, Tone/Volume, Record, Color, Brightness Setup, Night Mode Setup, Graphic Trend Setup, Tabular Trend Setup, Resp. List Setup, Recall Setup, ST Graphic Trend Setup, ST Disp. Lead Setup, Set Other Alarm, Bed ID, BP User Label, TEMP User Label, CF Card, Telemetry Wave Setup, Vigilance List Setup, OFF	Tone/Volume, Display Config., Record, Sweep Speed, Color, Night Mode Setup, CF Card, Brightness Setup, ST Disp. Lead Setup	○
Display Optim. Setup	Priority		(From higher priority) HR, BP1, BP2, BP3, BP4, SpO_2, PR_SpO_2, TEMP1·2, CO_2, GAS, RR, VENT, NIBP, HL-500, BP5, BP6, BP7, BP8, TEMP3·4, TEMP5·6, TEMP7·8, Tb, EEG	○
	BP Format	Overlap, Separate	Overlap	○
Input Box Setup	Slot 1–6	HB-500, HC-500, HF-500, HR-500	All OFF	○
	CO_2 Module Priority	HC-500, Super Module	HC-500	○
	CO Module Priority	HF-500, Super Module	HF-500	○
Backup at Discharge	Display Config.	Backup, Initial	Initial	○
	Alarm	Backup, Initial	Initial	○
	ECG1, ECG2 Lead	Backup, Initial	Initial	○
	CVA Set	Backup, OFF	OFF	○
	Impedance Resp. ON/OFF	Backup, Initial	Initial	○
	BP Scale	Backup, Initial	Initial	○
	NIBP Auto Mode	Backup, OFF, Backup (Resume auto mode by manual measurement)	OFF	○
	CO_2 Averaging	Backup, 10sec.	10 sec.	○
	CO_2 Scale	Backup, Initial	Initial	○
Mouse Setup	Mouse	ON, OFF	ON	○
	Auto Erase of Pointer	ON, OFF	ON	○
	Pointer			○
	Moving Speed	5 levels	2nd from left	○

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.

Alarm Mode Setup

Item		*Selection*	*Backup*
Alarm Mode		1	
Alarm Mode 1–5	HR	ON, 40–120	
	ASYSTOLE	ON, 5 sec.	
	VF	ON	
	VT	ON	
	SLOW_VT	ON	
	RUN	ON, 3 beats	
	COUPLET	OFF	
	PAUSE	OFF, 3.0 sec.	
	BIGEMINY	OFF	
	TRIGEMINY	OFF	
	FREQUENT	OFF, 10 beats	
	TACHY	ON	
	BRADY	ON	
	HR Low Limit for VT	120bpm	
	HR Low Limit for RUN	40bpm	
	STI, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6	All Alarm OFF Indiv. Alarm OFF OFF–OFF	
	BP1	ON SYS 80–180 DIA OFF–OFF MEAN OFF–OFF	○
	BP2–8	OFF SYS OFF–OFF DIA OFF–OFF MEAN OFF–OFF	
	RR	ON 5–30	
	APNEA	ON, 15 sec.	
	SpO_2	ON, 90–OFF SEC Alarm, OFF	
	NIBP	ON SYS 80–180 DIA OFF–OFF MAP OFF–OFF	
	TEMP1–8, Tb	OFF OFF–OFF	
	$EtCO_2$	ON 30–45mmHg 4.0–6.0kPa 4.0–6.0%	
	$InspCO_2$	ON 3mmHg 0.4kPa 0.4%	

This section explains the connector pin assignments.

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 Transmission 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	——

Status I/O Signal (Status II Connector)

No.	*Signal Type*	*Description*	*Signal Level*
1	STATUS-OUT	Reserved	Logic TTL
2	ALM_OUT2+	Alarm Output 2+ (Isolation)	Photo MOS Relay Contact
3	TxD	Serial Transmit Data Output	RS232C
4	RxD / ALARM 1IN	Serial Receive Data Input / Alarm Input 1 under 25V (against GND)	RS232C / Logic
5	ALARM 2IN+ (Logic)	Alarm Input 2+ (Isolation)	Logic Input (5mA)
6	ALARM 2IN– (Return)	Alarm Input 2– Return (Isolation)	Return
7	+5V	+5V	+5V power supply (150mA)
8	ALM_OUT2–	Alarm Input 2– (Isolation)	Photo MOS Relay Contact
9	GND	Power Supply Digital GND	——

* If isolation is necessary for RS-232C and status connector, use alarm input 2 and output 2.

Chapter 12
Accessories

Accessories

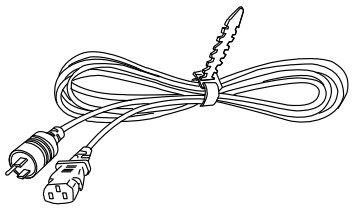
This section lists the accessories for the DS-7300 system.

⚠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

DSC-7300 Main Unit

Power Cable: CS-24 (3m)



⚠CAUTION	When the product is used in regions whose voltage is other than 220-240V, a cable appropriate to the regulations and voltage of the country in which the product is being used shall be used.

Display Unit Connection Cable: CJ-731A (0.35m)

Module Connection Cable: CJ-732B (0.7m)

DS-7300 System Operation Manual

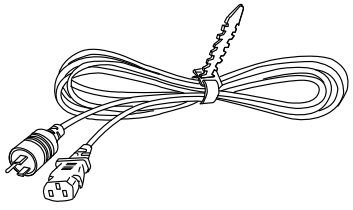
LC-7315T (LC-7319T) Display Unit

Cleaning Cloth

LC-7315T (LC-7319T) Operation Manual

HS-700 Super Module

Power Cable: CS-24 (3m)



⚠CAUTION	When the product is used in regions whose voltage is other than 220-240V, a cable appropriate to the regulations and voltage of the country in which the product is being used shall be used.

HS-700 Operation Manual

Optional Accessories

The following products are available as optional accessories for the DS-7300 system. Purchase them as required.

⚠CAUTION	● Use only the accessories specified for this device. Otherwise, proper function cannot be executed. ● For quality improvement, specifications are subject to change without prior notice.

ECG, Impedance Respiration Measurement (HS-700 Series)

Item	*Model Type*	*Description*
ECG Lead Cable	3380.0648.13	3-electrode (limb) AAMI
ECG Lead Cable	500398800	4-electrode
ECG Lead Cable	3380.0661.13	10-electrode / 5-electrode (limb) AAMI
ECG Lead Cable	3380.0661.15	10-electrode / 5-electrode (limb) AAMI
ECG Lead Cable	500403200	5-electrode (chest) AAMI
ECG Relay Cable	CI-700D-3 (FA)	3-electrode (defibrillation-proof)
ECG Relay Cable	CI-700E-3 (FA)	3-electrode (electrosurgery-proof) *
ECG Relay Cable	CI-700D-4 (FA)	4-electrode (defibrillation-proof)
ECG Relay Cable	CI-700E-4 (FA)	4-electrode (electrosurgery-proof) *
ECG Relay Cable	CI-700D-5 (FA)	5-electrode (defibrillation-proof)
ECG Relay Cable	CI-700E-5 (FA)	5-electrode (electrosurgery-proof) *
ECG Relay Cable	500403000	10-electrode AAMI

⚠CAUTION	* Fukuda Denshi recommends using the electrosurgery-proof type ECG relay cable during electrosurgery. However, when using the electrosurgery-proof type ECG relay cable, respiration measurement cannot be performed.

Invasive Blood Pressure Measurement (HS-700 Series)

Item	*Model Type*	*Description*
Interface Cable (for CDX III / Press)	CJ-369	For use with Argon Medical Devices CDX III / Press Disposable Pressure Transducers
Interface Cable (for DTX Plus)	CJ-410	For use with Becton-Dickinson DTX Plus Disposable Pressure Transducers
Interface Cable (for TruWave)	CJ-428	For use with Edwards TruWave Disposable Pressure Transducers
BP Transducer	P-23XL	
BP Transducer	P-10EZ	
2ch BP Conversion Cable	CJ-7546	

Non-Invasive Blood Pressure Measurement (HS-700 Series)

Item	*Model Type*	*Description*
Adult Cuff (Large)	CUF-7101	
Adult Cuff (Medium)	CUF-7102A	
Adult Cuff (Small)	CUF-7103	
Pediatric Cuff	CUF-7104	
Infant Cuff	CUF-7105	
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	
BP Conversion Socket	CUFJ-MO1	for connection to neonate cuff

Temperature Measurement (HS-700 Series)

Item	*Model Type*	*Q'ty*	*Description*
Rectal Temperature Probe (for adult)	401J	1	
Rectal Temperature Probe (for pediatric)	402J	1	
Body Surface Temperature Probe	409J	1	
Probe Cover	70 14 616	10	
2ch Temperature Relay Cable	CJ-7414	1	

SpO_2 Measurement (HS-710, 710E, 720, 720E, 720C, 702C, 702E)

Item	*Model Type*	*Description*
SpO_2 DURASENSOR®	DS-100A	
SpO_2 OXISENSOR® III	D-25	24 per box
SpO_2 OXISENSOR® III	D-20	24 per box
SpO_2 OXISENSOR® III	I-20	24 per box
SpO_2 OXISENSOR® III	N-25	24 per box
SpO_2 OXISENSOR® III	R-15	24 per box
MAX-PACi	MAX-PACi	D-25x2, N-25x2
MAX-FAST	MAX-FAST	24 per box
SpO_2 Relay Cable	DOC-10	

CO Measurement

Item	*Model Type*	*Description*
Catheter Relay Cable	CJ-7382	
Flow-through Sensor Relay Cable	CJ-7413	
In-line Sensor Relay Cable	CJ-7412	
Injectate Probe Relay Cable	CJ-7411	

CO_2 Concentration Measurement (HS-710E, 720E, 702E)

Item	*Oridion P.N.*	*Note*
Intubated $EtCO_2$		
Filterline® H Set (Adult/Pediatric)	XS04624	with Nafion, adapter
Filterline® H Set (Infant/Neonate)	006324	with Nafion, adapter
Filterline® H Set (Adult/Pediatric)	XS04620	with adapter
Non-Intubated O_2 and $EtCO_2$		
Smart CapnoLine® Plus (Adult/Intermediate)	009822	for oral/nasal, with oxygen delivery
Smart CapnoLine® (Pediatric)	007269	for oral/nasal, with oxygen delivery
CapnoLine H (Adult)	008180	for nasal, with Nafion, oxygen delivery
CapnoLine H (Pediatric)	008181	for nasal, with Nafion, oxygen delivery
Non-Intubated $EtCO_2$		
Smart CapnoLine Plus (Adult/Intermediate)	009818	for oral/nasal
Smart CapnoLine (Pediatric)	007266	for oral/nasal
CapnoLine H (Adult)	008177	for nasal, with Nafion
CapnoLine H (Pediatric)	008178	for nasal, with Nafion
CapnoLine H (Infant/Neonate)	008179	for nasal, with Nafion
NIV Line (Adult)	008174	for nasal
NIV Line (Pediatric)	008175	for nasal

Calibration Accessories

Item	*Model Type*	*Description*
Calibration kit	0304653ORFBD	The calibration kit includes: 1.Calibration Gas Canister (5%CO_2, 21% O_2, Bal.N_2) 2. T-piece connector 3. Calibration FilterLine®

⚠CAUTION	There are various types of sampling products available. For details, refer to our service representative.

CO_2 Concentration Measurement (HS-720C, 702C: RESPIRONICS® Sensor)

Item	*Model Type*	*Description*
CO_2 Sensor Capnostat 5	1015928	
Airway Adapter (Adult)	7007	
Airway Adapter (Neonate)	7053	
Airway Adapter (Disposable, Adult)	6063	10 per box
Airway Adapter (Disposable, Neonate)	6312	10 per box

Others

Item	*Model Type*	*Description*
Ground Cable	CE-12	
Display Unit Connection Cable	CJ-731A	0.35m
	CJ-731B	2.5m
	CJ-731C	6m
	CJ-731D	10m
Module Connection Cable	CJ-732A	0.3m
	CJ-732B	0.7m
	CJ-732C	5m
	CJ-732D	10m
	CJ-732E	20m
RS-232C Cable (N type)	CJ-331	
RS-232C Cable (R type)	CJ-325	
RS-232C Cable (Cross)	CJ-725	For serial communication
LAN Branch Cable (for DS-LAN)	CJ-522A	1m
	CJ-522B	2m
	CJ-522C	4m
	CJ-522D	10m
	CJ-522E	20m
Connection Cable (for DS-LAN)	CJ-530A	2.5m
	CJ-530B	5m
	CJ-530C	10m
Digital Display Connection Cable (for slave monitor digital connection)	CJZ-01SS3	3m
	CJZ-01SS5	5m
	CJZ-01SS10	10m
Multiport Relay Cable	CJM-01SR0.6	
Flash Memory Card (CF Card)	FCF-128	
Recording Paper	OP-124TE	
Cleaning Cloth	OA-57	
Air Filter	OA-485	For HS/IB cooling fan. (10 in each pack)
Mouse (PS/2 Mouse)	—	Use the product recommended by Fukuda Denshi. (For LC-7319T only.)
Telemetry Transmitter Module	HLX-561	
DS-7300 Mounting Bracket	OA-469	
Relay Cable Mounting Bracket	OA-470	For HS-700
GCX Plate Adapter	OA-473	For HS-700
Cable Holder	OA-484	For HS-700
Mounting Bracket	OAO-07A	For HS-700/IB-7300

【External Equipment Connection Cable】

External Equipment	*Model Type*	*Description*
For multiport relay cable connection		
SV-300	CJ-514	
Servo-i / Servo-s, VigilanceII / Vigileo	CJ-584	
PB-7200ae / 7200e	CJ-518, CJ-525A	
PB-740 / 760 / 840	CJO-02RR4, CJ-527	
Evita 4 / XL / 2 dura / Savina	CJ-583	
Vigilance, Vigilance CEDV	CJ-515	
OXIMETRIX3	CJ-516	
Q-vue	CJ-517	
Q2 Computer	CJ-582	
For Super Module serial connector connection		
SV-300	CJ-501	
PB-740 / 760 / 840	CJ-504	
Servo-i / Servo-s, Evita 4 / XL / 2 dura / Savina, VigilanceII / Vigileo	CJ-502	
Vigilance, Vigilance CEDV	CJO-04RS4	
Poet IQ 8500A	Po-1452	90cm
	Po-1453	3m
For DSC-7300 serial connector connection		
BIS	CJO-03RS4	

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FUKUDA DENSHI CO.,LTD.

39-4, Hongo, 3-chome, Bunkyo-ku, Tokyo, Japan
Phone:+81-3-3815-2121 Fax:+81-3-3814-1222

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