

Product Information

- Product Model: BioVision
- Product Name: Central monitoring system
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CE mark



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Statement

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The contents contained in this manual are subject to amendments without notification.

Manufacturer's Responsibility

Only under the following circumstances will manufacturer be responsible for the safety, reliability and performance of the instrument:

- ☐ All the installation, expansion, readjustment, renovation or repairs are conducted by the personnel certified by manufacturer.
- ☐ All the replaced components, assorted accessories and consumables used in maintenance are original or approved by Biolight.
- ☐ Relevant electrical equipment meets the requirements of national standards and this manual;
- ☐ The instrument is used in accordance with the user's manual.

Signs in this manual:



WARNING: Indicates a potential hazard or unsafe practice that, if not avoided, will result in death or serious injury.



CAUTION: Indicates a potential hazard or unsafe practice that, if not avoided, could result in minor personal injury or product/property damage.



NOTE: Provides application tips or other useful information to ensure that you get the most from your product.

Warranty and maintenance service

The warranty period for the purchased products shall be subject to the sales contract. The consumables means disposable consumables material needed to be replaced after using every time or vulnerable material needed to be replaced regularly. The consumables don't have warranty service.

The warranty period starts from the "installation date" filled in on the attached **<Equipment Warranty Card>**, which is the only proof to calculate the warranty period. In order to protect your rights, please fill in the warranty

card after the installation of the equipment, and give the second warranty card ("Biolight company retention") to the installer or mail it back to the after-service department of Biolight.

Please note that the following conditions will not be covered by the warranty:

- ⇒ The customer does not fill in or return the equipment warranty card within 30 days after the installation acceptance;
- ⇒ The equipment series number provided by the customer is not correct (our company confirms the equipment series number is warranty or not).

Within the warranty period, all products can enjoy free after-sales service; however, please note that, even within the warranty period, due to the following reasons, the products need to be repaired, the company will carry out maintenance service, you need to pay maintenance fees and accessories fees:

- ⇒ Man-made damage;
- ⇒ Improper use;
- ⇒ The voltage of the power network exceeds the product's specified range;
- ⇒ Irresistible natural disasters;
- ⇒ Replace or use parts, accessories, consumables that are not approved by Biolight or maintained by non-authorized personnel of Biolight;
- ⇒ Other faults not caused by the product itself.

After the expiration of the warranty, Biolight can continue to provide charged maintenance services. If you do not pay or delay in paying the maintenance fee, Biolight will suspend the maintenance service until you pay for it.

About this manual

This manual contains the instructions necessary to operate the product safely and in accordance with its function and intended use. Observance of this manual is a prerequisite for proper product performance and correct operation and ensures patient and operator safety.

This manual is based on the maximum configuration and therefore some contents may not apply to your product. If you have any question, please contact us.

This manual is an integral part of the product. It should always be kept close to the equipment so that it can be obtained conveniently when needed.

The manual is geared for clinical professionals who are expected to have a working knowledge of medical procedures, practiced and terminology as required for monitoring patients.

All illustrations in this manual serve as examples only. They may not necessarily reflect the setup or data displayed on your product.

Conventions:

- ***Bold Italic*** text is used in this manual to quote the referenced chapter or sections.
- **【Text】** is used to enclose screen texts.
- → is used to indicate operational procedures.

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Chapter 1 General Introduction

1.1 Intended Use

The BioVision Central Monitoring System (hereafter referred to as CMS) is intended to conduct centralized monitoring of vital sign information from patient monitors manufactured by Biolight, through wired or wireless LAN in hospital or medical institutions.



WARNING

- **The device is intended for use only by clinical professionals or under their guidance. It must only be used by persons who have received adequate training in its use. Anyone unauthorized must not perform any operation on it.**
 - **The physiological waveforms, parameters and alarms displayed on the CMS screen are for clinician's reference only and cannot be directly used as the basis for clinical treatment. Before giving invasive treatment to a patient, you must go to the corresponding monitor to confirm the results you have obtained from the CMS.**
 - **If any value displayed on the screen of the CMS is abnormal or questionable, first determine the patient's vital signs by alternative means and then verify that CMS or monitor is working correctly.**
-

1.2 Contraindications

None.

1.3 Product Composition

The Central Monitoring System consists of system software, computer platform (optional), USB dongle, network device (optional), alarm device and UPS (optional).

1.3.1 Central Monitoring System Software

The **CMS** software constructs a central network by connecting monitors produced by Biolight via wired or wireless. By collecting, processing, analyzing and outputting the information coming from monitors, it can achieve centralized monitoring over multiple patients so as to greatly promote the efficiency and quality of the monitoring work.

1.3.2 Computer Platform

The **CMS** software runs on the computer platform. Computer components include display, host (server), dongle, mouse and keyboard.

1.3.2.1 Display

The display is used to display parameter values, waveforms, alarm information, system information, etc. Refer to *Appendix A Technical Specifications* for the specifications of the Display.



NOTE

- **Do not touch the display with sharp objects such as pencils. Otherwise, the display will be damaged.**

1.3.2.2 Host (Server)

The host computer is used to run the **CMS** program. Refer to *Appendix A Technical Specifications* for the specifications of the host.

1.3.2.3 Mouse

The mouse is the primary means of user interaction with the **CMS**.

NOTE

- **Unless otherwise specified, the term "Select" in this manual refers to clicking the left mouse button.**
-

1.3.2.4 Keyboard

Keyboard can be used to enter characters into text entry field.

1.3.3 USB Dongle

USB dongle is used to provide copyright protection for the **CMS**. When using the **CMS**, you must use the USB dongle, otherwise the system will not run normally.

NOTE

- **If the USB dongle lost, please contact us to get a new one.**
-

1.3.4 Alarm Device

External alarm device is used to realize sound and light alarm in **CMS**. The alarm device is connected with the host computer of the **CMS** through USB cable. For details of the alarm device, please refer to *Chapter 5 Alarm*.

1.3.5 Network Device

The network device is used to connect the monitoring device to the **CMS**. The network device includes switch, AP (Access Point), etc.

1.3.6 External Printer

The CMS can print reports through a printer. The printer is powered by a separate AC power supply. For details about printers, please refer to *Chapter 8 Printing*.

1.3.7 UPS

Uninterruptible power supply (UPS) can provide stable and uninterrupted power supply to the CMS when the AC power supply is unstable or suddenly cut off, so that the CMS can continue to work.

1.3.8 Communication

The monitoring device and the CMS communicate data in the following two ways.

- Wired network: the CMS, switch and monitoring device are connected by network cables.
- Wireless network: the CMS can only be connected to the wired network. The wireless monitor can be connected to a wireless network. Wired network and wireless network can be connected to realize the connection between CMS and wireless monitoring device.

1.3.8.1 Supported Monitoring Devices

Supported monitoring devices include the following devices:

- Monitors
 - ◆ P series patient monitor
 - ◆ S series patient monitor
 - ◆ A series patient monitor
 - ◆ Q series patient monitor
 - ◆ New M series patient monitor

Chapter 2 Safety

2.1 Safety Information



WARNING

- **The device is intended for use only by clinical professionals or under their guidance. It must only be used by persons who have received adequate training in its use. Anyone unauthorized must not perform any operation on it.**
- **The physiological waveforms, parameters and alarms displayed on the CMS screen are for clinician's reference only and cannot be directly used as the basis for clinical treatment. Before giving invasive treatment to a patient, you must go to the corresponding monitor to confirm the results you have obtained from the CMS.**
- **If any value displayed on the screen of the CMS is abnormal or questionable, first determine the patient's vital signs by alternative means and then verify that CMS or monitor is working correctly.**
- **The CMS is a clinical information device. Except for using such components as the mouse, keyboard etc. to perform normal operations, do not touch or disassemble any other component, especially the power component; otherwise, it may result in personnel injury.**
- **The computer running the CMS software must comply with local relevant regulations. The CMS is intended to connect Biolight monitors only. Connecting the monitors made by other manufacturers may cause the values displayed on the CMS to be inaccurate.**

- **The CMS can construct a wireless local area (WLAN) by connecting monitors. When data is transmitted via wireless radio frequency (RF) signals, it may impair the environment or the use of other equipment. Therefore, the wireless RF equipment must comply with CE, FCC and other local relevant standards and regulations.**
- **When the Central Station is transmitting data via wireless RF signals, loss of patient data may be caused by the interference of other RE signals.**
- **The CMS software copyright is solely owned by Biolight. No organization or individual shall resort to altering, copying, or exchanging it or to any other infringement on it in any form or by any means without due permission.**
- **Data communication must be performed within a closed network for all network functions.**
- **Do not connect any external audio equipment to the CMS.**
- **Do not block the speaker of the CMS.**
- **Do not rely exclusively on audible alarm system. Setting alarm volume to a low level may result in a hazard to the patient.**
- **A hazard can exist if different alarm presets are used for the same or similar equipment in any single area.**



CAUTION

- **The service life of the CMS depends on its hardware. Rough treatment, dropping or collision should be avoided in the operation of the keyboard, mouse and computer; otherwise, the service life of the CMS may be shortened.**
- **Components of the CMS may be contaminated by microorganisms**

during transport, storage and use. Before removing them from their packaging, the packaging should be inspected for damage. In case of any damage, contact the carrier or our company.

- All CMS equipment must utilize the hospital emergency power system. Failure to do so will result in loss of monitoring during extended periods of power failure. Hospitals without an emergency power system should use an Uninterruptible Power Supply (UPS) to power the CMS. When there is a power failure, the system should be shut down by following the specified shutdown procedure before the UPS is turned off. If the system has a sudden power failure, system failure may occur and consequently the system will not work correctly next time or may even have a serious result.
- Start or transport the CMS host in their specified environment. Otherwise, the CMS may be damaged. We will assume no responsibility for such damages.
- System time should be set before the CMS is put into use. If the system time is changed when the CMS is in use, it may result in patient data loss.
- The length of the network cable connecting the monitor and the hub cannot exceed 100m. Otherwise, it may result in network overload or weak network signal and consequently errors will occur during data transmission or while displaying.
- The CMS host should be restarted every three months. Long-term continuous operation may cause operating system failure.
- If the operating environment of the CMS does not meet the requirements of this manual, the CMS cannot operate normally and effectively. For details on operating environment, refer to *Appendix A.1 System Specifications*.

- **Ensure that the operating system can only be used for this software, not for other purposes, such as office and entertainment.**
- **Using the "Show Desktop" feature in Windows is prohibited. Installing or using any other software not provided by Biolight is prohibited. Software that has not been tested or verified by Biolight may cause the instability of the system. Biolight assumes no responsibility for this.**
- **When printing data through an external printer, be sure to follow the printer's instructions. In case any problem occurs during printing, consult the printer's instructions.**
- **To ensure the safety and stability of the network, the LAN connecting the CMS and the monitors should be a closed network which is not connected with the internet or other external networks.**
- **The hospital network where the CMS is located should be set up with a firewall to prevent computer viruses or malicious intrusion.**
- **The host of the CMS should be installed with genuine Windows systems and standard upgrade software, such as maintenance kits. Pirated software will cause the CMS to operate abnormally.**
- **The host of the CMS should install effective anti-virus software and update the virus database periodically. At the same time, the CMS process should be added to the whitelist to prevent accidental killing by anti-virus software.**
- **The firewall should be enabled during the operation of the operating system, and the central monitoring system protocol (TCP) and port (9100) should be opened.**
- **The equipment and its accessories that meet the service life must be disposed in accordance with relevant local regulations or hospital systems.**

- Execution of the software on an IT- NETWORK could result in previously unidentified risks to patients, users or third parties.
 - The RESPONSIBLE ORGANIZATION is advised to identify, analyze, evaluate and control these risks.
 - Subsequent changes to the IT- NETWORK could introduce new RISKS and require additional analysis; and changes to the IT-NETWORK include: 1) changes in IT- NETWORK configuration; 2) addition of items (hardware and/or software platforms or software applications) to the IT- NETWORK ; 3) removal of items from the IT-NETWORK ; 4) update of hardware and/or software platforms or software applications on the IT- NETWORK ; and 5) upgrade of hardware and/or software platforms or software applications on the IT-NETWORK .
-



NOTE

- This manual is written based on the maximum configuration. Some content may not apply to your system.
- Keep this manual in the vicinity of the CMS so that it can be easily located when needed.
- During normal use, the operator should face the front of the equipment.
- When using this system to export monitoring data, you should ask the manufacturer for the technical data for data sharing in advance, and professional developers should complete the corresponding development work.
- If the computer on which the CMS is installed suffers from hardware failure or operating system failure, please contact your local customer service representative.

- All characteristics of the software, including range(s), accuracy, and precision of the displayed values, please refer to the monitor user manual.

2.2 Equipment Symbols







NOTE: Some symbols may not appear on your equipment.

2.2.1 Equipment Symbols

Symbol	Note	Symbol	Note
	Attention: Consult accompanying documents (this manual).		Serial number
	Manufacture date		Manufacturer
	Alternating current (AC)		Power switch
	Equipotential grounding		Dispose of electrical and electronics device separately. Please dispose of them in accordance with relevant local regulation.

2.2.2 Packaging Symbols

Symbol	Note
	<p>Fragile. Handle with care.</p>
	<p>This Side Up.</p>
	<p>Keep dry.</p>
	<p>Stacking layer limit, where ‘n’ represents the maximum permissible number of layers. (N = 6).</p>

Chapter 3 Basic Operations

3.1 Introduction

This chapter introduces the preparation and basic settings before the CMS is put into use.

3.2 Safety Information



WARNING

- **The CMS software copyright is solely owned by the manufacturer. No organization or individual shall resort to altering, copying, or exchanging it or to any other infringement on it in any form or by any means without permission.**
- **The CMS connected to the analog or digital interfaces must comply with the respective IEC standards (e.g. IEC 60950 for data processing equipment and IEC 60601-1 for medical equipment). Furthermore all configurations shall comply with the current version of the standard for IEC 60601-1. Everybody who connects additional equipment to the signal input part or signal output part configures a medical system, and is therefore responsible that the system complies with current version of the requirements of the system standard IEC 60601-1. If in doubt, consult the technical service department or your local representative.**
- **When the CMS is connected to other electrical equipment into a combination with specific functions, if it is impossible to determine whether the combination is dangerous (for example, the electric shock hazard caused by the accumulation of leakage current), please**

contact the expert of the company or the hospital to ensure that the necessary safety of all equipment will not be damaged in the combination.



CAUTION

- **The CMS shall be installed and updated by the personnel authorized by our company. When the CMS needs to be moved to another environment, please contact the manufacture. Our company assumes no responsibility for any loss caused by unauthorized installation or relocation of the CMS.**
 - **Please carefully remove the host, display and other components of the CMS from the packing, Check the CMS components one by one in accordance with the packing list. Check to see if the parts have any mechanical damages. In case of problems, please contact us or our agent.**
 - **Make sure that the CMS operating environment meets the specific requirements. Otherwise unexpected consequences, e.g. damage to the equipment, could result.**
 - **The CMS might be microbial contaminated during storage and transport. Before use, please verify whether the packages are intact. In case of any damage, do not apply it to the patient.**
 - **Keep the packing materials out of children's reach. Disposal of the packing materials should comply with local regulations or the hospital's waste disposal system.**
 - **Please carefully read and correctly understand the contents of this manual for proper use to ensure the safety of the patient and the operator.**
-



NOTE

- **Do not install the CMS in the patient environment.**
 - **Do not block the screen of the monitor.**
 - **Put the CMS in a location where you can easily view and operate the equipment.**
 - **Keep this manual in the vicinity of the CMS so that it can be easily located when needed.**
 - **Keep all the packaging materials for future use in transportation or storage.**
-

3.3 Starting Central Monitoring System

Before starting, please perform safety checks. Please refer to *Chapter 10.3 General Inspection* for the contents of safety checks. Please start the CMS according to the following steps:

1. Connect the power cord to the AC power source. If you use UPS equipment, please connect the UPS to the power source, and then connect the **CMS** to the UPS.
2. Connect the alarm device to the CMS. The CMS should connect with alarm device for use. For details on alarm devices installation, please refer to *Installation Manual*.
3. Press the power switch of the display and host to start the operating system. The **CMS** software will conduct self-tests.
 - ◆ If the self-test pass, the system will make a "beep-beep-beep" self-test sound, and then enter the main screen.
 - ◆ If the self-test fail, the system will display an error message. Please refer to the manual of the computer or contact us.



CAUTION

- **To avoid unexpected errors or consequences caused by sudden power failure, it is recommended that your CMS equipped with UPS equipment.**

3.4 MultiBed Screen

The MultiBed screen is displayed after the CMS is started. MultiBed screen can be used for centralized monitoring of multiple patients.

3.4.1 Example of MultiBed Screen

The MultiBed screen is shown as follows:

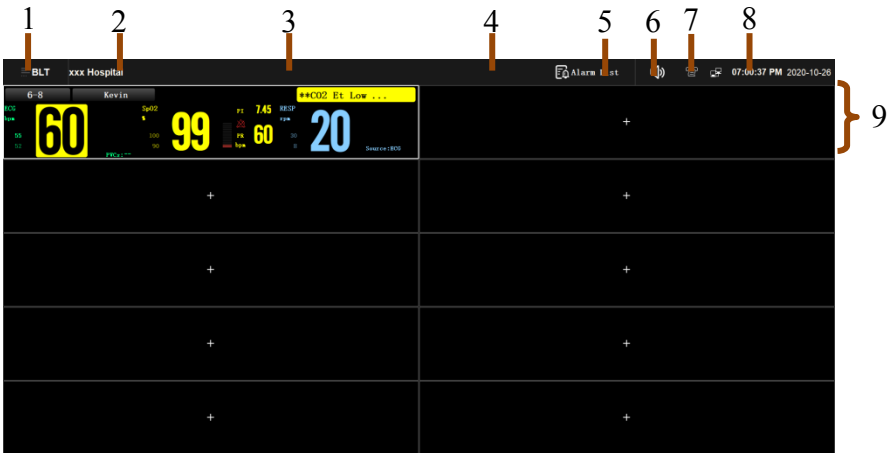




















Figure 3-1 Example of MultiBed screen

1. System menu area: Select this area to open the drop-down list.
2. Hospital information area: This area shows the hospital to which the **CMS** belongs. For setting hospital information, please refer to ***Chapter 9.5.6 Setting Other Patient Information Items.***
3. System alarm area: when system alarms are triggered, this area displays the system alarm information. For system alarm information, please refer to ***Appendix B.2 Alarm Information in the System Alarm Area.***
4. Alarm status symbol area: displays the alarm status of system. For details on description of alarm **symbols** please refer to ***Chapter 3.4.2 MultiBed Screen Symbols.***
5. Alarm list area: Select this area to display all physiological alarm information and technical alarm information of all monitoring device.
6. System silence symbol: Select this symbol, the **CMS** will be silenced. When the system is silenced, a symbol  will be displayed at the top of the screen. After the CMS silence function is enabled, the system silence symbol is displayed in this area. For enabling the function, please refer to ***Chapter 9.4.3 Setting Other Alarm Items.***
7. Print queue symbol: Select this symbol to open the print queue list; you can view the status of the print queue. For more information, please refer to ***Chapter 8 Printing.***
8. System status information area: display network status, system time, etc.
9. Patient sector: display the real-time monitoring data of patients. One patient sector displays data from one patient only. For details, please refer to ***Chapter 3.4.3 Patient Sector in Monitoring State.***

3.4.2 MultiBed Screen Symbols

The symbols on MultiBed screen are shown as follows:

Symbol	Explain	Symbol	Explain
	Adult, male		Adult, female
	Pediatric, male		Pediatric, female
	Newborn, male		Newborn, female
	Current patient sector is idle and can admit a monitoring device.		Contain more than one alarm messages.
	All the alarms are paused.		Alarms for some parameter are turned off or the monitoring device is in the alarm off state.
	Audible alarms are turned off.		The alarm has been confirmed and the alarm system has been reset
	The system is silenced.		The patient's 【Paced】 is set to 【Yes】
	The patient's 【Paced】 is set to 【No】		Selecting this symbol releases the system from silenced state.
	Selecting this symbol silences the system.		

3.4.3 Patient Sector in Monitoring State

When a patient sector is in normal monitoring status, it displays real-time patient data transmitted from monitoring device. The patient sector is shown as follows:

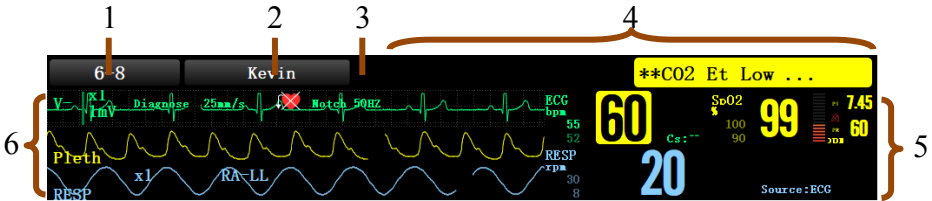



Figure 3-2 Example of Patient sector in Monitoring Status

1. Bed number and room number area: displays the patient's bed number and room number. You can assign a care group for a patient. After Selecting a care group, the bed number and room number area is filled with the background color Selected for **【Care Group】** on the patient management screen. For details, please refer to *Chapter 3.4.3.1 Bed Number and Room Number Area*.
2. Patient information area: displays the patient name or patient ID. For details on how to set the contents for displaying on this area, please refer to *Chapter 9.5.6 Setting Other Patient Information Items*. You can also assign a patient group for a patient. After that, the patient information area is filled with the background color Selected for **【Patient Group】** on the patient management screen. For details on how to setting patient group, please refer to *Chapter 9.5.4 Setting Patient Group*.
3. Alarm status symbol: indicates alarm status. For details, please refer to *Chapter 3.4.2 MultiBed Screen Symbols*.

4. Alarm information area: displays the highest priority alarm information. The symbol  indicated that there is more than one alarm information. When the display space is sufficient, the alarm information area can be divided into technical alarm information area and physiological alarm information area. The technical alarm area is displayed on the left side of the alarm information area. The physiological alarm information area is displayed on the right side of the alarm information area.
5. Parameter area: displays parameter values transmitted by monitoring device. Double-click the parameter area to enter the single-bed observation.
6. Waveform area: displays the waveform transmitted by monitoring device. When arrhythmia alarm is triggered, the corresponding alarm information is displayed under the first ECG waveform. Double-click waveform area to enter the single-bed observation.






NOTE

- **Contents displayed in a patient sector are subject to the number of patient sectors. The less the number of patient sectors, the more contents displayed in a patient sector. For details on how to set the number of patient sectors, please refer to *Chapter 9.3.3.2 Setting the Number of Patient Sectors*.**

3.4.3.1 Bed Number and Room Number Area

Select the bed number and room number area to open the drop-down menu. Only items that may need special remarks are described here.

Menu item	Description
Change	Switch the current patient sector to the target patient sector.
 Alarm reset	Reset alarm. Please refer to <i>Chapter 5.8 Alarm Reset</i> For details.
 Alarm pause	Pause alarm. Please refer to <i>Chapter 5.6 Alarm Pause</i> For details.
 Standby	Standby mode. Please refer to <i>Chapter 3.6.1 Standby Mode</i> For details.

3.4.3.2 Alarm Information Area

You can view all the alarm messages for a bed by Selecting the alarm information area. This area displays the following items:

- Alarm information and prompt information from monitoring device or CMS.
- The highest priority of alarm information. If there are more than one alarm messages of the highest priority, these messages will be displayed cyclically.

Alarms are displayed in different background colors to indicate alarm priorities:

- Red background indicates high priority alarms.
- Yellow background indicates medium priority alarms.
- Cyan background indicates low priority alarms.

The background color of the alarm text message can be set to whether it flashes or not. For details, please refer to *Chapter 9.4.3 Setting Other Alarm Items*.

3.4.3.3 Changing Patient Sector Layout (MultiBed Screen Layout)

Please change the screen layout of the patient sector as follows:

1. Double-click the parameter area/waveform area on the MultiBed screen to enter the ViewBed screen.
2. Select **【Screen Setup】** quick key.
3. Select **【MultiBed】** tab.
4. Select **【Select】** tab.
5. Set screen mode as needed. **【Normal Screen】** is the most common clinical monitoring screen. **【Big Numerics】** can display the values of parameters and waveforms more clearly.
6. Select **【Layout】** .
7. Select a parameter area or waveform, and select the elements to be displayed from the pop-up parameter list.



NOTE

- **The change of the screen layout of the patient sector only affects the patient sector only and does not affect the screen layout of the ViewBed screen.**
-

3.5 ViewBed Screen

The CMS can focus on monitoring a single patient through the ViewBed screen. The ViewBed screen displays patient information, waveform and parameter data transmitted from monitoring device. At the same time, the ViewBed screen also provides functions such as waveform freezing, dynamic short trend review and multi-channel ECG observation.

3.5.1 Accessing the ViewBed Screen

Please access the ViewBed screen as follows: Double-click the parameter area or waveform area of the desired patient sector on the MultiBed screen.



NOTE

- When the CMS is equipped with one display only, according to the size of the display, the ViewBed screen can be displayed in the lower half of the screen or on the right of the screen.
- When the CMS is equipped with more than one display, the ViewBed screen can be displayed on the auxiliary screen.

3.5.2 Example of ViewBed Screen

The following figure shows the regular ViewBed screen.

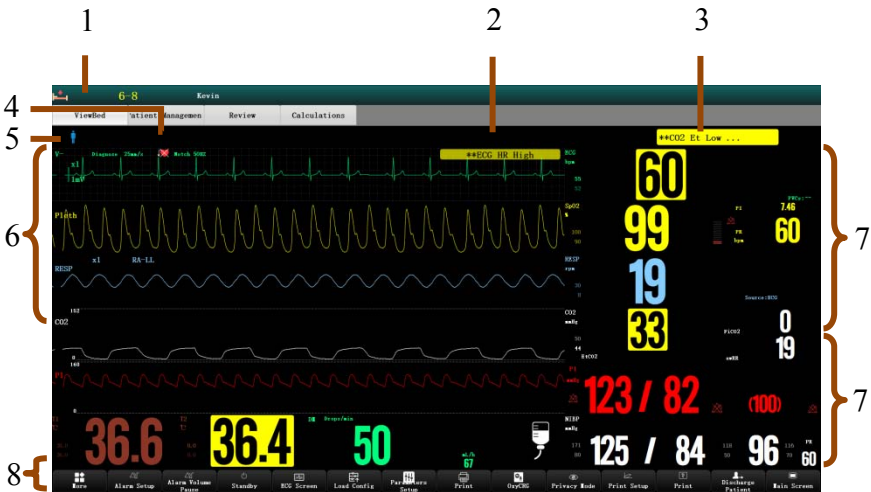



Figure 3-3 Example of ViewBed screen

1. Bed number and room number area: displays the patient's bed number and room number.
2. Technical alarm area: displays the highest priority technical alarm information.

3. Physiological alarm area: displays the highest priority physiological alarm information.
4. Alarm status symbol area: displays the alarm status of monitoring device. For details on description of alarm symbols please refer to *Chapter 3.4.2 MultiBed Screen Symbols*.
5. Patient type symbol: displays the patient type. For a detailed description of the patient type symbol, please refer to *Chapter 3.4.2 MultiBed Screen Symbols*.
6. Waveform area: displays the waveform transmitted by monitoring device.
7. Parameter area: displays parameter value, unit, alarm limit and alarm status. Select the parameter area to open the setting menu of the parameter. When the alarm of the parameter is turned off, the symbol  will be displayed in the parameter area.
8. Quick key area: displays quick keys, which can access some functions conveniently and quickly. For details, please refer to *Chapter 3.5.4 Setting the Quick Keys*.



NOTE

- **The waveforms and parameters displayed in the CMS are consistent with those in the monitoring device.**
- **When changing the display layout of waveforms and parameters on the monitoring device, the display layout of waveforms and parameters on the screen of the CMS will not change automatically, and vice versa.**
- **When the monitoring device closes a module or does not monitor a parameter, the waveforms and parameters of this module will be no longer displayed at CMS.**

3.5.3 Changing ViewBed Screen Layout

Please change the screen layout of the ViewBed screen as follows:

1. Select **【Screen Setup】** at the bottom of the ViewBed screen.
2. Select **【Choose Screen】** , and then Select the desired screen.
3. Select **【Tile Layout】** .
4. Select a parameter area or waveform, and Select the parameter or waveform to be displayed from the pop-up parameter list.



NOTE


- **Changing the screen layout of the ViewBed screen only affects the ViewBed screen, but does not affect the screen layout of the patient sector.**
-














3.5.4 Changing the Quick Keys




Quick keys are displayed at the bottom of the ViewBed screen. Through the quick keys, you can easily and quickly access some functions or perform operations. The **【More】** key is permanently located at the left bottom. Select **【More】** key to display more quick keys. The quick keys displayed on the screen are configurable. When a function is not supported by a monitoring device, its quick key is inactive.

3.5.4.1 Quick Key List

The following table lists all quick keys of the ViewBed screen.

Symbol	Quick key Note	Function
	Main menu	Enter the main menu

Symbol	Quick key Note	Function
	Standby	Enter the Standby mode
	Alarm Setup	Enter the 【Alarm Setup】 menu
	NIBP Start/ Stop	Start/Stop NIBP measurement
	Freeze waveforms	Enter the 【Freeze】 menu
	Alarm Reset	Alarm reset
	Alarm Pause	Pause current alarm
	Screen setup	Enter the 【Screen Setup】 menu
	Discharge the patient	Discharge the current patient
	Night mode / exit night mode	Enter / Exit night mode
	Privacy mode / exit privacy mode	Enter / Exit privacy mode
	Manual event	Manually trigger and save events
	Respiratory oxygenation	Enter the 【OxyCRG】 window
	Parameter setup	Enter the 【Parameter Set】 window

Symbol	Quick key Note	Function
	More	Display more quick key
	ECG 24h Sum	Enter the 【ECG 24h Sum】 window
	ECG Screen	Enter the 【ECG Screen】 window

3.5.4.2 Setting the Quick Keys

Please set the desired quick keys as follows:

1. Double-click the parameter area or waveform area of the desired patient sector on the MultiBed screen to enter the ViewBed screen → Select **【Screen Setup】** quick key → Select **【Quick key】** tab.
2. Set the quick key:
 - ◆ Add quick key: Select desired quick key from the quick key list. At the same time, the quick key adds in the quick key area.
 - ◆ Clear quick key: Select desired quick key from the quick key list, and then Select **【Empty】** . After setting, the quick key is cleared from the quick key area.
3. Select **【More】** tab, and set the quick key to be displayed when **【More】** quick key is selected on the ViewBed screen.

3.5.5 Starting/Stopping NIBP Measurement

When you enable the NIBP measurement remote control function on the CMS, you can remotely control the bedside monitor to start or stop NIBP measurement through the CMS. For details on how to enable NIBP measurement remote control function, please refer to *Chapter 9.10.6 Setting Remote Control*.

Please start NIBP measurement as follows: Select the shortcut key **【NIBP Start/Stop】** at the bottom of the ViewBed screen. The interface prompts "Before NIBP measurement, please confirm whether the patient type matches the cuff type! Please confirm the measurement mode of the bedside machine! Are you sure to start NIBP measurement?" select **【OK】**-perform the remote measurement; select **【Cancel】** -Cancel the remote measurement;

Stop NIBP measurement: Select **【NIBP Start/Stop】** quick key again.



WARNING

- **Before the CMS starts the bedside monitor for NIBP measurement, it must be confirmed that the patient type on the bedside monitor is consistent with the actual situation, and that the cuff type is suitable for this patient.**
 - **NIBP measurement function must be used in conjunction with the requirements in the monitor manual. For more details about NIBP, please refer to the monitor manual.**
-

3.5.6 Freezing/Unfreezing Waveforms


In the process of patient monitoring, you can freeze the dynamically refreshed waveform in the waveform area on the ViewBed screen, review the frozen waveform, and observe the waveform data of the patient in recent period.

3.5.6.1 Freezing Waveforms


Please freeze the waveform as follows:

1. Select **【Freeze】** quick key on the ViewBed screen.
2. In the **【Freeze】** window, you can select the left and right buttons to move the waveform to the desired time.

3.5.6.2 Unfreezing Waveforms

Selecting the  button in the upper right corner of the **【Freeze】** window to unfreeze waveform.

3.5.6.3 Printing Freeze Waveforms

Select the  button in the upper left corner of the **【Freeze】** window to print the frozen waveform.

3.5.7 Minitrends Screen

You can view the patient's dynamic short trend in the **minitrends screen**. The **minitrends screen** is located on the left side of the waveform area, and displays the trends of parameters in the recent period.

3.5.7.1 Accessing the Minitrends Screen

Please follow these steps to access the **minitrends screen**:

1. Double-click the parameter area or waveform area of the desired patient sector on the MultiBed screen.
2. Enter the **【Minitrends】** window by any of the following methods.
 - ◆ Select **【Minitrends】** quick key.
 - ◆ Select **【Screen Setup】** → Select **【Choose Screen】** in ViewBed tab → Select **【Minitrends】** .

3.5.7.2 Setting the Minitrends Screen

Please follow these steps to set the **minitrends screen**:

1. Select the minitrends area in the **minitrends screen** to open the minitrends setting menu.
2. Set **【Trend Length】** .

3.5.7.3 Exiting the Minitrends Screen

Please follow these steps to exit the **minitrends screen**:

1. Select **【Screen Setup】** quick key at the bottom of the ViewBed screen.

2. Select **【Choose Screen】** tab.
3. Select other desired screen.

3.5.8 OxyCRG Screen

You can view the patient's real-time respiratory oxygenation data in the **OxyCRG screen** of the CMS. The **OxyCRG screen** graphically displays the trend curves of HR, SpO₂ and RR and the **compressed waveform** of CO₂ or resp.

3.5.8.1 Accessing the OxyCRG Screen

Please follow these steps to access the OxyCRG screen:

1. Double-click the parameter area or waveform area of the desired patient sector on the MultiBed screen.
2. Access the **【OxyCRG】** window by any of the following methods.
 - ◆ Select **【OxyCRG】** quick key.
 - ◆ Select **【Screen Setup】** quick key → Select **【Choose Screen】** in ViewBed tab → Select **【OxyCRG】** .


3.5.8.2 Setting the OxyCRG screen

Follow these steps to set the **OxyCRG screen**:

1. In the **OxyCRG screen**, Select **【Setup】** button to enter the respiratory oxygenation setting menu.
2. Select **【Parameters】** tab and set the desired parameters.
3. Select **【Scale】** tab and set the desired scale. If you want to set as system default scale, select the **×** button to exit the setting, and then select **【Auto Scale】** in the OxyCRG screen.
4. Exit the setting interface.
5. Select **【Zoom】** , you can set the desired trend time.

3.5.8.3 Printing Respiratory Oxygenation Report

Please print the respiratory oxygenation report as follows:

1. In the OxyCRG screen, set the desired contents.
2. Select the  button in the upper left corner of the OxyCRG screen to start printing.


3.5.8.4 Accessing the OxyCRG Review Screen

You can view the trend curve and compressed waveform in the last 48 hours on the OxyCRG review screen. Please follow the following steps to access the OxyCRG review screen:

1. Access the OxyCRG screen. For details, please refer to *Chapter 3.5.8.1 Accessing the OxyCRG screen*.
2. Select **【Review】** button.

3.5.8.5 Exiting the OxyCRG Screen

You can exit the **OxyCRG screen** following the methods:

- Select **【Screen Setup】** quick key → Select **【Choose Screen】** in ViewBed tab → Select other desired screen.
- Select the  button.

3.5.9 24h ECG Summary

When the **CMS** is connected to a monitor that supports the 24h ECG summary function, you can view the 24h ECG summary of the current patient on the **CMS**.

The 24h ECG summary provides statistical results of ECG activity of current patients in recent 24 hours. You can view the following information through the 24h ECG summary:

- Heart rate statistics
- Arrhythmia event statistics
- QT/QTc measurement statistics
- ST maximum and minimum statistics for each lead
- Typical ECG waveform

3.5.9.1 Accessing the 24h ECG Summary Screen

Select **【ECG 24h Sum】** quick key to access the 24h ECG summary screen and view the relative information.




NOTE

- 24h ECG summary is only applicable to current patients, not to discharged patients.
 - Pacing statistics are only applicable to paced patients.
 - ECG summary report is to store, count and centrally display the real-time data of the monitor, not to recalculate the data after collection.
-

3.5.9.2 Printing 24h ECG Summary Report

Please print the 24h ECG summary report as follows:

1. In the 24h ECG summary screen, select the  button in the upper left corner of the screen to access print setup page.
2. Select the desired contents.
3. Select **【Print】** .

3.5.9.3 Full Disclosure of ECG

You can review ECG waveform data on full disclosure screen of the 24h ECG summary. Please follow the steps bellow to access the full disclosure screen of ECG:

In the 24h ECG summary screen, Select **【Full disclosure】** button.

3.6 Operation Mode

When monitoring devices support standby mode, night mode, or privacy mode, and remote control for these modes has been set at the CMS, you can

control corresponding monitoring devices to enter or exit these modes either via the monitoring devices or via the CMS.

This section only describes how to control the monitoring devices to enter or exit these modes through the **CMS**. Please refer to **Chapter 9.10.6 Setting Remote Control** for how to set the remote control function for these modes on the **CMS**. For how to control the monitoring devices to enter or exit these modes via the monitoring devices and how monitoring devices behave in these modes, please refer to the manual of the monitoring device.

3.6.1 Standby Mode

When the monitoring device is connected to the **CMS** and is in normal monitoring mode, if you need to temporarily interrupt the monitoring for the current patient without switching off the devices, you can use standby mode.

3.6.1.1 Accessing the Standby Mode

Please access the standby mode as follows:

- ◆ On the MultiBed screen, Select the bed number and room number area in the upper left corner of the desired patient sector to open the drop-down menu and select the **【Standby】** , The interface prompts “Are you sure you want to go to standby?”, select **【OK】** .
- ◆ Select **【Standby】** quick key, The interface prompts “Are you sure you want to go to standby?”, select **【OK】** .

3.6.1.2 Exiting the Standby Mode

Please exit the standby mode as any of the following:

- On the MultiBed screen, Select the bed number and room number area in the upper left corner of the desired patient sector to open the drop-down menu and select the **【Standby】** .
- On ViewBed screen, Select **【Resume Monitor】** in the standby interface.

3.6.2 Night Mode

Night mode is a special clinical monitoring mode. To avoid disturbing the patient, night mode may be used.

3.6.2.1 Accessing the Night Mode

Please access the night mode as follows: Select **【Night Mode】** quick key at the bottom of the ViewBed screen.

3.6.2.2 Exiting the Night Mode

Please exit the night mode as follows: Select **【Night Mode】** quick key at the bottom of the ViewBed screen again.

3.6.3 Privacy Mode

In the privacy mode, the monitor does not display patient information and monitoring data to protect patient information from non-clinicians such as visitors.

3.6.3.1 Accessing the Privacy Mode

Please access the privacy mode as follows: Select **【Privacy Mode】** quick key at the bottom of the ViewBed screen.



WARNING

- **In the privacy mode, all audio alarm and light alarm on the monitor are shielded, and the audio alarm is only activated on the CMS.**
-

3.6.3.2 Exiting the Privacy Mode

Please exit the privacy mode as follows: Select **【Privacy Mode】** quick key at the bottom of the ViewBed screen again.



NOTE: When the monitor is disconnected from the CMS, it will automatically exit the privacy mode.

3.7 Viewing the System Information

Please view the system information as follows:

1. Select the system menu area in the upper left corner of the **CMS**.
2. Select **【System Information】** from the drop-down list.

3.8 Shutting Down the CMS

Please close the **CMS** according to the following steps:

1. Select the system menu area in the upper left corner of the **CMS**.
2. Select **【Shutdown】** from the drop-down list. The system will check whether any patient is being monitored.
 - ◆ If no patient is monitored, go to the Step 3.
 - ◆ If patients are still monitoring, " N patients are being monitored. Are you sure to shut down? (where N stands for the number of patients) " is displayed. Select **【Yes】** to shut down.
3. Enter the password in shutdown dialog, and then Select **【OK】**. The shutdown password is the same as the password for accessing the system settings tab. Then the **CMS** and the operating system will automatically shut down.
4. If equipped with UPS, turn off the UPS.
5. Disconnect the power cord of each device from the power socket.

Chapter 4 Patient Management

4.1 Introduction

The **CMS** provides different functions on patient management. The **CMS** provides the following functions:

- ◆ Obtaining patient information
- ◆ Viewing patient information
- ◆ Changing patient information
- ◆ Searching for patient
- ◆ Discharging patient

4.2 Admitting Monitoring device

Only when the monitoring device is admitted by the **CMS**, the **CMS** will display the patient's physiological parameters, waveforms, alarm information and so on, and store the patient's data.

You can set the **CMS** to automatically admit monitoring device. You can also set to manually admit monitoring device on the **CMS**.

4.2.1 Automatically Receiving Monitoring Device

The received monitoring device does not establish a fixed correspondence with the patient sector.

Please follow the steps below:

1. Select the system menu area in the upper left corner of the **main screen** → Select **【System Setup】** from the drop-down list to enter the system setup menu.
2. Select **【Device Management】** tab → enter the password → Select **【OK】** .

3. Select **【Auto Admit Device】** tab.
4. Set the automatic receive criteria.
 - ◆ If you need to automatically receive the monitoring device within an IP address range: enter the starting and ending IP addresses on the right of **【Start】** and **【End】**, and then select **【Add】** button.
 - ◆ If you need to automatically receive the monitoring device within a particular department: enter the department name on the right of **【Department】**, and then select **【Add】** button.

Once the CMS detects the monitoring device that meets the requirements for automatic receiving, it will automatically receive these equipments and assign them to the patient sector of the MultiBed screen.

If you want to cancel the automatic receiving of the monitoring device, select the desired automatic receiving criteria in the **【Auto Admit Device】** interface, and then select **【Delete】** button.

4.2.2 Manually Receiving Monitoring Device








The received monitoring device establishes a fixed correspondence with the patient sector. When the monitoring device is online next time, it will be displayed in the same patient sector. When the monitoring device will be used in a particular department and it is not easy to move to other departments, it is more suitable to receive the monitoring device in this way.

You can manually receive the monitoring device in either of the following ways:

- Receive monitoring device on the **【Device Assignment】** page.
- Receive monitoring device on the MultiBed screen.

4.2.2.1 Receiving the Monitoring Device on Device Assignment Page

Please follow the steps below to receive monitoring devices on the device assignment page:


1. Select the system menu area in the upper left corner of the **main screen** → Select **【System Setup】** from the drop-down list to enter the system setup menu.
2. Select **【Device Management】** tab → enter the password → Select **【OK】** .
3. Select **【Device Assignment】** tab to enter the device assignment interface.
 - ◆ On the device assignment interface: Select **【Identify】** to view the display number. Select “<”、“>” button to enter the previous or next display to view the patient sector on device assignment interface. The room number and bed number of the monitoring device will be displayed on the patient sector which has received the monitoring device. Select the button  in the upper right corner of the patient sector to disconnect the monitoring device of this section from the **CMS**.
 - ◆ The right side of the device assignment interface: displays the list of monitoring device. Select  to receive the device.  indicates that the device has been received by the **CMS**. Select  to remove the device from the **CMS**. Select  to view the device identification (device name, device serial number), device location (department, room number, and bed number), device address (IP address) and the binding state between the device and sector (that is, the receiving status of the device). Select  to sort the monitoring devices. Select  to refresh the device list.
4. Receive monitoring device.
 - ◆ If you need to assign the monitoring device to the specific patient sector, Select the desired patient sector on the left side of

the interface, and then select the button **+** behind the monitoring device on the right side of the interface to receive the device.

- ◆ If you need to randomly assign monitoring device, select the button **+** behind the monitoring device on the right side of the interface. After the monitoring device is received, it will be assigned to the idle patient sector in the order from left to right and top to bottom.

4.2.2.2 Receiving the Monitoring Device on the MultiBed Screen

Please follow the steps below to receive monitoring device on the MultiBed screen:

1. On the MultiBed screen, select the patient sector with the **symbol**  to enter the **【Device Management】** interface.
2. Receive monitoring device.
 - ◆ If you need to assign the monitoring device to the specific patient sector, select the patient sector on the left side of the interface, and then select the button **+** behind the monitoring device on the right side of the interface to receive the device.
 - ◆ If you need to randomly assign monitoring device, select the button **+** on the right side of the interface to receive the monitoring device. After the monitoring device is received, it will be assigned to the idle patient sector in the order from left to right and top to bottom.



NOTE

- **In the same local area network (LAN), a monitoring device can be received by any CMS and only one CMS.**
-

4.3 Accessing the Patient Management Screen

After receiving the monitoring device, on the patient management screen of the CMS, you can perform operations such as changing patient information, discharging the patient, etc.

Please access the **【Patient Management】** screen as follows: Select **【Patient Management】** tab in the ViewBed screen.

4.4 Patient Information Management

You can enter, change and find patient information on the patient management screen.

4.4.1 Entering Patient Information

If a monitoring device is admitted by the CMS, you can enter patient information on the CMS.

Please follow the steps below to enter patient information:

1. Select or enter the desired patient information in the patient management screen. Only fields that may need special remarks are described here.
 - ◆ **【Patient Type】** : Set the patient category corresponding to the patient being monitored. Changing the patient type will cause the monitoring device to reload the configuration.
 - ◆ **【Paced】** : Please set corresponding to the patient being monitored. For paced patients, you must set **【Paced】** to **【Yes】**. Otherwise, the paced pulse will be treated as a regular QRS, and when the ECG signal is too weak, the system cannot detect and fail to alarm. Do not rely solely on the alarm information calculated by the heart rate, and closely monitor the paced patient.

- ◆ **【Care Group】** : Assign a care group for the patient. You can customize the name of the care group. For details on how to set care group, refer to *Chapter 9.5.5 Setting Care Group*.
 - ◆ **【Patient Group】** : Assign a patient group for the patient. You can customize the name of the patient group. For details on how to set patient group, refer to *Chapter 9.5.4 Setting Patient Group*.
 - ◆ **【Remarks】**: You can enter other information such as the name of the nurse, etc.
2. After setting, confirm that all the information on the patient management screen is correct.
 3. Select **【Update Patient】** button.

4.4.2 Changing Patient Information

After receiving the patient, please change the patient information as soon as possible. You can change patient information on the **CMS**. The changed patient information will be synchronized to the monitoring device.

This section only describes the method of changing patient information on the **CMS**. For details on how to change patient information on the monitoring device, please refer to the manual of the monitoring device.

Please follow the steps below to change patient information:

1. Change the desired patient information on the patient management screen.
2. After changing, confirm that all the information on the patient management screen is correct.
3. Select **【Update Patient】** button.

4.4.3 Searching Patient Information

You can search discharged patient information on the **CMS**, and perform

operations such as reviewing patient data. The **CMS** provides the function of patient search.

You can search discharged patient information on the patient management screen and discharged patient management screen.

For details on how to search patient information on the discharged patient management screen, please refer to ***Chapter 4.6.2 Viewing Discharged Patient Information.***

Please follow the steps below to search discharged patient information on patient management screen:

1. On the patient management screen, Select **【Find Patient】** .
2. Enter the search criteria. For details on how to set the query criteria item, please refer to ***Chapter 9.5.3 Setting ADT Query.***
3. Select **【Search】** button.
4. Select **【Detail】** button of the desired patient.

4.4.4 Patient Information Synchronization

When the monitoring device is connected to the **CMS** normally, the patient information changed on the monitoring device or the **CMS** will be synchronized for the each other, so as to ensure that the patient information is consistent between the monitoring device and the **CMS**.

When the monitoring device is disconnected from the network and then connected to the **CMS**, the patient information on the monitoring device will be synchronized to the **CMS**.

4.5 Discharging Patient

Before monitoring a new patient, the current patient must be discharged. This ensures that the data of the discharged patient will not be mixed with the data of the new patient.

This section only describes how to discharge patient on the **CMS**. For

details on how to discharge patient on the monitoring device, refer to corresponding manuals for these devices.

Please follow the steps below to discharge the patient: On the ViewBed screen, Select **【Discharge Patient】** .

4.6 Discharged Patient Management

On the discharged patient management screen, you can view detailed information for discharged patient.



NOTE

- When the system alarm area prompts "The patient data storage space is nearly full. Please delete some discharged patient ", please delete some discharged patient data in time. Otherwise, the system will automatically delete the oldest discharged patient data.

4.6.1 Accessing the Discharged Patient Management Screen

Please access the discharged patient management screen as follows:

1. Select the system menu area in the upper left corner of the CMS.
2. Select **【History Patients】** from the drop-down list.

4.6.2 Viewing Discharged Patient Information

You can search discharged patient information on the patient management screen and discharged patient management screen.

For details on how to search patient information on the patient management screen, please refer to *Chapter 4.4.3 Searching Patient Information*.

Please follow the steps below to manage discharged patients:

1. Enter search criteria.

2. Select **【Search】** button.
3. Select **【Detail】** button after the desired patient information. View patient information under the **【Patient Information】** tab and review data under the **【Review】** tab.

4.6.3 Deleting Discharged Patient

Please follow the steps below to delete discharged patient:

1. Select the required patient data. If you need to Select all patient data, check **【Select All】** in the bottom left corner.
2. Select **【Delete】** button at the bottom right corner of the page.
3. In the delete confirmation dialog box, Select **【OK】** .

Chapter 5 Alarm

5.1 Introduction

This chapter introduces the alarm function and alarm-related setting item of the CMS.

5.2 About the Alarm

Alarms triggered by a vital sign that appears abnormally or due to technical problems identified by the monitoring devices are sent to the CMS. The CMS prompts the user through sound, flashing, prompt information and so on.

Most of the alarm information of the CMS comes from the monitoring device. For the alarm information from the CMS, please refer to *Appendix B.2 Alarm Information in the System Alarm Area*.

5.2.1 Alarm Categories

The CMS has two different types of alarms: physiological alarms and technical alarm.

- Physiological alarms: Physiological alarms are triggered by a monitored parameter value that violates set alarm limits or an abnormal patient condition.
- Technical alarms: Technical alarms are triggered by a device malfunction and irresponsible monitoring parameters due to improper operation or system problems.

Apart from the physiological and technical alarm messages, the CMS will also display some information related to system status.

5.2.2 Alarm Priority

By severity, the patient monitor's alarms can be classified into three categories:

- High priority: Indicate that the patient is in a life threatening situation or a severe device malfunction, and an emergency treatment is necessary.
- Medium priority: Indicate that your patient's vital signs appear abnormal, a severe device malfunction or an improper operation, and an immediate treatment is required.
- Low priority: Indicate that the patient's vital signs appear abnormal, a severe device malfunction or an improper operation, the user needs to know the current situation.
- Prompt: Prompt patient and system status information.

5.2.3 Alarm Indicators

When an alarm occurs, the CMS will indicate it to the user through visual or audible alarm indications:

Alarm signal		High priority alarm	Medium priority alarm	Low priority alarm	Prompt	Note
Alarm Lamp		Red Flashing frequency: 2Hz	Yellow Flashing frequency: 0.5Hz	Cyan Without flashing.	None	None
Alarm sound mode	ISO	Dang-Dang-Dang--Dang-Dan g-----Dang-Dang-Dang--Dang-Dan g-----	Dang-Dang-Dang-	Dang-	None	The sound frequency of the audio alarm is different.
	Mode 1	Ding-Ding-Ding	Ding-Ding	Ding	None	
	Mode 2	Tong-Tong -Tong	Tong-Tong	Tong	None	
Alarm reminder		Dang-Dang-Dang--Dang-Dan g-----Dang-Dang-Dang--Dang-Dan g-----	Dang-Dang-Dang-	Dang-	None	The reminder interval can be set as need, please refer to <i>Chapter 9.4.2 Setting Alarm Volume</i>

Alarm signal	High priority alarm	Medium priority alarm	Low priority alarm	Prompt	Note
Alarm information	White text, red background,	Black text, yellow background,	Black text, cyan background	White text	Displayed in the alarm information area of the ViewBed screen and the patient window of the MultiBed screen. The background color of the alarm text information can be set to flash or not, please refer to Chapter 9.4.3 Setting Other Alarm Items.
Alarm level symbol	***	**	*	None	Displayed in front of the alarm text
Parameter alarm	Red background, flashing	Yellow background, flashing	Cyan background, flashing	None	None



NOTE

- **Alarm time is displayed for latched physiological alarms only.**
 - **The audible and visual alarms given by the CMS comply with the IEC 60601-1-8 standard. The hospital or institution employing the use of the CMS should give adequate training to the operators.**
 - **When multiple alarms of different priorities occur simultaneously, the CMS selects the alarms of the highest priorities and provides alarm tones accordingly.**
 - **Alarm information area of patient sector/ViewBed screen: When there are multiple alarms of the same priority levels in the same area at the same time, the alarm messages are displayed circularly in the display area.**
 - **System alarm information area: When multiple system alarms of different priorities occur simultaneously, the alarm messages are displayed circularly in the display area.**
-

5.2.4 About the Alarm Device

The CMS uses external alarm device to realize audio and light alarms. For the details on alarm indication, please refer to *Chapter 5.2.3 Alarm Indicators*.



CAUTION

- **The alarm device should be placed in a high and unobstructed place, and should be placed smoothly on a horizontal surface to avoid intentional sliding or falling!**
-

5.2.5 Alarm Status Symbols

In addition to the alarm methods described in *Chapter 5.2.3 Alarm Indicators*, the following alarm symbols will appear on the screen to indicate different alarm states:



Indicates all the alarms are paused.



Indicates an alarm for a parameter is off or the alarm system is off.



Indicates the alarm sound is off.



Indicates alarms are reset.

5.3 Viewing Alarm

You can view physiological and technical alarms from all monitoring beds or a single monitoring bed and CMS's technical alarms.

5.3.1 Viewing All Alarms

You can view the physiological alarms and technical alarms of all monitoring devices in a recent time period. Please follow the steps below:

1. Select the alarm list area on the main screen to enter the **【Alarm List】** interface.
2. In the upper right corner of the interface, Select the time period.
3. Under the **【Physiological Alarm】** or **【Technical Alarm】** tab, Select the desired physiological alarm or technical alarm.


5.3.2 Viewing Alarm from a Single Monitoring Bed

Please follow the steps below:


- ◆ Select the alarm information area of the patient sector of the MultiBed screen.
- ◆ Select the technical alarm information area or physiological alarm information area of the ViewBed screen.

5.4 Clearing Alarm in the Alarm List

You can clear the physiological alarms and technical alarms displayed in the alarm list interface, please follow the steps below:

1. Select the alarm list on the main screen and access the **【Alarm List】** interface.
2. Select the button  in the upper right corner of the alarm list interface to clear all physiological alarms and technical alarms.



NOTE: Selecting the button  to clear all physiological alarms and technical alarms in the alarm list, but does not clear the physiological alarms and technical alarms stored in the system.

5.5 Setting Alarm



WARNING

- When the alarm system is powered off, the CMS will save the alarm before the power failure. The stored alarm information will not change. The CMS does not save the event of alarm system power failure and the time.
-

5.5.1 Setting Parameter Alarm

You can collectively set the alarm properties of all parameters of each monitoring device, or separately set the alarm properties of each parameter of each monitoring device.

5.5.1.1 Setting Parameter Alarm Collectively

Please follow the steps below:

1. Select **【Alarm Setup】** quick key on the ViewBed screen. If there is no **【Alarm Setup】** in the quick key area, please set the quick key according to *Chapter 3.5.4.2 Setting the Quick Keys*.
2. Select **【Alarm Limit】** tab, turn on or off the parameter alarm switch, set the parameter alarm limits, and set the priority of the parameter alarm as needed.



CAUTION

- When changing the alarm limit of the monitor through the CMS, please confirm the alarm limit is suitable for the current patient. Setting alarm limits to extreme values may cause the alarm system to become ineffective.
-



NOTE

- When the **【Alarm Setup】** is enabled in the **【Remote Control】** tab of the CMS, you can change the alarm settings of this parameter through the CMS or monitoring device. Alarm changes made will be synchronized to all locations to ensure consistency. For details, please refer to *Chapter 9.10.5.1 Setting the Password Effective Time*.
 - When the **【Alarm Setup】** is disabled in the **【Remote Control】** tab of the CMS, you cannot remotely change the alarm settings of the monitoring device parameters through the CMS.
-

5.5.1.2 Setting Parameter Alarm Individually

Please follow the steps below:

1. Enter the ViewBed screen by the following method: double-click the parameter area or waveform area of the desired patient sector on the MultiBed screen.
2. Select the desired parameter area to enter the parameter setup menu.
3. Select **【Alarm】** tab to set related item.

5.5.2 Setting Arrhythmia Alarm

Please follow the steps below:

1. Enter the **【Arrhythmia】** menu in either of the following methods.
 - ◆ Select **【Alarm Setup】** quick key in the quick key area at the bottom of the ViewBed screen → Select **【Arrhythmia】** tab.
 - ◆ Select the ECG parameter area on the ViewBed screen to enter the ECG setting menu → Select **【Arrhythmia】** tab.
2. Select **【Alarm】** tab and set the alarm-related item:
 - ◆ Set the alarm switch: You can individually set the switch for one arrhythmia or you can collectively set the switch for more than one arrhythmia. If you need to set collectively, Select **【All On】** to turn on all arrhythmia alarm switches; Select **【All Off】** to turn off all arrhythmia alarm switches; Select **【Lethals Only】** to turn on lethal arrhythmia alarm switches only.
 - ◆ Set the alarm priority.



NOTE

- If the monitor is connected and the monitor's **【Lethals Arrhy Off】** is disabled, then in the CMS, the **【All Off】** button is not available.

- For details on setup for arrhythmia alarm and threshold, please refer to the manual of the monitor.
-

5.5.3 Setting ST Alarm

Please follow the steps below:

1. Enter the **【ST】** menu in either of the following methods.
 - ◆ Select **【Alarm Setup】** quick key in the quick key area at the bottom of the ViewBed screen → Select **【ST】** tab.
 - ◆ Select the ECG parameter area on the ViewBed screen to enter the ECG setting menu → Select **【ST】** tab.
2. Select **【Alarm】** tab to set the alarm attributes.


5.5.4 Setting Alarm Volume

Please follow the steps below:

1. Select the system menu area in the upper left corner of the main screen → Select **【System Setup】** from the drop-down list to enter the **【System Setup】** interface.
2. Select **【General】** tab to enter the general setting interface.
3. Select **【Volume】** tab.
4. Select the **+** or **-** buttons on both sides of **【Alarm Volume】** to increase or decrease the alarm volume. The range of the alarm volume is from X to 10. Where X is the minimum alarm volume, which depends on the minimum alarm volume setting, and 10 is the maximum volume. For the setting of the minimum alarm volume, see *Chapter 9.4.2 Setting Alarm Volume*.
5. Select **【High Alarm Volume】**. The volume of the high priority alarm is higher than any other alarm volume.
6. Set the **【Reminder Volume】**.



NOTE

- **Cannot only rely on the audio alarm to monitor patients. Adjusting the alarm volume to a lower volume may be risky.**
 - **When the alarm volume is set to 0, the high alarm volume cannot be set. At the same time, the audio alarm of the CMS is turned off. After the audio alarm is turned off, the symbol  appears in the alarm symbol area of the main screen of the CMS. Even if there is a new alarm, the CMS cannot give an audio alarm, but other alarm indicators and other audio prompts are not affected. Please set the alarm volume carefully.**
 - **Turning off the audio alarm of the CMS only affects the CMS, not the audio alarm of the monitoring device.**
-

5.5.5 Setting Alarm Sound Pattern, Alarm Interval and Alarm Volume Escalation

The CMS provides the function of escalating alarm tone volume. When this function is enabled, and if an alarm is not reset within the designated delay time after the alarm occurs, the volume of the alarm tone increases automatically. You can set the alarm volume escalation, alarm sound pattern and alarm interval. For more information, see *Chapter 9.4.2 Setting Alarm Volume*.

5.5.6 Setting Reminder Tones

The reminder tone is enabled by default. When the alarm volume is 0, the alarm is reset or the alarm is off, the monitor can provide periodic alarm prompts to remind user that active alarms still exist in the current system. For details, refer to *Chapter 9.4.2 Setting Alarm Volume*.


5.6 Alarm Pause

When the monitor supports alarm pause through the **CMS** and the **【Alarm Pause/Reset】** function is enabled on the **CMS**, you can remotely reset the alarm through the **CMS**, or pause the local alarm issued by the **CMS**. For details on how to enable **【Alarm Pause/Reset】**, please refer to *Chapter 9.10.6 Setting Remote Control*.

5.6.1 Pausing Alarm

You can pause the alarm on the MultiBed screen or the ViewBed screen.

5.6.1.1 Pausing Alarm in the Patient Sector

Please follow the steps below: Select bed number and room number area of the desired patient sector on MultiBed screen, select the symbol  from the drop-down list.

5.6.1.2 Pausing Alarm on the ViewBed Screen

Please follow the steps below:


1. Enter the ViewBed screen by the following method: double-click the parameter area or waveform area of the desired patient sector on the MultiBed screen.
2. Select **【Alarm Pause】** in the quick key area at the bottom of the interface. If the **【Alarm Pause】** quick key does not appear, please refer to *Chapter 3.5.4.2 Setting the Quick Keys*.

The alarm pause time is set on the monitor. After the alarm pause time expires, the alarm pause will be automatically cancelled. You can also select **【Alarm Pause】** quick key on the ViewBed screen to cancel the alarm pause.

5.6.2 System Responses after Pausing Alarm

After the alarm is paused, the system response of the **CMS** is as follows:

- All physiological alarms of the monitor are paused.

- The audio alarm of the technical alarm of the monitor is paused, but the alarm light and alarm information are still displayed.
- The symbol  , the text of “Alarm Pause”, and the remaining time of the alarm pause are displayed in the patient sector and the alarm information area of the ViewBed screen. The background color of the **【Alarm Pause】** quick key turns red during the alarm pause.

5.7 Alarm Reset


If you enable the **【Alarm Pause/Reset】** function on the CMS, you can remotely reset alarm through the CMS. For details on how to enable **【Alarm Pause/Reset】** , please refer to *Chapter 9.10.6 Setting Remote Control*.

5.7.1 Resetting Alarm

You can reset the alarm on the MultiBed screen or the ViewBed screen.

5.7.1.1 Resetting Alarm in the Patient Sector

Please follow the steps below to reset the alarm in the patient sector:

Select the bed number and room number area in the upper left corner of the desired patient sector on the MultiBed screen, and select the symbol  from the drop-down list.

5.7.1.2 Resetting Alarm on the ViewBed Screen

Please follow the steps below:

1. Access the ViewBed screen by the following method: double-click the parameter area or waveform area of the desired patient sector on the MultiBed screen.
2. Select **【Alarm Reset】** in the quick key area at the bottom of the interface. If the **【Alarm Reset】** quick key does not appear, please refer to *Chapter 3.5.4 Changing the Quick Keys*.

5.7.2 System Responses after Resetting Alarm

After the alarm is reset, it has the following responses:

- The sound of the current physiological alarm is silenced.
- Technical alarms that can be completely cleared are cleared. For the cleared technical alarm, there will be no alarm indication.
- Technical alarms that can clear the sound are displayed as prompt message.




NOTE: In the alarm reset state, if a new alarm is generated, the alarm reset symbol disappears and the alarm system is reactivated.

5.8 CMS Silence

The CMS silence only affects the sounds of the CMS. It does not affect the sounds at monitoring devices.


5.8.1 Setting Silence

Please follow the steps below:

- If you set silence quick key on the CMS, press the silence quick key to silence the system. For details on setting the silence quick key, see *Chapter 9.4.3 Setting other Alarm Items*.
- Select the symbol  at the top of the main screen.


5.8.2 System Responses after Silencing CMS

When the CMS is in a silent state, it has the following responses:

- The symbol  is displayed on the top of the main screen of the CMS.

- The alarm sound is silenced, but other alarm prompt messages are still retained, such as alarm text prompts.

5.8.3 Exiting CMS Silenced Status

When the **CMS** is in silenced state, press the silence quick key again or select the symbol  to exit the system silenced state.

5.9 Detecting Alarm

The **CMS** automatically performs a self-test at startup. Please refer to *Chapter 3.3 Starting Central Monitoring System*.

To further detect the alarm of a certain parameter, you can perform measurements using a simulator, adjust the alarm limit and check that the correct alarm response can be observed.

5.10 Actions When an Alarm Occurs

When an alarm occurs in the **CMS**, please refer to the following steps to take proper actions:

1. Check the patient's condition.
2. Confirm the alarming parameter or alarm category.
3. Identify the source of the alarm.
4. Take proper action to eliminate the alarm condition.
5. Check if the alarm is eliminated.

Chapter 6 Review

6.1 Introduction

You can review historical data for online patients and discharged patients on the review screen. The review screen provides several tabs to display historical data from different aspects. The review tabs for the online patients and discharged patients are the same.



NOTE

- **Review tabs on review screen are dependent on the setup for review tabs on system setup menu. For details on how to set the review tabs, refer to *Chapter 9.3.4 Setting Patient Window*.**
-

6.2 Accessing Review Screen

The way to access review screen for online and discharged patient are different.

6.2.1 Accessing the Review Screen for Online Patient

You can enter the review screen by: Select the **【Review】** tab on the ViewBed screen.

6.2.2 Accessing the Review Screen for Discharged Patient

Please follow the steps below:

1. Select the system menu area in the upper left corner of the main screen.
2. Select **【History Patients】** from the drop-down list.

3. Select the **【Detail】** button after selecting the required patient information.
4. Select the **【Review】** tab.

6.3 The structure of review Screen

The page under each Review Tab has a similar structure. We take the graphic trends review page as an example. These contents will not be introduced in each review page.

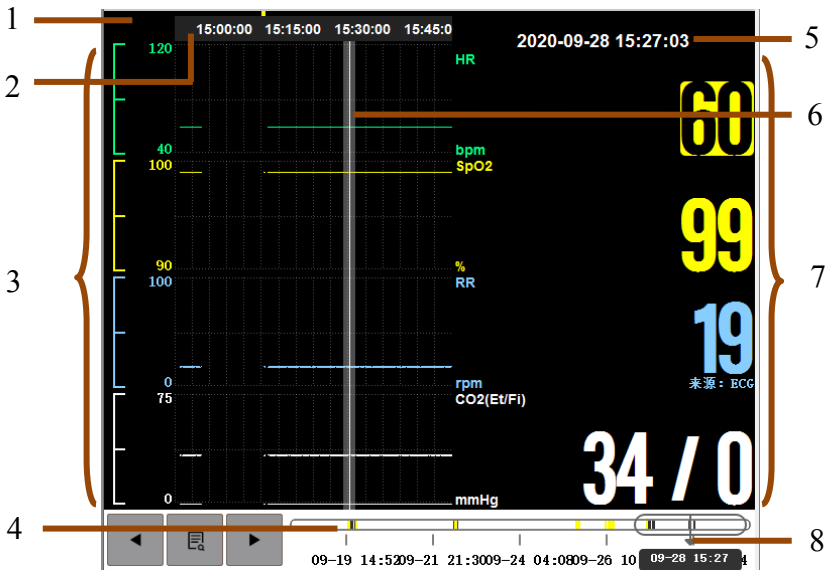




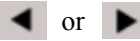

Figure 6-1 Example Review Page

1. Event type indicator: Different color blocks match different types of events.
 - Red: high priority alarm event
 - Yellow: medium priority alarm event
 - Cyan: low priority alarm event

2. Current window time line: indicates the time length of the current window.
3. Waveform area: display trend curves. The color of trend curves is consistent with the color of parameter labels.
4. Time line:
 -  can be moved within this time length.
 - Different color blocks at the time line indicate alarm events of different types. The color of the color block is consistent with the color of the Event type indicator.
5. Cursor time
6. Cursor
7. Parameter area: displays the parameter value at the cursor time.
8. Slider: indicates the position of current window time in the entire time length. Dragging this button left or right enables you to locate the trend data at a specific time and also refreshes trend data in current window accordingly.

6.4 Symbols on Review Pages

The following table lists the symbols on review pages.


Symbol	Description
	Slider: indicates the position of current window time in the entire time length. Dragging this button left or right enables you to locate the trend data at a specific time and also refreshes trend data in current window accordingly.
	Goes to the previous or next event.
	Event list: displays events in a chronological order. The most recent event is displayed at the top. The number of asterisk symbols (*) before an event matches alarm priority.

6.5 Common Operations of Review Page

This section describes common operations for all review pages.




6.5.1 Browsing Trend Data

On the review page, you can browse the trend data in either of the following ways:

- Move .
- Move the cursor.
- Slide page.

6.5.2 Viewing events

View events in one of the following ways.

- ◆ Select  to open the event list. You can select the event you want to view from the event list.
- ◆ Select  or  to view the previous or next events. In event list, events are displayed in a chronological order. The most recent event is displayed at the top. The number of asterisk symbols (*) before an event matches alarm priority as follow:
 - ***: high priority alarm
 - ** : medium priority alarm
 - * : low priority alarm

6.6 Tabular Trends Review Page

The tabular trends review page displays how the patient's physiological parameter trend is developing in a tabular manner.

6.6.1 Accessing the Tabular Trends Review Page

Please follow these steps below to access the tabular trends review page:
Select the **【Tabular Trends】** on the left side of the review screen.

6.6.2 Selecting the Trend Group

Follow the steps bellow:

1. Access the tabular trends review page.
2. Select **【 Trend Group 】** and select the desired option. For information on trend group settings, refer to *Chapter 9.7.2 Setting Trend Group*.
3. Set **【Rate】** and Select the desired interval to display trend data. In these option, **【NIBP】** refers to view the tabular trends at the moment that NIBP measurements were acquired.




NOTE

- **【Rate】** option are depended on the functions of the monitor.
-

6.6.3 Printing Tabular Trends Report

Please follow the steps below to print the tabular trends report:

1. Access the tabular trends review page.
2. Select the  button in the upper right corner to enter the **【Print Setup】** menu.
3. Set the desired options.
4. Select **【Print】** .

6.7 Graphic Trends Review Page

The graphic trends review page displays trend data in graphical form.

6.7.1 Accessing the Graphic Trends Review Page

Please follow the steps below to access the graphic trends review page:
Select **【Graphic Trends】** button on the left side of the review screen.


6.7.2 Selecting the Graphic Trends

Please follow the steps below to set the trend graph:

1. Access the graphic trends review screen.
2. Select **【 Trend Group 】** and select the desired option. For information on trend group settings, refer to *Chapter 9.7.2 Setting Trend Group*.
3. Set **【Wave Number】** and select the desired option.
4. Select **【Duration】** : Set the duration of each parameter graphic trend.

6.7.3 Printing Trend Graph Report

Please follow the steps below to print the trend report:

1. Access the graphic trends review screen.
2. Select the button  in the upper right corner to enter the **【Print Setup】** menu.
3. Set the desired options.
4. Select **【Print】** .

6.8 Full Disclosure Review Page

You can view the patient's compressed waveform and detailed waveform on the full disclosure review page.

6.8.1 Accessing the Full Disclosure Review Page

Please follow the steps below to access the full disclosure review page: Select **【Full Disclosure】** button on the left side of the review screen

6.8.2 Selecting Waveforms

If the desired waveform is not displayed on the full disclosure review page, please follow the steps below to select the waveforms:

1. Access the full disclosure review page.

2. Select **【Setup】** to enter the **【Full Disclosure Setup】** menu.
3. Select **【Storage】** tab.
4. Select the desired waveforms to be stored.
5. Select **【Display (Maximum: 3)】** tab.
6. Select the waveform to be displayed.

After selecting the waveform, you can view the compressed waveform.

When an alarm occurs, the band on the compressed waveform at the alarm time will use different background color to indicate different alarm levels.

- Red: high priority alarm
- Yellow: med priority alarm
- Cyan: low priority alarm

6.8.3 Compressed Waveform

After entering the full disclosure review page, the system displays the compressed waveform.

6.8.3.1 Setting the Duration

Please follow the steps below to set the duration of each compressed waveform:

1. Access the full disclosure review page.
2. Select **【Duration】** and select desired option.

6.8.3.2 Selecting Compressed Waveform Segments

You can select one compressed waveform segments and print the selected segments. For details on how to print the selected segments, please refer to *Chapter 6.8.5 Printing Compressed Waveform or Detail Waveform.*

Please follow the steps below to Select a compressed waveform segments:

1. Access the full disclosure review page.
2. Select the compressed waveform segments in either of the following methods:

- ◆ In the compressed waveform area, select the desired waveform segment. You can also move the screen up and down to select the desired compressed waveform.
- ◆ Select **【Select】** button at the upper right corner of the page, and hold down the right mouse button and drag the mouse to select the desired waveform segment. If you need to move the screen up and down, please select **【Select】** button again to exit the waveform selection state. After moving the screen up and down, select **【Select】** button to select the desired waveform segments.

If you need to cancel the currently selected compressed waveform segments, please select **【Select】** button to exit the waveform selection state.

6.8.4 Detail Waveform Window

If you want to view the complete waveform and parameter values of the compressed waveform, please follow the steps below:

- Select the waveform to be viewed in the compressed waveform window, and then select **【Detail】** button.

In the Detail waveform window:

- Timeline and waveforms are displayed in the upper part of the window.
- The parameter value is displayed in the lower part of the window. The background color of the parameter indicates whether the parameter alarm is triggered and the alarm priority.
 - ◆ No background color: no alarm is triggered.
 - ◆ Red: a high priority alarm is triggered.
 - ◆ Yellow: a medium priority alarm is triggered.
 - ◆ Cyan: a low priority alarm is triggered.

Select the button at the upper right corner of the detail waveform window to close the detail waveform window.

6.8.4.1 Setting ECG Gain

Please follow the steps below to set ECG gain:

1. Enter the detail waveform window.
2. Set **【ECG Gain】**.

6.8.4.2 Setting Waveform Scan Speed

Please follow the steps below to set the waveform scan speed:

1. Enter the detail waveform window.
2. Set **【Wave Speed】**. The speed is applicable to all displayed waveforms.

6.8.4.3 Caliper Measurement

After the full disclosure data is stored in the **CMS**, you can use the horizontal caliper to measure the values of PR, QRS, QT, and QTc, calculate the RR interval, and use the vertical caliper to measure the ST waveform amplitude.

The horizontal and vertical calipers are shown in Figure 6-2.

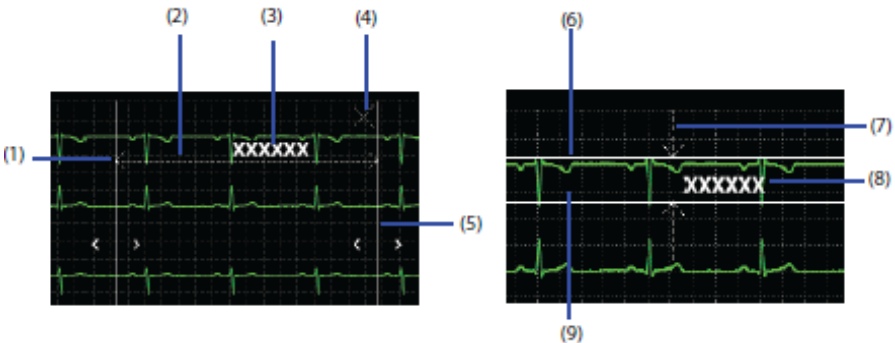


Figure 6-2 Horizontal and Vertical Calipers

(1)	Left caliper arm
(2)、(7)	Measurement line
(4)	Close button: closes the caliper window without saving the measured value.
(5)	Right caliper arm
(3)、(8)	Real-time measurement
(6)	Upper caliper arm
(9)	Lower caliper arm

Performing Measurements Using a Horizontal Caliper

Please perform horizontal caliper measurement according to the following methods:

1. Enter the detail waveform window.
2. Select **【Caliper】** to enter the **【Caliper】** menu.
3. Select the desired waveform area, press the left mouse and drag it horizontally, a horizontal caliper will appear on the waveform. Drag the caliper arm to the desired position.
4. Select **【PR】**, **【QRS】**, **【RR】**, and **【QT】** in the **【Caliper】** menu to obtain the corresponding measurement value. The QTC value can be calculated after obtaining the RR interval and QT value.
5. Save or clear the measured value.
 - ◆ **【Save】** : Save the current measurement value and current caliper measurement location on the event review page. If you need to save, please enter the name and remarks of the caliper measurement in the **【ECG Measurement Result】** dialog box. Then select **【OK】**. The measurement result is displayed above the first ECG waveform in the event details window.
 - ◆ **【Reset】** : Clear the measured value.



Performing Measurements Using a Vertical Caliper






Please follow the steps below to measure using a vertical caliper:

1. Enter the detail waveform window.
2. Select **【Caliper】** to enter the **【Caliper】** menu.
3. Select **【ST】** in the menu.
4. Select the desired waveform area, press the left mouse and drag up and down, a vertical caliper will appear on the waveform. Drag the caliper arm to the desired position.
5. Select **【ST】** in the **【Caliper】** menu to obtain the corresponding measurement value.
6. Save or clear the measured value.
 - ◆ **【Save】** : Save the current measurement value and current caliper measurement location on the event review page. If you need to save, please enter the name and remarks of this caliper measurement in the **【ECG Measurement Result】** dialog box. Then select **【OK】**. The measured value is displayed above the first ECG waveform in the event details window.
 - ◆ **【Reset】** : Clear the measured value.

Moving the Caliper

After the caliper appears, you can more easily measure the real-time measurement value between any two points on the waveform by adjusting the caliper:

- When the cursor is moved to the caliper measuring line and the cursor is in shape of  , you can move the caliper arm horizontally.
- When the cursor is moved to the caliper measuring line and the cursor is in shape of  , you can move the caliper arm up and down.

- When the cursor is between the two arms of the caliper, the cursor changes to a shape of  , and you can move the entire caliper window.
- Select the  or  button in the horizontal caliper measurement area. Select the  or  button in the vertical caliper measurement area.

Canceling Caliper Measurements

During the caliper measurement, you can cancel the caliper measurement in either of the following methods:

- Select **【Caliper】** button.
- Select the close button in the upper right corner of the caliper measurement area.

6.8.4.4 Setting Beat Annotation

When the monitor supports the beat annotation function, you can enable or disable Beat Annotation function in the detail waveform window. When the **【Beat Anno】** is enabled, a white beat annotation will be displayed above the first ECG waveform. The annotation indicates how the monitor classifies beats. Beat annotation may help identify suspicious, undetected, or false arrhythmia events. The meaning of the beat annotation is as follows:

- N = Normal
- V = Ventricular
- S = Supraventricular Premature
- P = Paced
- L = Learning
- ? = Insufficient information to classify beats
- I= Inoperative (for example, Lead Off)
- M = Missed beat

You can print the beat annotation. When you enable or disable the function of **【Beat Anno】** in the detail waveform window, the beat annotation in the detail event review window will be displayed or hidden accordingly. Vice versa.




CAUTION

- **Make sure to select the best ECG lead with the largest waveform amplitude and the highest signal-to-noise ratio. Selecting the best ECG lead is very important for detecting heartbeats, classifying heartbeats, and detecting ventricular fibrillation.**
-

6.8.5 Printing Compressed Waveform or Detail Waveform

Please follow the steps below to print the desired compressed waveform or detailed waveform:

1. Enter the full disclosure review page.
2. Select the button  in the upper right corner to enter the **【Print Setup】** menu.
3. Select the desired option. Only items that may need special remarks are described here.
 - ◆ **【Print Selected CompressedWave】** : Print the Selected compressed waveform. For details on how to Select a compressed waveform, please refer to *Chapter 6.8.3.4 Selecting Compressed Waveform Segments*.
 - ◆ **【Print Selected CompressedWave Detail】** : Print the detailed waveform corresponding to the selected compressed waveform.
 - ◆ **【Print DetailWave】**: Print the detailed waveform on the detail waveform windows.

4. Select **【Print】** .

6.9 Event Review Page

On the event review page, you can view the technical alarm events, physiological alarm events, manual events, and operational events from the monitoring device.

6.9.1 Accessing the Event Review Page

Please follow the steps below to enter the event review page: Select **【Event】** button on the left side of the review screen.

6.9.2 Event List

In the event list:

- Events are displayed in order of occurrence time. The most recent event is displayed at the top of the list. The number of asterisks (*) in front of the event corresponds to different alarm priorities.
 - ◆ ***: high priority alarm
 - ◆ **: medium priority alarm
 - ◆ *: low priority alarm
- The event indicator bar on the left of the event uses different color blocks to indicate different types of events:
 - ◆ Red: high priority alarm event
 - ◆ Yellow: medium priority alarm event
 - ◆ Cyan: low priority alarm event
 - ◆ Green: Manual event
 - ◆ White: Operational events

The upper right corner of the event list displays the total number of filtered events and the current event number. For example, 3/10 means that there are 10 events selected, and the current event is the third event.

6.9.2.1 Setting Filters

You can filter events by time, alarm priority, alarm category, and parameter type. Please follow the steps below to set the filter criteria:

1. Enter the event review page.
2. Open **【Filter】**.
3. Select **【Filter Setup】** to set filter criterion. The filtered events will appear in the event list.



NOTE

- If **【Filter】** is disabled, the related settings made in **【Filter Setup】** will not take effect.
-

6.9.2.2 Other Operations in the Event List

In the event list, you can change the remark of the event. Please follow the steps below to operate the event:

1. Enter the event review page.
2. Select the desired event in the event list.
3. Select **【Note】**. In the pup-up dialog, enter the remarks of the event. After entering the remarks, select **【OK】**.

6.9.3 Event Detail Window

Please enter the event details window in either of the following methods:


- In the event list, double-click the selected event.
- Select **【Detail】** button at the top of the event review page. In the event details window:

In the upper part of the window, the displayed items include the name of the event, the time at which the event occurred, and the

waveforms before and after the event triggered time. If you enter the remark information, the remark information is displayed in the upper left corner of the window.

In the lower part of the window, the values of all parameters are displayed. The background color of the parameter indicates whether the parameter alarm is triggered and the alarm priority.

- ◆ No background color: no alarm is triggered.
- ◆ Red: a high priority alarm is triggered.
- ◆ Yellow: a medium priority alarm is triggered.
- ◆ Cyan: a low priority alarm is triggered.

Select the button  in the upper right corner of the event details window to close the event details window. Or you can select **【Event List】** in the upper left corner of the event details window to close the event details window.

6.9.3.1 Setting ECG Gain

Please follow the steps below to set ECG gain:

1. Enter the event details window.
2. Set **【ECG Gain】**.

6.9.3.2 Setting Waveform Scan Speed

Please follow the steps below to set waveform speed:

1. Enter the event details window.
2. Set **【Speed】**. The speed is applicable to all waveforms.

6.9.3.3 Caliper Measurement


For details on how to perform caliper measurement, refer to *Chapter 6.8.4.3 Caliper Measurement*.

6.9.3.4 Setting Beat Annotation

For details on how to set beat annotation, refer to *Chapter 6.8.4.4 Setting Beat Annotation*.

6.9.4 Printing Event

Follow the steps below to print event:

1. Enter the event review page.
2. Select the desired event in the event list.
3. Select the button  in the upper right corner to enter the **【Print Setup】** menu.
4. Select the desired option.
5. Select **【Print】** .

6.10 OxyCRG Review Page

You can review up to 48 hours' trend curves and compressed waveforms on the OxyCRG review page.

6.10.1 Accessing the OxyCRG Review Page

Please follow the steps below to enter the OxyCRG review page: Select **【OxyCRG】** button on the left side of the review screen.


6.10.2 Setting the OxyCRG Review Page

Please follow the steps below to set OxyCRG review page:

1. Enter the OxyCRG review screen.
2. Set **【Waveform】** .
3. Set **【Duration】** .

6.10.3 Printing OxyCRG Review Report

Please follow the steps below to print an OxyCRG review report:

1. Enter the OxyCRG review screen.
2. Select the button  in the upper right corner to enter the **【Print Setup】** menu.
3. Set the desired options.
4. Select **【Print】** .

6.11 ST Review Page

You can review the ST segment waveform on the ST review page.

6.11.1 Setting the ST Review Page

Please follow the steps below to enter the ST review page: Select **【ST】** button on the left side of the review screen.

6.11.2 Setting ST Reference Template

You can set the desired ST template as a reference template, please follow the steps below.

1. Enter the ST review page.
2. Select the required ST template.
3. Select **【Set Reference】** .

6.11.3 Showing/Hiding ST Reference Template

Select **【Show Reference】** or **【Hide Reference】** on the ST review page.

- **【Show Reference】** : The reference template is displayed below the ST template, and the ST value corresponding to the reference template is also displayed.
- **【Hide Reference】** : Hide the ST reference template.


6.11.4 Displaying/Hiding Markers

Select **【Show Marker】** or **【Hide Marker】** on the ST review page.

- **【Show Marks】** : Mark the positions of ISO point, J point and ST point with white vertical lines on the ST template.
- **【Hide Marks】** : ST template does not display the positions of ISO point, J point and ST point.

6.11.5 Printing ST Segment Waveform

Follow the steps below to print the ST segment waveform:

1. Enter the ST review page.
2. Select the button  in the upper right corner to enter the **【Print Setup】** menu.
3. Select the desired option.
4. Select **【Print】** .

6.12 Arrhythmia Statistics Page

On the arrhythmia statistics page, you can view the statistics about HR values and the number of various arrhythmias within a certain period of time.

6.12.1 Accessing the Arrhythmia Statistics Page


Please follow the steps below to enter the arrhythmia statistics page: Select **【Arrhythmia】** button on the left side of the review screen.

6.12.2 Viewing Arrhythmia Statistics

In the **【Duration】** in the upper right corner of the arrhythmia statistics page, set the time period for which arrhythmia needs to be viewed.

6.12.3 Printing Arrhythmia Statistics Results

Please follow the steps below to print arrhythmia statistics:

1. Enter the arrhythmia statistics page.
2. Select the button  in the upper right corner to enter the **【Print Setup】** menu.
3. Select the desired option.
4. Select **【Print】** .

6.13 DM Review Page

You can review the infusion drip rate and flow trend graph on the DM review page.

6.13.1 Accessing the DM Review Page

Please follow the steps below to enter the DM review page: Select **【DM】** button on the left side of the review screen.


6.13.2 Setting the DM Review Page

You can set the time period for which DM needs to be viewed, Please follow the steps below:

1. Enter the DM review page.
2. Set **【Duration】** .

6.13.3 Printing DM Waveform

Please follow the steps below to print DM waveform:

1. Enter the DM review page.
2. Select the button  in the upper right corner to enter the **【Print Setup】** menu.
3. Select the desired option.
4. Select **【Print】** .

Chapter 7 Calculation

7.1 Introduction

The CMS provides calculation function which outputs calculation results based on input data and measured values. The calculation function will not affect the patient being monitored.

The CMS can calculate the following:

- Drug calculation
- Hemodynamic calculation
- Oxygenation calculation
- Ventilation calculation
- Nephridium function calculation



NOTE

- **The calculation can be performed on the CMS whose calculation function is enabled. Refer to *Chapter 9.3.4 Setting Patient window* for how to enable the calculation function.**
-

7.2 Safety Information



WARNING

- **The dosage of drugs must be decided by the physician in charge.**
- **During calculation, check that the entered values are correct and the calculated values are appropriate. We assume no responsibility for any consequences caused by wrong entries and improper operations.**

- **The calculations in the titration table are subject to the drug calculations. Therefore, always ensure the correctness of the drug calculations and confirm the reference, dose interval and dose type.**
-

7.3 Accessing the Calculations Screen

Please access the calculation screen by the following way: on the MultiBed screen, select the desired waveform area or parameter area of the patient sector to access the ViewBed screen→ Select **【Calculations】** tab.

7.4 Drug Calculation

On the drug calculation screen, you can perform drug calculation, view the titration table, and print the titration table.

7.4.1 Calculation Step

The drug calculation steps are as follows:

1. In the calculation screen, select **【Drug】** to enter the drug calculation page.
2. Select **【Calculate】** tab.
3. Set **【Drug Name】** and **【Patient Type】**. In the **【Drug Name】** option, Drug A to Drug E are available to define by user.
4. If the selected drug is affected by weight, switch on **【Weight Base】** and enter the patient's weight.
5. Enter the drug-related information such as total amount, volume and dose.
6. Select **【Calculate】** button to calculate. Red arrow marks are displayed before the calculation results and the results are displayed in the titration table.



NOTE

- **If available, the patient category and weight from the patient management screen are automatically entered when you first access drug calculation. You can change the patient category and weight. This will not change the patient category and weight stored in the patient management screen.**
-

7.4.2 Viewing the Titration Table

The Titration Table shows information on the currently used drugs. You can check the dose received by the patient at different infusion rate through the Titration Table. The procedure for viewing the titration table is as follows:

1. In the calculation screen, select **【Drug】** to enter the drug calculation page.
2. Select **【Titration】** tab.
3. Select **【Dose Type】** at the bottom of the interface to set the unit type of the drug dosage in the titration table.
4. Select **【Step】** to set the interval between two adjacent items in the titration table.
5. You can choose the sorting method of titration table:
 - ◆ **【Dose】** : The titration table is listed in the sequence of increased drug dose.
 - ◆ **【INF Rate】** : The titration table is listed in the sequence of increased infusion rate.

7.4.3 Printing the Titration Table

Select **【Print】** button at the bottom right corner of the titration table page to print the titration table.

7.4.4 Drug calculation Formula

Description	Unit	Formula
Drug Amount	g series: mcg, mg, g; unit series: unit, kU, MU; mEq series: mEq;	Dose = Liquid volume × drug concentration
Liquid Volume	ml	Manual input required
Drug concentration	mcg/ml, mg/ml, g/ml, Unit/ml, kU/ml, MU/ml, mEq/ml	Drug concentration = Drug amount /liquid volume
Drop Size	GTT/ml	Manual input required
Dose/hr	g series: mcg, mg, g; unit series: unit, kU, MU; mEq series: mEq;	Dose/h=Dose/min×60
Dose/min	g series: mcg, mg, g; unit series: unit, kU, MU; mEq series: mEq;	DoseMin = DoseMin
Dose/kg/hr (weight based)	g series: mcg, mg, g; unit series: unit, kU, MU; mEq series: mEq;	Dose/h= Dose/h/weight
Dose/kg/min (weight based)	g series: mcg, mg, g; unit series: unit, kU, MU; mEq series: mEq;	Dose/min = Dose/min /weight
INF rate	ml/h	Infusion rate = Dose/h/drug concentration
Drip rate	GTT/min	Drip rate = infusion rate*Drop size /60
Duration	h	Duration = drug amount/dose/h

7.5 Hemodynamic Calculation

You can perform hemodynamic calculations, view calculation results, and print calculation results on the hemodynamic calculation page.

7.5.1 Calculation Step

The hemodynamic calculation steps are as follows:

1. Select **【Hemodynamics】** at the top of the calculation screen to enter the hemodynamic calculation page.
2. Enter the correct value of each parameter. For the patient being monitored, the height and weight come from the entered patient information on patient management screen.
3. Select **【Calculate】** to calculate the value of each output parameter. For the output value beyond the normal range: “↑” is displayed next to the output value which is greater than the upper limit of the normal range; “↓” is displayed next to the output value which is less than the lower limit of the normal range.
 - Select **【Range】** to show the normal range of each parameter.
 - Select **【Unit】** to show the unit of each parameter.

7.5.2 Viewing the Calculation Results

The calculation result will be automatically saved in the CMS. The CMS can save the results of up to 20 calculations. The calculation time will be displayed on the left side of the hemodynamics calculation page. You can select the desired calculation time and view the calculation result of selected time.

7.5.3 Printing the Calculation Results

Select **【Print】** button at the lower right corner of the hemodynamic calculation page to print the hemodynamic calculation results.

7.5.4 Input Parameters

Abbreviation	Unit	Full Name
C.O.	L/min	Cardiac output
HR	bpm	Heart rate
PAWP	mmHg	Pulmonary artery wedge pressure
MAP	mmHg	Artery mean pressure
MPAP	mmHg	Mean pulmonary artery pressure
CVP	mmHg	Central venous pressure
EDV	ml	End-diastolic volume
Height	cm	Height
Weight	kg	Weight

7.5.5 Output Parameters and calculation formula

Output Parameter	Unit	Full Name	Formula
C.I.	mL/min/m ²	cardiac index	C. I. = C. O. / BSA
BSA	m ²	body surface area	BSA = HT ^{0.725} × WT ^{0.425} × 0.007184
SV	mL	stroke volume	SV = 1000 × C.O. /HR
SVI	mL/m ²	stroke index	SVI= SV/BSA
SVR	dyn*s/cm ⁵	systemic vascular resistance	SVR = 79.96 × $\frac{MAP - CVP}{C. O.}$
SVRI	dyn*s*m ² /cm ⁵	systemic vascular resistance index	SVRI = SVI /BSA or $SVRI = 79.96 \times \frac{MAP - CVP}{C.I.}$

Output Parameter	Unit	Full Name	Formula
PVR	$\text{dyn}\cdot\text{s}/\text{cm}^5$	pulmonary vascular resistance	$\text{PVR} = 79.96 \times \frac{\text{MPAP} - \text{PAWP}}{\text{C.O.}}$
PVRI	$\text{dyn}\cdot\text{s}\cdot\text{m}^2/\text{cm}^5$	pulmonary vascular resistance index	$\text{PVRI} = \text{PVR} \times \text{BSA}$ or $\text{PVRI} = 79.96 \times \frac{\text{MPAP} - \text{PAWP}}{\text{C.I.}}$
LCW	$\text{kg}\cdot\text{m}$	left cardiac work	$\text{LCW} = 0.0136 \times \text{APMAP} \times \text{C.O.}$
LCWI	$\text{kg}\cdot\text{m}/\text{m}^2$	left cardiac work index	$\text{LCWI} = \text{LCW} \times \text{BSA}$ or $\text{LCWI} = 0.0136 \times \text{APMAP} \times \text{C.I.}$
LVSW	$\text{g}\cdot\text{m}$	left ventricular stroke work	$\text{LVSW} = 0.0136 \times \text{MAP} \times \text{SV}$
LVSWI	$\text{g}\cdot\text{m}/\text{m}^2$	left ventricular stroke work index	$\text{LVSWI} = \text{LVSW} / \text{BSA}$ or $\text{LVSWI} = 0.0136 \times \text{MAP} \times \text{SVI}$
RCW	$\text{kg}\cdot\text{m}$	right cardiac work	$\text{RCW} = 0.0136 \times \text{PAMAP} \times \text{C.O.}$

Output Parameter	Unit	Full Name	Formula
RCWI	kg*m/m ²	right cardiac work index	RCWI= RCW/BSA or $RCWI = 0.0136 \times PAMAP \times C.I.$
RVSW	g*m	right ventricular stroke work	$RVSW = 0.0136 \times MPAP \times SV$
RVSWI	g*m/m ²	right ventricular stroke work index	RVSWI=RVSW/BSA or $RVSWI = 0.0136 \times MPAP \times SVI$
EF	%	ejection fraction	$EF = 100 \times SV / EDV$

7.6 Oxygenation Calculation

You can perform oxygenation calculation, view calculation results, and print calculation results on the oxygenation calculation page.

7.6.1 Calculation Step

The oxygenation calculation steps are as follows:

1. At the top of the calculation screen, select **【Oxygenation】** to enter the oxygenation calculation page.
2. Enter the correct value for each parameter. For the patient being monitored, the height and weight come from the entered patient information on patient management screen.
3. Select **【Calculate】** to calculate the value of each output parameter. For the output value beyond the normal range: “↑” is displayed next

to the output value which is greater than the upper limit of the normal range; “↓” is displayed next to the output value which is less than the lower limit of the normal range.

In the oxygenation calculation page, you can also perform the following operations:

- Select **【Oxygen Unit】**, **【Hb Unit】** and **【Pressure Unit】**, then corresponding parameter values will be automatically converted and updated accordingly.
- Select **【Range】** to show the normal range of each parameter.
- Select **【Unit】** to show the unit of each parameter.

7.6.2 Viewing the Calculation Results

The calculation result will be automatically saved in the CMS. The CMS can save the results of up to 20 calculations. The calculation time will be displayed on the left side of the oxygenation calculation page. You can select the desired calculation time and view the calculation result of selected time.

7.6.3 Printing the Calculation Results

Select **【Print】** button at the bottom right corner of the oxygenation calculation page to print the oxygenation calculation results.

7.6.4 Input Parameters

Input Parameter	Unit	Full Name
C.O.	L/min	cardiac output
FiO2	bpm	percentage fraction of inspired oxygen
PaO2	mmHg, kPa	partial pressure of oxygen in the arteries
PaCO2	mmHg, kPa	partial pressure of carbon dioxide in the arteries
SaO2	%	arterial oxygen saturation
PvO2	mmHg, kPa	partial pressure of oxygen in venous blood

Input Parameter	Unit	Full Name
SvO2	%	venous oxygen saturation
Hb	g/L, g/dL, mmol/L	hemoglobin
CaO2	mL/dL, mL/L	arterial oxygen content
CvO2	mL/dL, mL/L	venous oxygen content
VO2	mL/min	oxygen consumption
RQ		Respiratory quotient
ATMP	mmHg, kPa	atmospheric pressure
Height	cm, inch	height
Weight	kg, lb	weight

7.6.5 Output Parameters and calculation formula

Output Parameters	Unit	Full Name	Formula
BSA	m ²	body surface area	$BSA = HT^{0.725} \times WT^{0.425} \times 0.007184$ Formula for adult female:
C(a-v)O2	mL/L, mL/dL	arteriovenous oxygen content difference	$C(a-v)O_2 = CaO_2 - CvO_2$
O2ER	%	oxygen extraction ratio	$O_2ER = (CaO_2 - CvO_2) / CaO_2$
DO2	mL/min	oxygen transport	$DO_2 = C.O. \times CaO_2$
PAO2	mmHg, kPa	partial pressure of oxygen in the alveolar	$PAO_2 = [FiO_2 \times (ATMP - \text{water pressure})] - (PaCO_2 \times 1.25)$ Wherein the water pressure is selected to be 47mmHg (6.3kPa)
AaDO2	mmHg, kPa	alveolar-arterial	$AaDO_2 = PAO_2 - PaO_2$

Output Parameters	Unit	Full Name	Formula
		oxygen difference	
CcO ₂	mL/L, mL/dL	capillary oxygen content	$CcO_2 = Hb \times 1.34 + 0.031 \times PAO_2$
Qs/Qt	%	venousad mixture	$Qs/Qt = (CcO_2 - CaO_2) / (CcO_2 - CvO_2)$

7.7 Ventilation Calculation

You can perform ventilation calculations, view the calculation results, and print the calculation results on the ventilation calculation page.

7.7.1 Calculation Step

The ventilation calculation steps are as follows:

1. At the top of the calculation screen, select **【Ventilation】** to enter the ventilation calculation page.
2. Enter the correct value for each parameter. For the patient being monitored, the height and weight come from the entered patient information on patient management screen.
3. Select **【Calculate】** to calculate the value of each output parameter. For output values beyond the normal range: “↑” is displayed next to the output value which is greater than the upper limit of the normal range; “↓” is displayed next to the output value which is less than the lower limit of the normal range.

In the ventilation calculation page, you can also perform the following operations:

- Select **【Pressure Unit】**, then corresponding parameter values will be automatically converted and updated accordingly.
- Select **【Range】** to show the normal range of each parameter.

- Select **【Unit】** to display the unit of each parameter.

7.7.2 Viewing the Calculation Results

The calculation result will be automatically saved in the CMS. The CMS can save the results of up to 20 calculations. The calculation time will be displayed on the left side of the ventilation calculation page. You can select the desired calculation time and view the calculation result of selected time.

7.7.3 Printing the Calculation Results

Select **【Print】** button at the lower right corner of the ventilation calculation page to print the ventilation calculation results.

7.7.4 Input Parameters

Input Parameter	Unit	Full Name
FiO2	%	percentage fraction of inspired oxygen
RR	rpm	respiration rate
PeCO2	mmHg, kPa	partial pressure of mixed expiratory CO2
PaCO2	mmHg, kPa	partial pressure of carbon dioxide in the arteries
PaO2	mmHg, kPa	partial pressure of oxygen in the arteries
TV	mL	tidal volume
RQ	/	respiratory quotient
ATMP	mmHg, kPa	atmospheric pressure

7.7.5 Output Parameter and calculation formula

Output Parameter	Unit	Full Name	Formula
PAO2	mmHg, kPa	partial pressure of oxygen in the alveolar	$PAO_2 = \left[FiO_2 \times (ATMP - \text{water pressure}) \right] - (PaCO_2 \times 1.25)$ Wherein the water pressure is selected to be 47mmHg (6.3kPa)
AaDO2	mmHg, kPa	alveolar-arterial oxygen difference	$AaDO_2 = PAO_2 - PaO_2$
Pa/FiO2	mmHg, kPa	oxygenation ratio	$Pa/FiO_2 = PaO_2 / FiO_2$
a/AO2	%	arterial to alveolar oxygen ratio	$a/AO_2 = (100 \times PaO_2) / PAO_2$
MV	L/min	minute volume	$MV = (TV / 1000) \times RR$
Vd	mL	volume of physiological dead space	$V_d = \left[(PaCO_2 - PeCO_2) \times TV \right] / PaCO_2$
Vd/Vt	%	physiologic dead space in percent of tidal volume	$V_d/V_t = (PaCO_2 - PeCO_2) / PaCO_2 \times 100\%$
VA	L/min	alveolar volume	$VA = (TV - V_d) \times RR$

7.8 Nephridium Calculation

You can perform nephridium calculations, view calculation results, and print calculation results on the nephridium calculation page.

7.8.1 Calculation Step

The nephridium calculation steps are as follows:

1. At the top of the calculation screen, select **【Nephridium】** to enter the nephridium calculation page.
2. Enter the correct value for each parameter. For the patient being monitored, the height and weight come from the entered patient information on patient management screen.
3. Select **【Calculate】** to calculate the value of each output parameter. For output values beyond the normal range: “↑” is displayed next to the output value which is greater than the upper limit of the normal range; “↓” is displayed next to the output value which is less than the lower limit of the normal range.

In the nephridium calculation page, you can also perform the following operations:

- Select **【Range】** to show the normal range of each parameter.
- Select **【Unit】** to show the unit of each parameter.

7.8.2 Viewing the Calculation Results

The calculation result will be automatically saved in the CMS. The CMS can save the results of up to 20 calculations. The calculation time will be displayed on the left side of the nephridium calculation page. You can select the desired calculation time and view the calculation result of selected time.

7.8.3 Printing the Calculation Results

Select **【Print】** button at the bottom right corner of the nephridium calculation page to print the calculation results.

7.8.4 Input Parameter

Input Parameters	Unit	Full Name
URK	mmol/L	Urine pstassium
Urna	mmol/L	Urinary sodium

Input Parameters	Unit	Full Name
Urine	mL/24h	Urine
Posm	mosm/kg	Plasm osmolality
Uosm	mosm/kg	Urine osmolality
Serna	mmol/L	Serum sodium
Cr	umol/L	Creatinine
Ucr	umol/L	Urine creatinine
BUN	mmol/L	Blood urea nitrogen
Height	cm, inch	Height
Weight	kg, lb	Weight

7.8.5 Output Parameter and calculation formula

Output Parameter	Unit	Full Name	Formula
URNaEx	mmol/24h	urinesodium excretion	$URNaEx = \text{Urine} \times URNa / 1000$
Cosm	mL/min	osmolar clearance	$Cosm = Uosm \times (\text{Urine} / 24 / 60) / Posm$
URKEx	mmol/24h	urine potassium excretion	$URKEx = \text{Urine} \times URK / 1000$
CH2O	mL/h	free water clearance	$CH2O = \text{Urine} / 24 \times (1 - Uosm / Posm)$
Na/K	%	sodium potassium ratio	$Na/K = URNaEx / URKEx$
U/Posm		urine to plasma osmolality ratio	$U/Posm = Uosm / Posm$
BUN/Cr		blood ureanitrogen creatinine ratio	BUN / Cr
CNa	mL/24h	clearance of sodium	$CNa(mL/24hrs) = URNa \times \text{Urine} / SerNa$

Output Parameter	Unit	Full Name	Formula
Clcr	mL/min	creatinine clearance rate	$\text{Ccr} = \frac{(140 - \text{age}) \times \text{weight}(\text{kg})}{[72 \times \text{Scr}(\text{mg/dL})]}$ or $\text{Ccr} = \frac{(140 - \text{age}) \times \text{weight}(\text{kg})}{[0.818 \times \text{Scr}(\text{umol/L})]}$ Female: the calculation result $\times 0.85$.
U/Cr		urine-serum creatinine ratio	UCr/Cr
Fena	%	fractional excretion of sodium	$\text{FENa}\% = \frac{\text{URNa} \times \text{Cr}}{\text{SerNa} \times \text{Ucr}} \times 100\%$

Note: BUN/Cr is a ratio at mol unit system.

Chapter 8 Printing

8.1 Introduction

The CMS can be connected with a printer to output reports. The printer has a separate AC power supply.



NOTE

- For the details of the printer, please refer to the document accompanying the printer.
 - You can only print PDF reports through PDFCreator.
-

8.2 Start Printing

You can manually start printing reports such as trend data, calculation results, etc.

8.2.1 Printing Review Data

For details on how to print reports such as tabular trend, graphic trend, waveform review, waveform segment, event review, OxyCRG review, ST segment waveform, arrhythmia statistical results and so on, please refer to *Chapter 6 Review*.

8.2.2 Printing Calculation Results

For details on how to manually print the drug calculation results, hemodynamics calculation results, oxygenation calculation results, ventilation calculation results and nephridium calculation results, please refer to *Chapter 7 Calculation*.

8.2.3 Printing ECG 24h Sum


For details on how to manually print the ECG 24h Summary, please refer to *Chapter 3.5.9.2 Printing 24h ECG Summary Report*.

8.2.4 Printing Respiratory Oxygenation Report

For details on how to manually print the respiratory oxygenation report, please refer to *Chapter 3.5.8.3 Printing Respiratory Oxygenation Report*.

8.2.5 Printing QT Reports


When the monitor performs QT analysis, you can print the QT reports on the CMS. Please follow the steps below:

1. Enter the ViewBed screen as follows: Double-click the parameter area or waveform area of the desired patient sector on the MultiBed screen.
2. Enter **【QT View】** in either of the following methods:
 - ◆ Select QT parameter area to enter QT menu → Select **【QT View】** at the bottom of the menu.
 - ◆ Select the ECG parameter area to enter the ECG menu → Select **【QT】** tab → Select **【QT view】** at the bottom of the menu.
3. Select the button  in the upper left corner.

8.2.6 Printing ST View

The ST view shows a complete QRS segment of each ST lead. You can print the ST view. Please follow the steps:

1. Enter the ViewBed screen as follows: Double-click the parameter area or waveform area of the desired patient sector on the MultiBed screen.
2. Enter **【ST View】** in either of the following methods:
 - ◆ Select ST parameter area to enter **【ST】** menu → Select **【ST View】** at the bottom of the menu.


- ◆ Select the ECG parameter area to enter the ECG menu → Select **【ST】** tab → Select **【ST View】** at the bottom of the menu.
- 3. Select the button  in the upper left corner.

8.2.7 Printing Freeze Waveform


For details on how to print freeze waveforms, please refer to *Chapter 3.5.6.3 Printing Freeze Waveforms*.

8.2.8 Print Alarm Setup

Please follow the steps below:

1. Enter the ViewBed screen as follows: double-click the parameter area or waveform area of the desired patient sector on the MultiBed screen.
2. Select **【Alarm Setup】** quick key at the bottom of the interface.
3. After setting, select the button  in the upper left corner.

8.3 Viewing Printing Statuses

You can view the status of the latest print job in the current queue in **【Print Queue】**. Please follow the steps below to view the status of the print job: Select the button  at the top right of the main screen.

8.4 Setting Reports

You can set the patient information displayed on the report. For details, please refer to *Chapter 9.9.3 Setting Report Layout*.

8.5 Printer Out of Paper

When the printer is out of paper, the print request may not be responded to; when there are too many unresponsive tasks, may caused the printer cannot work properly. In this case, you need to load the paper, and then resend the print request. Restart the printer if necessary.

Therefore, it is best to ensure that there is enough paper in the printer before sending a print request.

Chapter 9 System Setup

9.1 Introduction

The CMS provides system setting. You can change the system setting as needed. The current system in this chapter refers to the CMS.



WARNING

- **Do not arbitrarily change the system settings. Before changing the system settings, please fully evaluate the impact on patient.**



NOTE

- **Many system settings are protected by passwords. The password must be changed by authorized personnel. If you need a password to access these functions, please contact the relevant personnel.**
-

9.2 General Tab

In the **【General】** tab, you can adjust the volume and view help information.

9.2.1 Accessing General Setup Page

Please follow the steps below to enter the general setup page:

1. Select the system menu area at the upper left corner of the main screen → Select **【System Setup】** from the drop-down list to enter the **【System Setup】** menu.
2. Select **【General】** tab.

9.2.2 Setting Alarm Volume

In the **【Volume】** tab, you can set the current system alarm volume, high alarm volume and reminder volume. For details about the alarm volume, refer to *Chapter 5.5.4 Setting Alarm Volume*.

9.3 Display Tab

In the **【Display】** tab, you can set the parameters color, related information on the screen, patient window and so on.

9.3.1 Accessing Display Setup Page

Please follow the steps below to enter the display setup page:

1. Select the system menu area at the upper left corner of the main screen → Select **【System Setup】** from the drop-down list to enter the **【System Setup】** menu.
2. Select **【Display】** tab → enter the password → Select **【OK】** .

9.3.2 Setting Parameter Color

On the screen of the **CMS**, the related information of the same parameter is displayed in the same color. This information includes: real-time waveform, real-time parameter value, review waveform (including waveform name, gain, filtering method), etc. You can set the desired color for parameter.

Please follow the steps below:

1. On the display setup page, select **【Param Color】** tab.
2. Select the color box on the right side of the desired parameter.
3. From the drop-down list, select the desired color.

9.3.3 Screen Setup

In the **【Screen】** tab, you can set:

- Screen size
- Number of patient sectors

- Auto close ViewBed screen

9.3.3.1 Setting Screen Size

Please follow the steps below to set the screen size:

1. On the display setup page, select **【Screen】** tab.
2. Select **【Screen Size】** , select the desired screen size. If there is no desired screen size, select **【Others】** , and then select the **+** or **-** button to set the desired screen size.
3. Select **【Confirm】** .



NOTE

- **Restart the system after making a change in the screen size.**
 - **The CMS can connect up to four displays. The number of screens will be checked every time the system is started. When using more than one screen, the same screen size and the same resolution should be selected.**
-

9.3.3.2 Setting Patient Sectors Number

You can set the number of patient sectors displayed on the MultiBed screen as needed. Please follow the steps below:

1. On the display setup page, select **【Screen】** tab.
2. Set **【Patient Sectors Number】** .

9.3.3.3 Setting Auto Close ViewBed Screen

Please follow the steps below to enable automatically close the ViewBed screen:

1. On the display setup page, select **【Screen】** tab.
2. Set **【Auto Close ViewBed Screen】** . Select options other than

【Never】 to turn on the automatic closing of the ViewBed screen function.

3. Select the desired closing time from the drop-down list. After entering the ViewBed screen, if you do not perform any operation within the set time, the CMS will automatically close ViewBed screen and enter the MultiBed screen.

9.3.3.4 Setting the Position of Main Screens

The **【Main Screen Position】** option is displayed only when more than one display is available. You can select the desired display where the MultiBed screen (main screen) is shown.

To set the position of main screen, follow this procedure:

1. On the display setup page, select the **【Screen】** tab.
2. Set **【Main Screen Position】**. Select the desired display number. For example, if you select 2, then the main screen will be shown on the second display.

9.3.3.5 Enabling the Screen Scaling

The **【Screen Scaling】** item is displayed only when more than one display is available. If enable the **【Screen Scaling】**, the patient sector layout will scale automatically according to display area.

Please follow the steps below to enable/disable the function:

1. On the display setup page, select the **【Screen】** tab.
2. Enable/disable **【Screen Scaling】**.

9.3.4 Setting Patient Window

You can choose what needs to be displayed on the review screen. Please follow the steps below:

1. Select **【Patient Window】** tab on the display setup page.
2. Select the desired option.

9.3.5 Setting Sector

You can enable/disable switching locked sector function. Please follow the steps below:

1. Select **【Sector】** tab on the display setup page.
2. Enable/disable **【Support Switching Locked Sector】** .

9.4 Alarm Tab

In the **【Alarm】** tab, you can set alarm-related properties, such as alarm volume.

9.4.1 Accessing Alarm Setup Page

Please follow the steps below to enter the alarm setup page:

1. Select the system menu area at the upper left corner of the main screen → Select **【System Setup】** from the drop-down list to enter the **【System Setup】** menu.
2. Select **【Alarm】** tab → enter the password → Select **【OK】** .

9.4.2 Setting Alarm Volume

Please follow the steps below to set the alarm volume:

1. Select **【Volume】** tab on the alarm setup page.
2. Set the desired content. The following only introduces the content that may need to be explained in the setup page.
 - ◆ **【Minimum Alarm Volume】** : The setting range is 0-10.
 - ◆ **【Alarm Volume】** : Three modes are available: **【ISO】** , **【Mode 1】** , **【Mode 2】** . Only in the ISO mode you can set **【High Alarm Interval】**, **【Med Alarm Interval】** and **【Low Alarm Interval】** .
 - ◆ **【Auto Increase Volume】** : **【2 Step】** means that the alarm volume is automatically increased by 2 levels; **【1 Step】** means

that the alarm volume is automatically increased by 1 level;
【Off】 means the alarm volume is unchanged.

- ◆ **【Reminder Interval】** : Select the desired time from drop-down lists.

9.4.3 Setting Other Alarm Items

Please follow the steps below to set other items:

1. Select **【Other】** tab on the alarm setup page.
2. Set the desired item.
 - ◆ **【Global Silence Hotkey】** : Set the hotkey that can be used to silence the system.
 - ◆ **【Global Silence】** : Allow or prohibit system silence. After enabling the system silence, press the silence hotkey or select the symbol at the top of the main screen to silence the system.
 - ◆ **【Offline Alarm Priority】** : Set the alarm priority of that the monitoring device is disconnected from the CMS.
 - ◆ **【Flashing Alarm Bar】** : When enabled, the background color of high and medium alarm messages will flash.

9.5 Patient Management Tab

In the **【Patient Management】** tab, you can set the patient information items displayed on the patient management screen.

9.5.1 Accessing Patient Management Page

Please follow the steps below to enter the patient management setup page:

1. Select the system menu area at the upper left corner of the main screen → Select **【System Setup】** from the drop-down list to enter the **【System Setup】** menu.
2. Select **【Patient Management】** tab → Enter the password → Select **【OK】** .

9.5.2 Setting Patient Information Items

In the **【Field】** tab, you can set the patient fields that are displayed on the patient management screen.

Please follow the steps below to set the patient fields:

1. On the patient management setup page, select **【Field】** tab.
2. Select the desired patient information items.
3. If you need to customize patient information items, Select the custom field and enter the desired name in the text box.

9.5.3 Setting ADT Query

In the **【ADT Quick Query】** tab, you can set the criteria for querying discharged patient data in the patient management screen.

Please follow the steps below to set:

1. On the patient management setup page, select **【ADT Query】** tab.
2. Select the desired items.

9.5.4 Setting Patient Group

In the **【Patient Group】** tab, you can set the name of the patient group. After setting, the name and background color of the set patient group will appear in the drop-down options of the **【Patient Group】** field on the patient management screen.

Please follow the steps below to set patient group:

1. Select **【Patient Group】** tab on the patient management setup page.
2. Select the desired patient group.
3. Enter the desired name.

9.5.5 Setting Care Group

In the **【Care Group】** tab, you can set the name of the care group. After setting, the name and background color of the set care group will appear in the

drop-down options of the **【Care Group】** field on the patient management screen.

Please follow the steps below to set care group:

1. On the patient management setup page, Select **【Care Group】** tab.
2. Select the desired care group.
3. Enter the desired name.

9.5.6 Setting Other Patient Information Items

In the **【Other】** tab, you can set the patient information displayed in the patient sector.

Please follow the steps below:

1. On the patient management setup page, select **【Other】** tab.
2. Select the desired item in **【Display Information in Patient Sector】** .
 - ◆ **【Patient Name】** : Display the patient's name in the patient information area of the patient sector.
 - ◆ **【Patient ID】**: Display the patient ID in the patient information area of the patient sector.
 - ◆ **【Visit Number】** : Display the visit number in the patient information area of the patient sector.
 - ◆ **【None】**: The patient information is not displayed in the patient information area of the patient sector.

9.6 Device Management Tab

In the **【Device Management】** tab, you can admit monitoring devices. This tab includes two sub tabs, **【Device Assignment】** and **【Auto Admit Devices】** .

9.6.1 Accessing Device Management Page

Please follow the steps below to enter the device management interface:

1. Select the system menu area in the upper left corner of the main screen → Select **【System Setup】** from the drop-down list to enter the **【System Setup】** menu.
2. Select **【Device Management】** tab → enter the password → Select **【OK】** .

9.6.2 Device Management

On the CMS, you can manually admit monitoring device or set the system to automatically admit monitoring device. For details, refer to *Chapter 4.2 Admitting Monitoring device*.

9.7 Review tab

In the **【Review】** tab, you can set information such as trend groups and so on.

9.7.1 Accessing Review Setup Page

Please follow the steps below to access the review setup page:

1. Select the system menu area in the upper left corner of the main screen → Select **【System Setup】** from the drop-down list to enter the **【System Setup】** menu.
2. Select **【Review】** tab → enter the password → Select **【OK】** .

9.7.2 Setting Trend Group

In the **【Trend】** tab, you can set the trend group. A trend group defines the trend displayed on the tabular/graphic trends review page and printed in trend reports and recordings.

You can perform the following operations on trend groups:

- Add/delete parameters

- Move parameters



NOTE

- In the **【Trend Group Setup】** window, HR is displayed in the first row of the parameter list and cannot be deleted or moved.
-

9.7.2.1 Setting Trend Parameter

Please follow the steps below to add, delete or move parameters:

1. On the review setup page, select **【Trend】** tab.
2. Select **【Trend Group】** to enter the **【Trend Group】** menu.
3. Select the desired trend group tab and parameters.
4. Select the corresponding button to set the parameters:
 - ◆ Add parameters: select desired parameters from the **【Choices】** column on the left and select **【Add】** .
 - ◆ Delete parameters: select desired parameter from the **【Selected】** column on the right and then select **【Remove】** .
 - ◆ Move the position of parameters: select desired parameters from the **【Selected】** column on the right and select **【Move Up】** , **【Move Down】** , **【Move To Top】** or **【Move To Bottom】** .

Selecting **【Default Config】** will resume the trend group setting to factory defaults.

9.7.3 Setting History Patient

In the **【History Patient】** tab, you can set automatically delete history patient and storage full alarm level.

9.7.3.1 Setting Automatically Delete History Patient When Storage is Full

Please follow the steps below:

1. On the review setup page, select **【History Patient】** tab.
2. Enable **【History Patients are Automatically Deleted When the Storage Capacity is Full】**

9.7.3.2 Setting Automatically Delete History Patient When Prompted

Please follow the steps below:

1. On the review setup page, select **【History Patient】** tab.
2. Enable **【Automatically Delete the History Patients When Prompted】**

9.7.3.3 Setting Storage Full Alarm Level

Please follow the steps below:

1. On the review setup page, select **【History Patient】** tab.
2. set **【Storage Full Alarm Level】**

9.8 Network Tab

In the **【Network】** tab, you can set the communication between the CMS and the monitoring device.

9.8.1 Accessing Network Setup Page

Please follow the steps below to access the network setup page:

1. Select the system menu area in the upper left corner of the main screen → Select **【System Setup】** from the drop-down list to enter the **【System Setup】** menu.
2. Select **【Network】** tab → enter the password → Select **【OK】** .

9.8.2 Setting General Tab

On the **【General】** tab of the CMS, you can set the central monitoring network.

Please follow the steps below to set the network:

1. Select **【General】** tab On the network setup page.
2. Select **【Central Monitoring Network Setup】** tab.
 - ◆ **【Server IP Address】** : Enter the IP address of the CMS used as the master server.
 - ◆ **【Connection Status】** : Display the network connection status of the CMS.

9.8.3 Setting HL7 Data Transmit

The CMS provides active transmit mode and inquiry transmit mode. In the active transmit mode, the CMS acts as a TCP server to monitor the connection of external systems. Once the connection with the external system is established, the CMS will actively transmit data at the set interval.

Please follow the steps below to set the active transmit mode:

1. On the network setup page, select **【HL7】** tab.
2. Set the desired content.
 - ◆ Enable **【HL7 Server Support】** .
 - ◆ **【Active Transmission Port】** : TCP listening port, the default value is **【6210】** . You can change the port as need.
 - ◆ **【time Interval for Transmitting Data】** : Select the interval for active mode.

9.9 Print Tab

In the **【Print】** tab, you can set the item related to the printer or the report.

9.9.1 Accessing the Print Setup Page

Please follow the steps below to access the print setup page:

1. Select the system menu area in the upper left corner of the main

screen → Select **【System Setup】** from the drop-down list to enter the **【System Setup】** menu.

2. Select **【Print】** tab → Enter the password → Select **【OK】** .

9.9.2 Setting Printer

Please follow the steps below to set the printer:

1. On the print setup page, select **【Printer】** tab.
2. Set **【Printer】** , **【Paper Size】** and **【Resolution】** .



NOTE

- **PDF reports can be output by PDF Creator only.**
-

9.9.3 Setting Report Layout

In the **【Report Layout】** tab, you can set the patient information displayed on reports.

Follow the steps below to set the report layout:

1. On the print setup page, select **【Report Layout】** tab.
2. Set the desired patient information field under **【Report Name】** .
【None】 means that the information field is not displayed on a report.

9.9.4 Setting PDF File Name

In the **【PDF File Name】** tab, you can set the naming rule for PDF report. Please follow the steps below to set:

1. On the print setup page, select **【PDF File Name】** tab.
2. Select the desired items under **【PDF File Name】** .
3. In the **【File Path】** text box, enter the directory where PDF files are saved.

4. In the **【User Name】** text box and the **【Password】** text box, enter the user name and password to access the directory where PDF files are saved.
5. Select **【Confirm】**

9.10 Other Tab

In the **【Other】** tab, you can set the unit, password, remote control, language, module, etc.

9.10.1 Accessing the Other Setup Page

Please follow the steps below to access the **【Other】** setup page:

1. Select the system menu area in the upper left corner of the main screen → Select **【System Setup】** from the drop-down list to access the **【System Setup】** menu.
2. Select **【Others】** tab → Enter the password → Select **【OK】** .

9.10.2 Setting Unit

Please follow the steps below to set the required unit:

1. Select **【Unit】** tab on the other setup page.
2. Set the desired unit.

9.10.3 Setting Module

In the **【Module】** tab, you can set ECG Standards and Low-Confidence Display ‘?’, QTc formula and ST auto scale.

Please follow the steps below to set:

1. On the other setup page, Select **【Module】** tab.
2. Set **【ECG Standard】** .
3. Enable/disable **【Low-Confidence Display ‘?’】** .
4. Set the desired **【QTc Formula】**. The CMS uses the Hodges formula by default to correct the QT interval based on the heart rate.

- ◆ Hodges: $QT_c = QT + 1.75 \times (\text{HeartRate} - 60)$
- ◆ Bazett: $QT_c = QT \times \left(\frac{\text{HeartRate}}{60} \right)^{\frac{1}{2}}$
- ◆ Fridericia: $QT_c = QT \times \left(\frac{\text{HeartRate}}{60} \right)^{\frac{1}{3}}$
- ◆ Framingham: $QT_c = QT + 154 \times \left(1 - \frac{60}{\text{HeartRate}} \right)$

5. Enable/disable **【ST Auto Scale】**. Enable **【ST Auto Scale】**, the scale on ST Graphic will automatically adjust according to the measurement value.

9.10.4 Setting Time



WARNING

- Do not change the operating system time manually or automatically. Otherwise, it may result in the loss of data stored in the CMS. The time can only be changed on the CMS.
-



NOTE

- After changing the system time of the CMS, the system time of the monitoring device networked with the CMS will also be changed synchronously, which is consistent with the system time of the CMS.
 - When the monitoring device is connected to the CMS, the CMS will synchronize the time of the monitoring device.
-

Please follow the steps below to set the time automatically or manually:

1. Select **【Time】** tab on the other setup page.
2. Set **【Time Synchronization】** :
 - ◆ **【Master Server】** : It will automatically synchronize with the time on the master server.
 - ◆ **【Manual】** : You can manually set the system time. After selecting **【Manual】** , you need to set the desired **【Date】** , **【Time】** .
 - ◆ Set **【Date Format】** .
 - ◆ **【24-Hour Time】**:When the **【24-Hour Time】** is disabled, the 12 hour format is enabled.

9.10.5 Setting the Password

9.10.5.1 Setting the Password Effective Time

If you use a password to access the alarm and other alarm-related settings, you can set the effective time of the password, after which you need to re-enter the password.

Please follow the steps below:

1. Select **【Password】** tab on the other setup page.
2. Set **【Retention Time】** .



NOTE

- It is recommended that the password be set by authorized personnel.
-

9.10.6 Setting Remote Control

In the **【Remote Control】** tab, you can set the authority to control the monitor to perform certain operations on the CMS.

Only when the monitor supports the function of remote control, you can remotely control the monitor through the **CMS** to perform related operations after setting in the **【Remote Control】**.

Please follow the steps below to set:

1. On the **【Other】** setup page, select **【Remote Control】** tab.
2. Select the desired item.
3. Set the desired item.
 - ◆ **【Read Only】** : You can only view the relevant information of the monitor on the CMS, and cannot perform related operations on the monitor.
 - ◆ **【Allow】** : On the CMS, you can control monitors remotely. No password is required.
 - ◆ **【User Password】** : On the CMS, you can control monitors remotely. Password is required. For details on password setup, consult the authorized personnel or us.

9.10.7 Setting Language

In the **【Multi-Language】** tab, you can change the language. When the **CMS** starts, the default language is the language selected during installation.

Please follow the steps below to change the language:

1. On the **【Other】** setup page, select **【Multi-Language】** tab.
2. Select the desired language. It is recommended to select the language supported by the operating system.
3. Restart the system.



NOTE

- If the language you choose is inconsistent with the language of the operating system, it may cause garbled characters in the CMS. Please

refer to the manual of the operating system to change the language and region settings of the operating system.

9.10.8 Setting Night Time

You can set the night time on the **CMS** for the average heart rate statistics. Please follow the steps below:

1. Select **【ECG 24h Summary】** tab on the other setup page.
2. Select **【From】** and **【To】** to define the beginning and end of the night time.

9.11 Factory Maintenance Tab

The item of the **【Factory Maintenance】** tab are used by maintenance personnel.

9.12 About Tab

In the **【About】** tab, you can view the CMS information such as version, manufacturer information.

Chapter 10 Maintenance

10.1 Introduction

Regular maintenance of the CMS is essential to ensure that the CMS works properly.

10.2 Safety information



WARNING

- **The hospital or medical institution using the CMS should establish a complete equipment maintenance plan, otherwise it may cause equipment failure and unpredictable consequences, and may cause health hazards possibly.**
- **Hospitals or medical institutions that use the central monitoring system should regularly pay attention to and timely update the official patches to improve the stability of the operating system;**
- **All safety inspections or repairs involving any disassembly of the CMS must be performed by professional maintenance personnel. Otherwise, equipment failure and possible health hazards could result.**
- **The maintenance personnel must be properly qualified and familiar with the operation of the product.**
- **If no patients are to be centrally monitored, please close the CMS.**
- **If the system software runs continuously for half a year, please restart the system. Long-term continuous operation may cause operating system failure.**

- **During the restart of the CMS, the patient data will not be saved. To avoid loss, please restart the system when patients are not monitored.**
 - **Disinfection and sterilization may cause damage to the equipment. When it is necessary to disinfect and sterilize the equipment, please consult the person of infectious disease control or an infectious disease expert in the hospital. After disinfection, check the equipment carefully. If you find any signs of aging or damage, stop using it immediately.**
-



CAUTION

- **If necessary, please contact us for information related to the maintenance.**
 - **If there is any problem with the CMS, please contact the maintenance personnel.**
 - **The CMS must be used and stored under the specified temperature, humidity and latitude.**
 - **When disposing of package materials, you must comply with relevant local regulations or hospital systems.**
 - **The equipment and its accessories that meet the service life must be disposed in accordance with relevant local regulations. If you have any questions about the disposal of the equipment, please contact us.**
-

10.3 Inspection

After the CMS has been used continuously for 6 to 12 months, repaired or upgraded, a comprehensive inspection should be carried out by qualified maintenance personnel to ensure the normal operation and work of the system.

The inspection before and during the use of the CMS should include:

- There is no mechanical damage to the equipment and accessories.
- The environment and power supply meet the requirements.
- The power cord and signal line have no abrasion and good insulation performance.
- The alarm system functions normally.
- The sound system functions normally.
- Various functions are in good working condition.

In case of any damage or abnormality, please do not use the CMS, and immediately contact the hospital's medical engineer or us.

10.4 Cleaning

The CMS should be cleaned regularly, and the frequency of cleaning should be increased in areas with serious environmental pollution or sandstorms.

The equipment to be cleaned includes the host, monitor, printer, keyboard mouse and etc. For details on clean, please refer to their manual. Please consult or understand the hospital's regulations on equipment cleaning, disinfection and sterilization before cleaning.



CAUTION

- **Before cleaning the equipment, the CMS must be turned off, and the power cord must be disconnected from the socket.**
- **When cleaning the mouse, keyboard or other peripheral devices, unplug them from the CMS.**
- **Be careful when cleaning the display. When cleaning the touch screen, it needs to be turned off.**

- **Please avoid the equipment and port when cleaning the equipment shell. Prevent water or detergent from entering the cabinet, switch, port, or any ventilation holes.**
 - **Never immerse any part of the CMS in liquids**
 - **Do not pour or spray any liquid on the CMS or permit fluid to seep into the interior. If you accidentally pour liquid on the CMS, please disconnect the power immediately, wipe the liquid, and contact maintenance personnel or us.**
 - **After cleaning, please check the equipment carefully. If you find any signs of aging or damage, stop using it immediately.**
-

10.5 Battery Maintenance

10.5.1 Introduction

The alarm device is equipped with rechargeable battery.

10.5.2 Installing and Replacing Battery

The battery must be installed and replaced by maintenance personnel trained and authorized by our company.

10.5.3 Battery Guidelines

The service life of the battery depends on the frequency and time of use. If lithium batteries are properly maintained and stored, their service life is about 3 years. If batteries are used improperly, their life may be shorter. We recommend replacing lithium batteries every 3 years.

Appendix A Technical Specifications

A.1 System Specifications

The hardware configuration of the **CMS** should have high reliability and stability. User should consider the functional configuration and performance requirements to ensure the normal and effective operation of the **CMS**.

The recommended hardware configuration of the **CMS** is as follows:

System Component	Requirements
System	<ul style="list-style-type: none"> ■ Meet the IEC 60950-1 requirements defined for ITE equipment, and comply with CE low voltage directives (LVD) and EMC directives. ■ Computer platforms should comply with IEC 61000-3-2:2018+A1:2020 and CISPR 32:2015+A1:2019 requirements
Host	<ul style="list-style-type: none"> ■ CPU: Intel i5 or above, minimum 4 cores, main frequency above 3.2 GHz ■ Memory: 4GB or above ■ Hard disk: 1TB or above, supporting dual hard disk data redundancy ■ Network card: 100M (or above) or self-adapting, Ethernet 802.3 ■ USB port: 2 or more ■ Optical drive: DVD-ROM
Display	<ul style="list-style-type: none"> ■ 19-inch or above widescreen display with 1920×1080 resolution

System Component	Requirements
	<ul style="list-style-type: none"> ■ Support up to 4 displays with 1920×1080 resolution
Operating System	Windows compatible system
Anti-virus Software	Install genuine antivirus software according to the actual situation when installation.
VGA Card	Supports dual or multiple screen
Printer	Windows compatible printer, supports A4 paper size
Alarm Device	Give alarm tones (45 to 85 dB) and alarm tones comply with the requirements of IEC 60601-1-8.
Network Device	16-port (or above) switches, POE wireless routers, network cables



NOTE

- The above configuration is for reference only, our company may change the above configuration at any time due to product upgrades.

A.2 Environmental specifications

Operating temperature	5°C ~ 40°C
Operating humidity	≤85% (non-condensing)
Operating atmospheric pressure	70kPa ~ 106kPa
Transportation and storage temperature	-20°C ~ +55°C
Transportation and storage	≤93% (non-condensing)

humidity	
Transportation and storage atmospheric pressure	50kPa~106kPa

A.3 Number of Monitoring Devices

Component	The maximum number of monitoring devices that can be connected
Central monitoring system	64

A.4 Wired Network

Network structure	Ethernet 802.3
Transmission rate	≥ 100 Mbps
Alarm delay to remote device	< 2 s

A.5 Review

Full disclosure	240 hours of full disclosure compressing waveform and enlarging waveform
Alarm events	The latest 1000 events; including the parameter value and 16-second waveform before and after an alarm is triggered
Mintrends	The last 8 hours of all parameters
OxyCRG review	The last 48 hours of OxyCRG curve
C.O. Review	The latest 720 C.O. measurement results
NIBP review	The latest 1000 NIBP measurement results
Historical review	Supports at least 500 discharged patient monitoring data review

ST Review	Last 240 hours of ST Review
------------------	-----------------------------

A.6 Calculation

The following five calculation types are supported:

- Drug calculation
- Hemodynamic calculation, support reviewing 20 calculation results
- Oxygenation calculation, support reviewing 20 calculation results
- Ventilation calculation, support reviewing 20 calculation results
- Nephridium calculation, support reviewing 20 calculation results

A.7 Printing

Printing paper	A4
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A.8 Battery

Type	Lithium-ion rechargeable battery, 3.7V, 1100mAh
Charge time	At least 3 hours. Turn off the power switch while charging.

Appendix B Message

B.1 Introduction

This chapter lists the alarm information of the CMS. For the physiological alarm information and technical alarm information of the monitoring device connected to the CMS, please refer to the manual of the monitoring device.

B.2 Alarm information in the system alarm area

The following table lists the alarm information displayed in the system alarm area at the top of the CMS screen.

Alarm Information	Alarm priority	Cause and Solution
Network disconnected.	High	The network connection of the CMS is disconnected. Please check whether the network connection is normal.
Low disk space.	Med	The storage space of discharged patient data is nearly full. You need to delete some discharged patients in the historical review.
Disk full.	High	The storage space of discharged patient data is full. You need to delete some discharged patients in the historical review.
No device online.	Med	The CMS does not have a monitor online. Please check whether the monitor in the network is normally connected to the CMS.

Alarm Information	Alarm priority	Cause and Solution
Alarm Box Disconnect	High	Check whether the communication cable of the alarm device is properly connected and the power switch is turned on.
Alarm Box Abnormal work	High	Alarm box battery failure, consult engineer; Alarm box circuit failure, consult engineer;
Device ID conflict	Med	Device ID of bedside units is set repeatedly. Please check and reset the device ID.
Device IP conflict	Med	Device IP of bedside units is set repeatedly. Please check and reset the device IP.

B.3 Alarm information in the patient sector alarm area

The following table lists the alarm information displayed in the alarm area of the patient sector. (For more alarm information, please refer to the manual of the monitoring devices)

Alarm Information	Alarm priority	Cause and Solution
Device Disconnected	High	Please check whether the monitor in the network is normally connected to the CMS.

B.4 Error Messages

Only items that may need special remarks are described here.

Error Messages	Cause and Solution
Input error: Drug Amount = Liquid Volume * Drug Concentration	The parameters involved in the calculation formula has

Error Messages	Cause and Solution
Input error: Drug Amount = Duration * (Dose/kg/min * 60) * Weight	been input values. Input value is not accordance with the calculation formula. Check the input value or delete one of input values.
Input error: Drug Amount = Duration * (Dose/kg/hr) * Weight	
Input error: Drug Amount = Duration * (Dose /min * 60)	
Input error: Drug Amount = Duration * Dose/hr	

Appendix C Default Settings

C.1 Introduction

This chapter lists the default setting information in the **【System Setting】** menu of the CMS. For details on how to access **【System Setup】** menu, please refer to *Chapter 9 System Settings*. For information about the default settings of the monitoring device on the CMS, please refer to the manual of the monitoring device.

C.2 General Tab

Subtab	Item	Default Setting
Volume	Alarm Volume	2
	High Alarm Volume	Alarm Volume +2
	Reminder Volume	5

C.3 Display Tab

Subtab	Item	Default Setting
Sector	Support Switching Locked Sector	Off
Screen	Patient Sector Number	8
	Auto Close the ViewBed Screen	Never
	Screen Scaling	Off
	Main Screen Position	1
Patient Window	OxyCRG	Selected
	ST	
	Arrhythmia	
	Drug calculation	
	Hemodynamic calculations	
	Oxygenation calculation	

Subtab	Item	Default Setting
	Ventilation calculation	
	Nephridium calculation	

C.4 Alarm Tab

Subtab	Item	Default Setting
Volume	Minimum Alarm Volume	2
	Alarm Volume	ISO
	High Alarm Interval	10 s
	Med Alarm Interval	20 s
	Low Alarm Interval	20 s
	Auto Increase Volume	Off
	Reminder Interval	1min
Other	Global Silence Hotkey	Null
	Global Silence	Enable
	Offline Alarm Priority	High
	Flashing Alarm Bar	On

C.5 Patient Management Tab

Subtab	Item	Default Setting
Field	Visit Number	Selected
ADT Query	Visit Number	Selected
	Name	Selected
Patient group	Group 1 ~ 16	Selected
Care group	Group 1 ~ 16	Selected
Other	Display Information in the patient sector	Patient Name

C.6 Review Tab

Subtab		Applicable to
History Patient	History patients are automatically delete when the storage capacity is full	On
	Automatically delete the history when prompted	On
	Storage full alarm level	Mid

C.7 Network Tab

Subtab	Item	Default Setting
General	Central Station Address	Off
HL7 data sending	HL7 Server Support	Off
	Port	6201
	Interval	1 min

C.8 Print Tab

Subtab	Item	Default Setting
Printer	Paper Size	A4
	Resolution	300 dpi
Report Layout	Visit Number	Displayed
	Name	
	Sex	
	Age	
	Blood Type	
	Room No.	
	Bed No.	

Subtab	Item	Default Setting
	Paced	
PDF File Name	Visit Number _ Name _ Room No. _ Bed No._ Printing Time	Displayed

C.9 Other Tab

Subtab	Item	Default Setting
Unit night mode	Height unit	cm
	Weight unit	kg
	Pressure unit	mmHg
	CO2 unit	mmHg
	O2 unit	%
	TEMP unit	°C
	DM unit	Drops/min
	IBP unit	mmHg
Module	ECG standard	AHA
	Low-confidence display '?'	Off
	Qtc formula	Hodges
	ST Auto Scale	On
Time	Time synchronization	Master server
	Date format	Year-month-day
	24 hour time	On
Password	Retention time	20 s
Remote control	Alarm setup	User password
	Nursing management	Allow
	Modify patient demographics	Allow
	Privacy mode	Read only

Subtab	Item	Default Setting
	Night mode	Read only
	NIBP start/stop	Read only
	Alarm pause/alarm reset	Read only
	Discharge patient	Allow
	ECG relearn	Allow

Appendix D Units, Symbols and Terms

D.1 List of Units

Abbreviation	Full Name
μA	microampere
μV	microvolt
μs	Microsecond
A	ampere
Ah	ampere hour
bpm	beat per minute
bps	bit per second
$^{\circ}\text{C}$	centigrade
cc	cubic centimeter
cm	centimeter
dB	decibel
DS	dyne second
$^{\circ}\text{F}$	fahrenheit
g	gram
GHz	gigahertz
GTT	gutta
h	hour
Hz	hertz
in	inch
k	kilo
kg	kilogram
kPa	kilopascal

Abbreviation	Full Name
L	litre
lb	pound
m	meter
mAh	milliampere hour
mbar	mbar
M	mega
MB	mega byte
MHz	mega hertz
mcg	microgram
mEq	milli-equivalents
mg	milligram
min	minute
ml	milliliter
mm	millimeter
mmHg	millimeters of mercury
ms	millisecond
mV	millivolt
mW	milliwatt
MΩ	megaohm
nm	nanometer
rpm	breaths per minute
s	second
V	volt
VA	volt ampere
Ω	ohm
W	watt

D.2 List of Symbols

Abbreviation	Full Name
—	Minus
-	Negative
%	Percent
/	Per; divide; or
~	To
+	Plus
=	Equal to
<	Less than
>	Greater than
≤	Less than or equal to
≥	Greater than or equal to
±	Plus or minus
×	Multiply
©	Copyright

D.3 List of Terms

Abbreviation	Full Name
AAMI	Association for Advancement of Medical Instrumentation
AC	Alternating current
ACI	Acceleration index
Adu	Adult
AHA	American Heart Association
ANSI	American National Standard Institute
Ao	Aortic pressure

Abbreviation	Full Name
aVF	Left foot augmented lead
aVL	Left arm augmented lead
aVR	Right arm augmented lead
awRR	Airway respiratory rate
BP	Blood pressure
BPSK	Binary phase shift keying
BSA	Bodysurface area
BTPS	Body temperature and pressures, saturated
CCU	Cardiac (coronary) care unit
CE	Conformité Européenne
CIS	Clinical information system
CISPR	International Special Committee on Radio Interference
CMOS	Complementary metal oxide semiconductor
CMS	Central monitoring system
COHb	Carboxyhemoglobin
CP	Cardiopulmonary
DC	Direct current
Dia	Diastolic
DPI	Dot per inch
DVI	Digital video interface
ECG	Electrocardiograph
EDV	End-diastolic volume
EEC	European Economic Community
EMC	Electromagnetic compatibility
EMG	Electromyograph

Abbreviation	Full Name
EMI	Electromagnetic interference
ESU	Electrosurgical unit
FCC	Federal Communication Commission
FDA	Food and Drug Administration
FV	Flow-volume
Hb	Hemoglobin
Hb-CO	Carbon mono-xide hemoglobin
HbO ₂	Oxyhemoglobin
HIS	Hospital information system
HR	Heart rate
ICU	Intensive care unit
ID	Identification
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronic Engineers
IP	Internet protocol
LA	Left arm
LAP	Left atrial pressure
Lat	Lateral
LCD	Liquid crystal display
LCW	Left cardiac work
LCWI	Left cardiac work index
LED	Light emitting diode
LL	Left leg
LVDS	Low voltage differential signal
MDD	Medical Device Directive
MetHb	Methemoglobin

Abbreviation	Full Name
MRI	Magnetic resonance imaging
N/A	Not applied
N ₂	Nitrogen
N ₂ O	Nitrous oxide
Neo	Neonate
NIBP	Noninvasive blood pressure
O ₂	Oxygen
OR	Operating room
OxyCRG	Oxygen cardio-respirogram
Paw	Airway pressure
PD	Photodetector
Ped	Pediatric
Pleth	Plethy smogram
PR	Pulse rate
PVC	Premature ventricular contraction
R	Right
RA	Right arm
RAM	Random access memory
RAP	Right atrial pressure
Rec	Record, recording
RESP	Respiration
RHb	Reduced hemoglobin
RL	Right leg
RR	Respiration rate
RSBI	Rapid shallow breathing index
SaO ₂	Arterial oxygen saturation

Abbreviation	Full Name
SEF	Spectral edge frequency
SFM	Self-maintenance
SpO ₂	Arterial oxygen saturation from pulse oximetry
SQI	Signal quality index
STR	Systolic time ratio
Sync	Synchronization
Sys	Systolic pressure
Taxil	Axillary temperature
TD	Temperature difference
TEMP	Temperature
TFC	Thoracic fluid content
TFI	Thoracic fluid index
TFT	Thin-film technology
Toral	Oral temperature
TP	Total power
Trect	Rectal temperature
UPS	Uninterruptible power supply
USB	Universal serial bus
VAC	Volts alternating current
VEPT	Volume of electrically participating tissue
VI	Velocity index

Appendix E Toxic and Harmful Substances or elements

Component		Lead Pb	Mercury Hg	Cadmium Cd	Hexavalent chromium Cr (VI)	Polybrominated biphenyls PBB	Polybrominated diphenyl ethers PBDE
Host	Label	○	○	○	○	○	○
Package	Package materials	○	○	○	○	○	○
Universal	Adapting piece	○	○	○	○	○	○
	Power cord	○	○	○	○	○	○
Remarks	○: It means that the content of the toxic and harmful substances in all homogeneous materials of the component is below the limit specified in SJ/T11363-2006.						



NOTE

- The CMS software does not contain toxic and harmful substances or elements.
- For the content of toxic and harmful substances or elements in the host computer, mouse, keyboard, monitor, printer and UPS, please refer to the relevant documents of these products.

Product Name: Central monitoring system

Product Model: BioVision

Manufacturer Name: Guangdong Biolight Meditech Co., Ltd.

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