

**BeneVision**

**Central Monitoring System Viewer**

**Operator's Manual**



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### WARNING

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- **This equipment must be operated by skilled/trained clinical professionals.**
  - **It is important for the hospital or organization that employs this equipment to carry out a reasonable service/maintenance plan. Neglect of this may result in machine breakdown or personal injury.**
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# Preface

## Manual Purpose

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 Mindray.

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.

## Intended Audience

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

## Illustrations

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

## Conventions

- *Italic text* is used in this manual to quote the referenced manuals, chapters, sections and formulas.
- **Bold text** is used to indicate the screen texts and names of hard keys.
- → is used to indicate operational procedures.

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# 1 General Product Description

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## 1.1 Overview

The BeneVision Central Monitoring System Viewer (hereinafter referred to as the CMS Viewer) is used to view a single patient connected to the target CentralStation. It is independent of the BeneVision Central Monitoring System (hereinafter referred to as the CMS) and shall be installed separately. The CMS Viewer is for remote browsing only and cannot be used to set or control the target CentralStation or the monitored devices at the target CentralStation.

The CMS Viewer provides the following major functions:

- The ability to view data in real-time and review data of online patients on the target CentralStation.
- The ability to view the review data of discharged patients.
- The ability to configure system settings such as unit of measure, network, and print settings.

### NOTE

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- **An online patient refers to a patient who is being monitored by the CentralStation.**
  - **Do not install the Viewer and the CMS system software on the same PC.**
  - **The Viewer does not provide alarm sound.**
  - **The system time of the Viewer shall be consistent with the system time of the CentralStation where the patient you wish to view is assigned to.**
  - **In this manual, the functions are presented according to the maximum product configuration.**
- 

## 1.2 Example Main Screen




After you select the desired bed from the bed list under the target department, the CMS Viewer main screen is as shown below.



(1)	System menu area: selecting this area opens the drop-down list where you can select different functions.
(2)	<b>Patient Management</b> tab: displays patient information.
(3)	<b>ViewBed</b> tab: displays the real-time data of the online patient.
(4)	<b>Summary</b> tab: you can view the summary data of the online patient. For details, see 3 <i>Summary Screen</i> .
(5)	Trend data or waveform data export queue symbol: selecting this symbol opens the <b>Export Setup</b> menu. In this menu, you can view export tasks in the <b>Name</b> column and view export progress and results in the <b>Status</b> column. Upon successful export, the task disappears from the task list. Selecting <b>Retry Failed Export</b> at the bottom of the menu re-exports failed items. Selecting <b>Remove Failed Export</b> removes all the export failure items from the task list. Note: the export symbol is displayed only when <b>Save As</b> is enabled in the system menu. For more information on enabling <b>Save As</b> , see 7.3.4 Setting Patient Data Export. For more information on the status of export symbol, see 2.4 <i>On-Screen Symbols</i> .
(6)	<b>Review</b> tab: you can view the patient history of the online patient.
(7)	Remote view button: selecting this button displays the bed list. For details, see 2.2 <i>Selecting an Online Patient..</i>
(8)	Department selecting and patient searching area: you can select desired department and search desired patient in this area.
(9)	Bed list: displays the list of beds in the selected department. A colored block is displayed before bed numbers to indicate different statuses: <ul style="list-style-type: none"> <li>◆ Red: indicates that a high priority alarm is triggered.</li> <li>◆ Yellow: indicates that a medium priority alarm is triggered.</li> <li>◆ Cyan: indicates that a low priority alarm is triggered.</li> </ul>

### 1.3 Trend Data or Waveform Data Export Symbol

The following table lists the symbols that may be displayed on the main screen.

Symbol	Description	Symbol	Description
	Selecting this symbol opens the <b>Export Setup</b> menu. For more information on this menu, see <i>1.2 Example Main Screen</i> .		Indicate that there are a total of five export tasks that are in progress or waiting to be started. The number in the green circle in the upper right corner changes with the number of export tasks. <ul style="list-style-type: none"> <li>■ When there are less than five tasks, the number of actual export tasks is displayed.</li> <li>■ When there are more than five tasks, ellipsis dots are displayed.</li> </ul>
	Indicate exporting failure.		

## 1.4 Directly Accessing the ViewBed Screen or the Review Screen

You can directly access the ViewBed screen or review screen of a specific patient by passing in command line parameters when starting the CMS Viewer application. You can also access these two screens by other means. For details on how to access these screens by other means, see *2 ViewBed Screen* and *4 Review Screen*.

To directly access the desired screen, follow this procedure:

1. Connect the CMS Viewer to the desired CentralStation.
2. From the Windows Command prompt or a shortcut link, enter either of the following parameters to the CMSViewer.exe:
  - ◆ --CMS="Department of CentralStation" --BedNo="Bed Number" --Entry="Desired Screen"
  - ◆ --PatientID="Medical Record No." --Entry="Desired Screen"

For example, if you wish to enter the full disclosure review screen of the patient whose medical record number is 1984, bed number is 0011 at the CentralStation whose department is ICU, enter this command: --CMS="ICU" --BedNo="0011" --Entry="Full Disclosure" or this command: --PatientID="1984" --Entry="Full Disclosure"


### NOTE

- **The command is case sensitive.**
- **Leave a blank space before the "--" symbol. Do not leave a blank space before or after the "=" symbol.**
- **The Desired Screen in this command can be replaced by ViewBed, Tabular Trends, Graphic Trends, Event, Full Disclosure, 12-Lead ECG, ST, or Arrhy Statistics.**

## 1.5 Viewing Patient Data Exported from CentralStation

You can view patient clinical data and historical data exported from CentralStation.

To view the patient data, follow this procedure:

1. Select the  button in the upper left corner of the main screen.
2. From the drop-down list, select **Browse**. The **Browse** menu is displayed.
3. Select **Browse**.
4. In the **File Path** dialog box, select the folder where patient data is saved and then select **OK**.
5. If you wish to view the data of a specific patient, enter patient name or Patient ID, and then select **Search**.
6. If you wish to view patient data details, select the desired patient from the patient list, and then select the **Details** button at the end of the discharged patient.
  - ◆ In the **Patient Management** tab, you can view patient information.
  - ◆ In the **Review** tab, you can review historical data of this patient. For more information on the **Review** tab, see Chapter *4 Review Screen*.

## NOTE

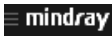
---

- Only when patient data is exported by the factory maintenance menu at the CentralStation can it be viewed at the CMS Viewer.
- 

## 1.6 Viewing System Information

You can view the system software version in the **System Information** the menu.

To access the **System Information** the menu, follow this procedure:

1. Select the  button in the upper left corner of the main screen.
2. From the drop-down list, select **System Information**.

# 2 ViewBed Screen



## 2.1 Overview

Real-time data of an online patient can be viewed on the ViewBed Screen.

## 2.2 Selecting an Online Patient

You need to select the desired patient before viewing real-time data.

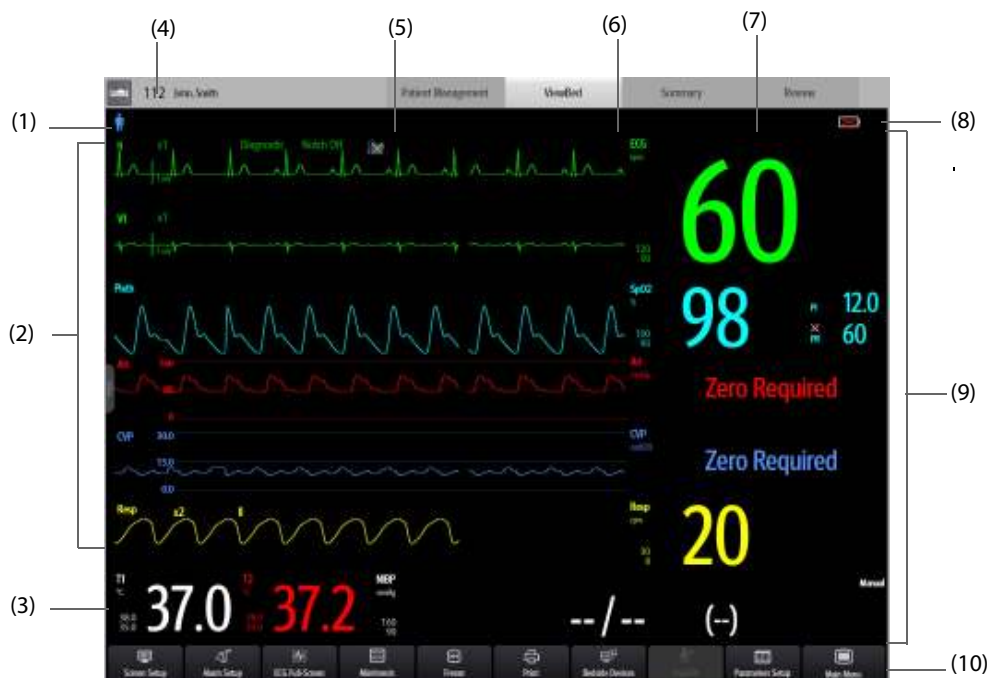
To select a patient, follow this procedure:

1. Select the  button in the upper left corner of the main screen.
2. Select the  button.
3. From the drop-down list, select the department where the desired device is located.
4. Select the desired bed by one of the following ways:
  - ◆ From the bed list, select the desired bed.
  - ◆ Search the patient in the search bar and select the desired bed.


## 2.3 Example ViewBed Screen

After selecting the desired bed, the ViewBed screen is displayed by default. The ViewBed screen displays monitoring information from the monitoring device.

The ViewBed screen is as shown below.









- (1) Patient information area: displays patient category, notes etc. For more information on patient category, see 2.4 *On-Screen Symbols*.
- (2) Waveform area: displays parameter waveforms. Selecting a waveform enters corresponding parameter menu.
- (3) Parameter numerics/waveform area: displays parameter values and waveforms.
- (4) Patient location information area: displays the bed number, room number and patient name.

- (5) Technical alarm information area: displays the highest priority technical alarm. Selecting this area displays more technical alarm information.
- (6) Physiological alarm information area: displays the highest priority physiological alarm. Selecting this area displays more physiological alarm information.
- (7) Alarm status area: indicates current alarm status. For more information, see Section 2.4 *On-Screen Symbols*.
- (8) Device status area: displays the battery capacity, network signal strength and privacy mode.
- (9) Parameter area: displays items such as parameter values, alarm limits, alarm status, and parameter list.
  - Selecting a parameter numeric block enters corresponding parameter menu. For more information on the parameters, see the operator's manual of the corresponding device.
  - Selecting the parameter list enters tabular trends review page. For information regarding the parameter list, refer to Section 2.7.2 *Displaying the Parameter List*.
  - When a parameter alarm is turned off, the  symbol is displayed in corresponding parameter area.
  - If the function of outline font for suspected values is enabled in the **System Setup** menu, when unreliable measurement values of HR, SpO<sub>2</sub>, or BIS are detected, these numerics are displayed in outline font.
- (10) Quick key area: displays quick keys to access commonly used functions (keys are configurable).

## 2.4 On-Screen Symbols

The following table lists the symbols that may be displayed on the ViewBed screen.







### 2.4.1 Patient Category Symbols

Symbol	Description	Symbol	Description
	Adult, male		Adult, female
	Pediatric, male		Pediatric, female
	Neonate, male		Neonate, female

#### NOTE





- Grey patient category symbol indicates that the gender of the patient is not specified.

### 2.4.2 Alarm Symbols

Symbol	Description	Symbol	Description
	All the alarms are paused.		Alarms for some parameter are turned off or the bedside device is in the alarm off state.
	Audible alarms are paused.		Audible alarms are turned off.
	Alarms are reset.		The system is silenced.











## 2.4.3 Battery Status Symbols

Symbol	Description	Symbol	Description
	The battery of the device has sufficient power. The white grid indicates the remaining battery power.		The battery of the device has low charge and needs to be charged or changed.
	The battery of the device has critically low charge and needs to be charged or changed immediately. Otherwise, the device will shut down.		No battery is installed into the device.

### NOTE

- When a battery symbol listed in the table above is displayed, see appropriate bedside device's operator's manuals for details about the battery time and alarms.

## 2.4.4 Other Symbols

Symbol	Description	Symbol	Description
	A patient's pacing status is set to <b>Yes</b> . The pace pulse markers " " are shown on the ECG wave when a pacer pulse is detected.		A patient's pacing status is set to <b>No</b> or <b>Unspecified</b> .
	Indicate that the followed parameter is from an external device connected to the monitor.		Contain more than one alarm messages.
	This device is in privacy mode.		This device is in night mode.
	Indicate the Wi-Fi signal strength after a bedside device is connected to an AP. More white arcs indicate a stronger Wi-Fi signal strength.		Indicate the received signal strength of telemetry devices. The color of the symbol changes to indicate received signal strength changes. White: indicates the received signal strength is normal. Yellow: indicates the received signal strength is weak. Red: indicates no signal is received.

## 2.5 Alarm Information Area

### 2.5.1 Technical Alarm Information Area

By selecting the technical alarm information area, you can view all the technical alarm messages.

This area displays:

- Technical alarms and prompts from a remote device or from the host CentralStation.
- The highest priority technical alarms. When multiple highest priority technical messages exist, they will scroll.
- Technical 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.

For more information on the alarm, see the operator's manual of the corresponding CMS.

## 2.5.2 Physiological Alarm Information Area

By selecting the physiological alarm information area, you can view all the physiological alarm messages. Selecting one physiological alarm message suffixed with the ">" symbol enters the event review page where you can view more details about this alarm.

This area displays:

- Physiological alarms from a remote device.
- Alarm time for latched physiological alarms.
- The highest priority physiological alarms. When multiple highest priority physiological alarms exist, they will scroll.
- Physiological 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.















For more information on the alarm, see the operator's manual of the corresponding CMS.

## 2.6 Quick Keys

The ViewBed screen provides quick keys for you to quickly access some functions. The **More** key is permanently located at the left bottom. Selecting the **More** quick key shows more quick keys. The quick keys displayed on the screen are configurable.

### 2.6.1 Available Quick Keys

The following table shows available quick keys.

Symbol	Label	Function	Symbol	Label	Function
	More	Show more quick keys		Screen Setup	Enter the <b>Screen Setup</b> menu
	Alarm Setup	Enter the iAlarm setup menu		ECG Full-Screen	Enter the ECG full screen
	Freeze	Freeze waveforms		Minitrends	Enter the Minitrends window
	Print	Start printing a real-time report		Print Setup	Enter the <b>Print Setup</b> menu
	EWS	Enter the EWS window.		Bedside Devices	Enter bedside devices pairing window
	aEEG	Enter the aEEG screen.		Main Menu	Enter the main menu
	SepsisSight	Enter the <b>SepsisSight</b> menu		NeuroSight	Enter the <b>NeuroSight</b> screen

## 2.6.2 Configuring Quick Keys



To configure the desired quick keys, follow this procedure:

1. Access the quick keys setup menu in either of the following ways:
  - ◆ On the ViewBed screen select the **Screen Setup** quick key from the quick key area →select the **Quick Keys** tab.
  - ◆ On the ViewBed screen, select the **Main Menu** quick key from the quick key area → from the **Display** column select **Quick Keys**.
2. Select the **Current** tab to configure the desired quick keys.
  - ◆ Add a quick key: on the top of **Quick Keys** tab, first select a key which you want to configure for a specific quick key function, next select the quick key function from the list of functions. For example, if you want to show the **Screen Setup** quick key in the first key, select the first key, and then select **Screen Setup** from the function list.
  - ◆ Clear a quick key: select the quick key to be cleared from the quick key and then select **Blank** from the function list
3. Select the **More** tab to configure the quick keys to be displayed when the **More** quick key is selected.

## 2.7 General Operations

### 2.7.1 Changing Tile Layout of the ViewBed Screen

To change tile layout of the ViewBed screen, follow this procedure:

1. Access the tile layout menu in either of the following ways:
  - ◆ On the ViewBed screen, select the **Screen Setup** quick key from the quick key area → select **Tile Layout**.
  - ◆ On the ViewBed screen, select the **Main Menu** quick key from the quick key area → from the **Display** column select **Tile Layout**.
2. Select a parameter area or waveform area, and then from the drop-down list select an element you want to display in this area. The parameters and waveforms selected are displayed on the ViewBed screen. The  symbol indicates that this area can be set to display waveforms. Selecting this area changes this symbol to , indicating that this area can be set to display parameters.

#### NOTE

- **The list of parameters/waveforms under the drop-down list in the Tile Layout tab is the super set, not depending on a device. If a parameter/waveform is not supported by the device, it is not displayed on the ViewBed screen.**
- **Changes to the ViewBed screen settings take effective for the CMS Viewer only and do not affect the screen settings at the target CentralStation.**

### 2.7.2 Displaying the Parameter List

You can display trends of HR, SpO<sub>2</sub>, RR, and NIBP/IBP in the parameter numerics area on the ViewBed screen.

To display the parameter list, follow this procedure:

1. Access the tile layout menu in either of the following ways:
  - ◆ On the ViewBed screen, select the **Screen Setup** quick key from the quick key area → select **Tile Layout**.
  - ◆ On the ViewBed screen, select the **Main Menu** quick key from the quick key area → from the **Display** column select **Tile Layout**.
2. Select a parameter area where you wish to display the parameter list.
3. From the drop-down list, select **Parameter List**.

## 2.7.3 Accessing Parameter Setup Menus

Each parameter has a setup menu in which you can adjust the alarm and parameter settings. You can enter a parameter setup menu by using any of the following methods:

- Select the parameter numeric area or waveform area.
- Select the Parameter Setup quick key, and then select the desired parameter.

## 2.7.4 SpO<sub>2</sub> Statistics

Statistic data of each SpO<sub>2</sub> section within a specific time can be displayed in the SpO<sub>2</sub> statistics area on the ViewBed screen. The target SpO<sub>2</sub> section is displayed in green.

### 2.7.4.1 Displaying the SpO<sub>2</sub> Statistics Area

To display the SpO<sub>2</sub> statistics area, follow this procedure:

1. On the ViewBed screen, select the **Screen Setup** quick key.
2. Select the **Tile Layout** tab.
3. Select a parameter area where you wish to display the SpO<sub>2</sub> statistics area.
4. From the drop-down list, select **SpO<sub>2</sub>**.
5. From the drop-down list, select **SpO<sub>2</sub> Statistics**.

### 2.7.4.2 Configuring SpO<sub>2</sub> Statistics

To configure SpO<sub>2</sub> statistics, follow this procedure:

1. In the upper right corner of the SpO<sub>2</sub> statistics area, select the time area, i.e. **1 h**.
2. Select the desired option.
3. Access the **SpO<sub>2</sub> Statistics** menu in either of the following ways:
  - ◆ Select the SpO<sub>2</sub> statistics area.
  - ◆ On the ViewBed screen, select the SpO<sub>2</sub> parameter or waveform area → select the **SpO<sub>2</sub> Statistics** tab.
4. In the **From** and **To** columns, select the starting and ending SpO<sub>2</sub> values for each section.
5. In the **Target** column, select the target section.
6. If you wish to use the default values, select **Defaults**.

#### NOTE

- 
- **The values for sections should be continuous. When the section value reaches 100, you cannot configure remaining sections.**
- 

## 2.7.5 Freezing/Unfreezing Waveforms

During patient monitoring, you can freeze waveforms on the ViewBed screen to allow a closer review of the waveform data.

### 2.7.5.1 Freezing Waveforms


To freeze waveforms, follow this procedure:

1. On the ViewBed screen, select the **Freeze** quick key.
2. In the **Freeze** window, select the left or right arrow to move the waveforms backward or forward one second, to display the desired time.

Freezing waveforms does not affect:

- Waveforms displayed in the minitrends window, OxyCRG window, EWS window and parameter numerics on the ViewBed screen
- Alarm enunciation

### 2.7.5.2 Unfreezing Waveforms

To unfreeze waveforms, select the  button in the upper right corner of the **Freeze** window.

### 2.7.5.3 Printing Frozen Waveforms

Selecting the  button in the upper left corner of the **Freeze** window prints frozen waveforms.

## 2.8 User Screens


To facilitate patient monitoring in different departments and clinical applications, different user screens are provided as follows on the Viewbed Screen:

- Normal Screen
- Minitrends
- Integrated Devices
- ECG Full-Screen
- 12-Lead

### 2.8.1 Minitrends Window

You can split the normal screen so that the left hand side of the screen shows the minitrends window. The Minitrends screen shows the recent graphic trends of parameters.

Choose one of the following methods to enter the Minitrends window:

- On the ViewBed screen, select the **Minitrends** quick key.
- On the ViewBed screen, select the **Screen Setup** quick key →select **Choose Screen** →select **Minitrends**.
- On the ViewBed screen, select the **Main Menu** quick key from the quick key area → from the **Display** column select **Minitrends**.
- Select the  button at the leftmost screen if normal screen is displayed currently.
- Swipe right on the touchscreen with one finger if normal screen is displayed currently.
- For a non-touchscreen, place the mouse at anywhere on the normal screen, and drag the mouse to right while holding the mouse right or left button.

#### NOTE

- 
- For details on the Minitrends window, see the operator's manual of the corresponding devices.
- 

### 2.8.2 Integrated Devices Window

You can view the information of the external devices that are integrated with the monitor in the integrated devices window.

Choose one of the following methods to enter the Integrated Devices window:

- On the ViewBed screen, select the **Screen Setup** quick key →select **Choose Screen** →select **Integrated Devices**.
- On the ViewBed screen, select the **Main Menu** quick key from the quick key area → from the **Display** column select **Choose Screen** →select **Integrated Devices**.

#### NOTE

- 
- For details on the integrated devices window, see the operator's manual of the corresponding devices.
- 

### 2.8.3 ECG Full-Screen

You can choose ECG Full-Screen when performing 5-lead, 6-lead or 12-lead monitoring. Only ECG waveforms are displayed in the waveform area of the ECG Full-Screen.

Choose one of the following methods to enter the ECG Full-Screen:

- On the ViewBed screen, select the **ECG Full-Screen** quick key.
- On the ViewBed screen, select the **Screen Setup** quick key →select **Choose Screen** →select **ECG Full-Screen**.
- On the ViewBed screen, select the **Main Menu** quick key from the quick key area → from the **Display** column select **Choose Screen** →select **ECG Full-Screen**.

#### NOTE

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- **For details on the ECG full-screen, see the operator's manual of the corresponding devices.**
- 

### 2.8.4 ECG 12-lead Screen

You can choose ECG 12-lead screen when performing 12-lead monitoring. Only 12-lead ECG waveforms are displayed in the waveform area of the ECG 12-lead screen.

Choose one of the following methods to enter the ECG 12-lead screen:

- On the ViewBed screen, select the **12-Lead** quick key.
- On the ViewBed screen, select the **Screen Setup** quick key →select **Choose Screen** →select **12-Lead**.

#### NOTE

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- **For details on the ECG 12-lead screen, see the operator's manual of the corresponding devices.**
- 

## 2.9 Clinical Assistive Applications (CAA)

The Clinical Assistive Applications (CAA) function integrates some commonly used clinical guidelines and tools into the monitor. It puts the currently monitoring parameter measurements together and provides comprehensive analysis results.

CAA is not intended to replace the competent judgment of a clinician. It must be used in conjunction with observation of clinical signs and symptoms.

The following CAA is provided:

- EWS(Early Warning Score)
- SepsisSight
- NeuroSight

### 2.9.1 SepsisSight™

The SepsisSight™ function is based on Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3) and Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: 2016 (SSC Guidelines 2012 and 2016).

SepsisSight™ is intended for adult patients suffering from sepsis or suspicious of sepsis.

Choose one of the following methods to enter the SepsisSight menu:

- On the ViewBed screen, select the **SepsisSight** quick key.
- On the ViewBed screen, select the **Main Menu** quick key from the quick key area → from the **CAA** column select **SepsisSight**.

#### NOTE

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- **SepsisSight is not a tool for Sepsis diagnosis and treatment. It cannot replace the physician's judgment.**
  - **For details on the SepsisSight screen, see the operator's manual of the corresponding devices.**
-

## 2.10 *iStatus* Window

The *istatus* window (~~iStatus~~) displays the current physiological alarms, alarmed systems or organs, and parameter trends over the last one hour.

When corresponding alarms are triggered, the *istatus* window pops up synchronously on the monitor and on the ViewBed screen of the CMS and the CMS Viewer.

For details on the *istatus* window, see the operator's manual of the corresponding devices.

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# 3 Summary Screen

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You can view summary data for online patients on the summary screen. The summary screen provides several tabs to display summary data from different aspects.

## NOTE



- **The summary function is intended for online patients. It is not intended for discharged patients.**
  - **Data displayed on the summary screen is not recalculated.**
- 

### 3.1 Accessing the Summary Screen

To enter the summary screen, select the **Summary** tab beside the ViewBed screen and the review screen.

### 3.2 Symbols on Summary Pages

The following table lists the symbols on summary pages.

Symbol	Description
	Setup button: select it to set up parameters.
	Print button: select it to output patient information and data through the printer.

### 3.3 Common Operations on Summary Pages

This section describes common operations on summary pages.

#### 3.3.1 Setting the Summary Statistical Duration

On the summary page, select **Zoom** to set summary statistical duration and the corresponding statistical duration displays.


#### 3.3.2 Printing the Summary Report

On the summary pages, select the print button to print corresponding summary reports.

### 3.4 Vital Sign Summary

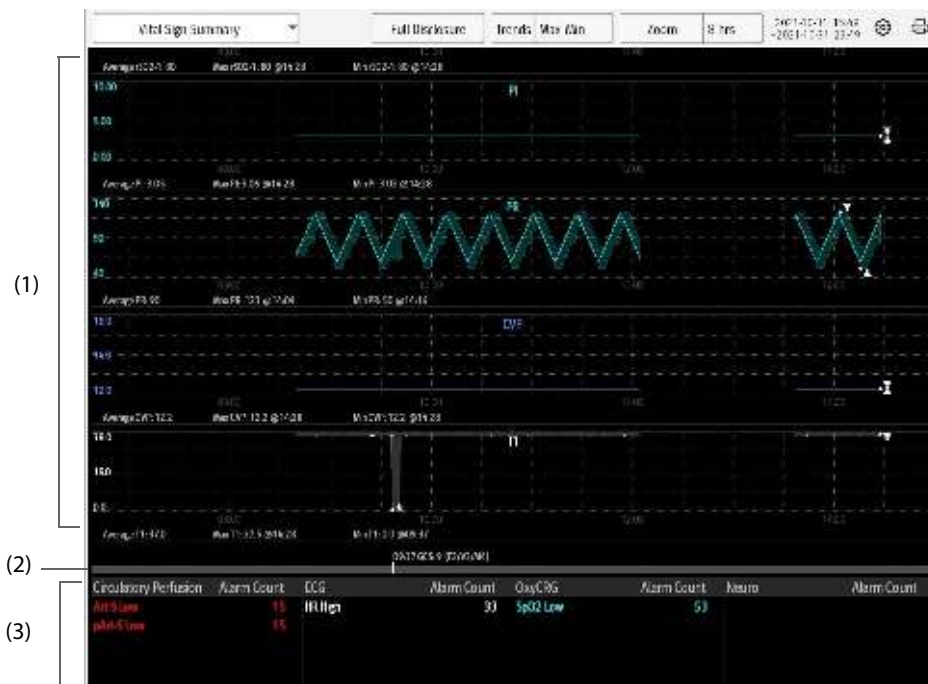
The vital sign summary provides the parameter trend of the patient's vital sign and the alarm events statistics.

#### 3.4.1 Entering the Vital Sign Summary Page

To enter the vital sign summary page, select the  button in the upper left corner of the summary screen → from the drop-down list, select **Vital Sign Summary**.

#### 3.4.2 The Display of Vital Sign Summary

The following figure is an example of the Vital Sign Summary page:



- (1) Graphic trends: show the trends of mean parameter value or maximum/minimum parameter value. Up arrow and down arrow indicate the maximum and minimum parameter value in the statistical duration respectively.
- (2) GCS score indicator area: indicate the time, total score and subscores of all the GCS. No indicator displays if no GCS score is performed in the statistical duration.
- (3)
  - For adults and pediatrics, this area shows alarm statistics.
  - For neonates, this area shows alarm statistics, SpO<sub>2</sub> statistics.

An up arrow indicates a increase in the current statistical duration compared to the previous one, while a down arrow indicates a decrease.

### 3.4.3 Setting Trend Parameters for the Vital Sign Summary

Select the setup button to set trend parameters to be displayed in the summary. One trend parameter one row. When parameters are overlapped, all the overlapped parameters are displayed in one row. A maximum of ten rows of parameters are displayed on the graphic trend area.

### 3.4.4 Setting the Trend Type for the Vital Sign Summary

Select **Trends** to set whether the trend of maximum/minimum values or the trend of mean values is displayed.

### 3.4.5 Viewing the Parameter Value at a Specific Time

In the graphic trends area, selecting any spot displays a cursor on the page and you can view the corresponding time and the parameter values of this specific time.

### 3.4.6 Accessing the Corresponding Review

You can access the corresponding review from the vital sign summary page:

- Selecting the area of the alarm statistics can access the events review.
- Selecting **Full Disclosure** can access the full disclosure review.


## 3.5 ECG Summary

The ECG Summary provides ECG statistics of the patient. It also displays the patient's typical ECG strips.

## NOTE

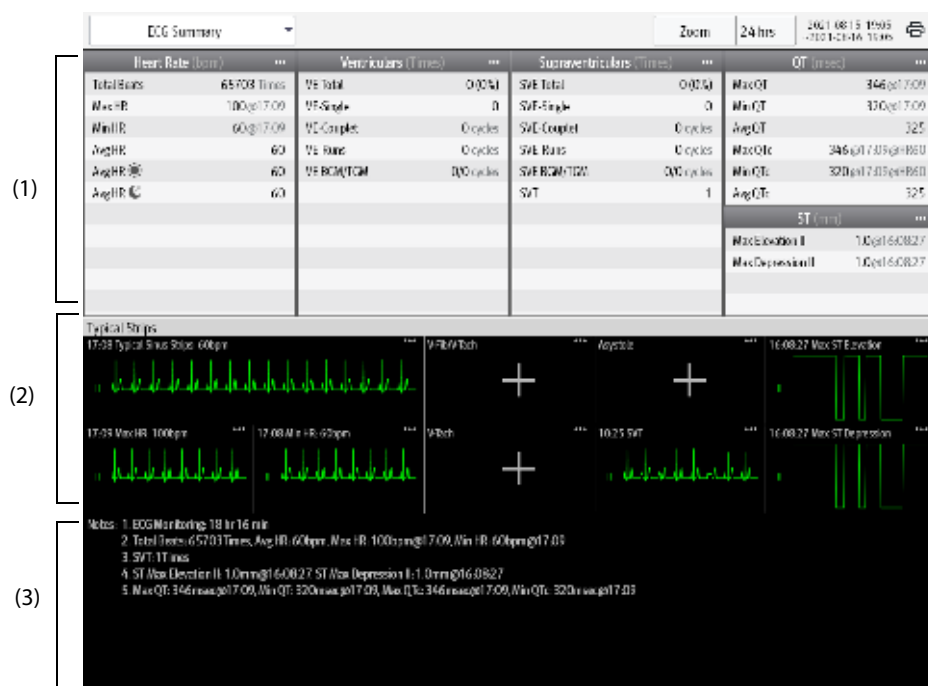
- **Pacer statistics is intended for paced patients. Pacer statistics is available only when the Paced setting is Yes.**
- **ST statistics is available only when ST analysis is switched on.**
- **QT statistics is available only when QT analysis is switched on.**

### 3.5.1 Entering the ECG Summary Page

To enter the ECG summary page, select the  button in the upper left corner of the summary screen → from the drop-down list, select **ECG Summary**.

### 3.5.2 The Display of ECG Summary


The following figure is an example of the ECG Summary page:



- (1) ECG statistics, including the following items:
  - Statistics of heart rates
  - Statistics of ventricular beats and ventricular arrhythmia events
  - Statistics of supraventricular beats and supraventricular arrhythmia events
  - Statistics of QT/QTc measurements
  - Statistics of maximum ST elevations and depressions
  - Statistics of pace
- (2) Typical ECG strips
- (3) Notes: include additional information on the ECG summary

### 3.5.3 Selecting Typical ECG Strips

Taking V-Tach as an example, to select typical V-Tach waveform, select the currently displayed V-Tach waveform, from the popup list select the desired waveform as typical V-Tach waveform.

If no V-Tach occurs to the patient in the statistical duration, an add symbol  is displayed in the V-Tach area. You can select the add symbol to display a typical ECG waveform of other arrhythmia event in this area.

### **3.5.4 Reviewing the ECG Summary**

Selecting any of the statistic area can access corresponding trends and events review. For more information, see *4 Review Screen*.

# 4 Review Screen

---

## 4.1 Overview

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 dimensions. The review tabs for the online patients and discharged patients are the same.

### NOTE



- **Review tabs are dependent on the patient category and patient window settings. For details on how to select the review tabs in the patient window, see Section 7.2.4 *Setting a Patient Window*.**
- 

## 4.2 Accessing the Review Screen

Methods for accessing the review screen for online patients and discharged patients are different.


### 4.2.1 Accessing the Review Screen for Online Patients

To enter the review screen for online patients, follow this procedure:

1. Select the  button in the upper left corner of the main screen.
2. Select the  button.
3. From the drop-down list, select the department where the desired patient is located.
4. From the bed list, select the desired bed.
5. Select the **Review** tab.

### 4.2.2 Accessing the Review Screen for Discharged Patients



To enter the review screen for discharged patients, follow this procedure:

1. Select the  button in the upper left corner of the main screen.
2. From the drop-down list, select **Discharged Patients**.
3. From the discharged patients list, select the **Details** button at the end of the desired discharged patient.
4. Select the **Review** tab.

## 4.3 Example Review Page Structure








Select the ▼ button in the upper left corner of the review screen to enter appropriate review pages. The graphic trends review page is an example to introduce the items that may also be displayed on other review pages.



(1)	Current review tab
(2)	Event type indicator: different color blocks match different types of events: <ul style="list-style-type: none"> <li>■ Red: high priority alarm event</li> <li>■ Yellow: medium priority alarm event</li> <li>■ Cyan: low priority alarm event</li> <li>■ Green: manual event</li> <li>■ White: operation-related event</li> </ul>
(3)	Waveform area: displays trend curves. The color of trend curves is consistent with the color of parameter labels.
(4)	Event or message or current time area: after you select an event from the event list, this event is displayed in this area. Selecting this area turns to the <b>Events</b> review page. If an event is not selected, this area displays current cursor time.
(5)	Scroll bar: indicates the position of currently displayed trend data in all the trend data.
(6)	Cursor: shows your current position in the trend page. When the cursor is moved across the timeline, the values measured at the cursor time are shown in the right column.
(7)	Parameter area: displays numeric values where the cursor stops. The color of numeric values is consistent with the color of parameter labels. The background color of numeric values matches the alarm priority.
(8)	Total timeline: indicates the entire time length. <ul style="list-style-type: none"> <li>■ <span style="display: inline-block; width: 20px; height: 10px; background-color: #cccccc; border: 1px solid #000;"></span>: indicates the time length of reviewable trend data.  can be moved within this time length.</li> <li>■ <span style="display: inline-block; width: 20px; height: 10px; background-color: #e0e0e0; border: 1px solid #000;"></span>: indicates no patient monitoring.  cannot be moved within this time length.</li> </ul> <p>Different color blocks at the timeline indicate events of different types. See the color definition for the event type indicator.</p>

## 4.4 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.
	Go to the previous or next event.
	Event list: displays events in a chronological order. The most recent event is displayed at the top.
	Patients' trend data or waveform data export setup symbol: it is displayed on the tabular trends review page, graphic trends review page, and full disclosure review page. Note: the export setup symbol is displayed only when <b>Save As</b> is enabled in the system menu. For more information on enabling <b>Save As</b> , see 7.3.4 <i>Setting Patient Data Export</i> .
	This symbol is displayed in the upper left corner of a review page for a landscape display greater than 19-inch. Selecting this symbol displays two review pages side by side.
	Print button
	Indicates that parameter numerics are unreliable.
+	Indicates that the followed parameter is from an external device connected to the monitoring device.

## 4.5 Common Operations on Review Pages

This section describes common operations on review pages.

### 4.5.1 Browsing Trend Data

Choose one of the following methods to browse trend data:





- Move .
- Move the cursor.
- Move the slider.

### 4.5.2 Viewing Events

You can view the following types of events:

- Manually triggered events
- Parameter-related operation events and alarm-related events, such as starting C.O. measurement
- Operation events not related to parameters



To view these events, follow this procedure:


1. Select the  button in the upper left corner of the review screen.
  2. From the drop-down list, select the desired review page.
  3. View events in either of the following ways:
    - ◆ Select .
    - ◆ Select  or .
- Events are displayed in a chronological order. The most recent event is displayed at the top. T

### 4.5.3 Displaying Two Review Pages Side by Side

When the display size of the CMS Viewer is greater than 19-inch, you can put two review pages side by side.

To do so, follow this procedure:

1. Select the  button in the upper left corner of the review screen.
2. From the drop-down list, select the desired review page.
3. Select the  symbol located at the top right of the screen. A new review page will be displayed below the desired review page.

You can browse trend data, view events, select other review tabs on the two review pages. If you refresh the trend data by moving cursor or  on one review page, the trend data on the other review page will be updated accordingly

#### NOTE

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- For 19-inch single display, two review pages can not be displayed simultaneously.
- 

## 4.6 Tabular Trends Review Page

The tabular trends review page displays trend data in a tabular form.

### 4.6.1 Entering the Tabular Trends Review Page

Enter the tabular trends review page in either of the following ways:

- Select the  button in the upper left corner of the review screen → from the drop-down list, select **Tabular Trends**.
- Select the parameter list area on the ViewBed screen.

### 4.6.2 Configuring Trends

To configure tabular trends, follow this procedure:

1. Enter the tabular trends review page.
2. Set **Trend Group** and select the desired option. For information on trend group settings, see Section 7.3.2.1 *Setting Trend Parameters*.
3. Set **Interval**. Select parameters, such as NIBP, Temp, to view the tabular trends when parameter measurements are acquired. Select **Manually Saved** to view the tabular trends when spot check data is acquired.


#### NOTE

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- The options for Interval are dependent on the functions of a bedside monitor.
  - The parameters displayed for Trend Group are dependent on the parameters configured at a bedside monitor.
- 

### 4.6.3 Printing a Tabular Trends Report

To print a tabular trends report, follow this procedure:

1. Enter the tabular trends review page.
2. Select the  button in the upper right corner of this page. The **Print Setup** menu is displayed.
3. Set the desired options. Only items that may need special remarks are described here.



Menu Item	Description	Options
Period	Select the period during which a tabular trends report will be printed.	30 min, 1 hr, 2 hrs, 4 hrs, 8 hrs, 12 hrs, 24 hrs, 48 hrs, 72 hrs, 96 hrs, Auto, All <b>Auto:</b> prints one page of a tabular trends before the current time. <b>All:</b> prints all stored tabular trends at the selected Interval. Note: <b>Auto</b> only limits the number of rows or columns for time on a report. The report may have multiple pages to accommodate the number of parameters. To limit the parameters, change the trend group on the review page.
Interval	Select the resolution of the tabular trends printed on a report.	5 sec, 30 sec, 1 min, 5 min, 10 min, 15 min, 30 min, 1 hr, 2 hrs, 3 hrs, NIBP, TempIF, C.O., Manually Saved, Auto, Parameters, such as <b>NIBP,Temp</b> : prints a tabular trends report when parameter measurements are acquired. <b>Manually Saved:</b> prints a tabular trends report when spot check data is acquired. <b>Auto:</b> print a tabular trends report at the interval set in the <b>Interval</b> option in the upper right corner of the <b>Tabular Trends</b> review page.
Report Format	Select the printing principle.	<b>Parameter Oriented:</b> prints a report with parameters listed by row and time listed by column. <b>Time Oriented:</b> prints a report with time listed by row and parameter listed by column.


4. Select the desired options.
  - ◆ **Print Preview:** previews the printout. Upon completion of preview, if you wish to start printing, select **Print**.
  - ◆ **Print (All):** prints a tabular trends report per **Trend Group** and **Interval** settings on the tabular trends review page.
  - ◆ **Print:** prints a tabular trends report per settings in the **Print Setup** menu

#### 4.6.4 Exporting Trend Data

When the CMS Viewer is connected to a storage device and exporting patients' data is allowed in the system setup menu, you can export patients' trend data from the tabular trends review page or the graphic trends review page. Patients' trend data exported from these two review pages is the same. Exported trend data is saved in csv format.

For more information on allowing exporting patients' data, see 7.3.4 *Setting Patient Data Export*. For more information on exporting patients' trend data from the graphic review page, see 4.7.4 *Exporting Trend Data*.

To export patients' trend data, follow this procedure:

1. Enter the tabular trends review page.
2. Select the  button in the upper right corner of this page. The **Export Setup** menu is displayed.
3. Set the desired options.

Menu Item	Description	Options
Date	Set the specific date on which you wish to export trend data.	Default to the date for the data where the cursor stops.
Time	Set the export end time.	Default to the date for the time where the cursor stops.

Menu Item	Description	Options
Period	Select the period during which trend data is exported.	30 min, 1 hr, 2 hrs, 4 hrs, 8 hrs, 12 hrs, 24 hrs, 48 hrs, 72 hrs, 96 hrs, All Default to 1 hr.
Interval	Select the resolution of trend data.	1 sec, 5 sec, 30 sec, 1 min, 5 min, 10 min, 15 min, 30 min, 1 hr, 2 hrs, 3 hrs, NIBP, TempIF, C.O., Manually Saved Parameters, such as <b>NIBP,Temp</b> : export trend data when parameter measurements are acquired. <b>Manually Saved</b> : export trend data when spot data is acquired. <b>Interval</b> is defaulted to <b>Interval</b> displayed on the tabular trends review page. Note: The options for Interval are dependent on the functions of a bedside monitor.
Save Path	Select the path to save the trend data.	/

4. Select **Export**.

You can view export progress and results in the **Export Queue** menu. For more information on this menu, see *1.2 Example Main Screen*. The exported trend data is saved in the sub-folder named as ParameterData under the patient's folder which is located in the selected **Save Path**.

## 4.7 Graphics Trends Review Page

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

### 4.7.1 Entering the Graphic Trends Review Page

To enter the graphic trends review page, follow this procedure:

1. Select the ▼ button in the upper left corner of the review screen.
2. From the drop-down list, select **Graphic Trends**.


### 4.7.2 Setting Graphic Trends

To set graphic trends, follow this procedure:

1. Enter the graphic trends review page.
2. Set **Trend Group** and select the desired option. For information on trend group settings, see Section 7.3.2.1 *Setting Trend Parameters*.
3. Set **Zoom**. Select the desired length of trend data to view the most recent 240-hour data.
4. Select the desired number of **Trends**.

### 4.7.3 Printing a Graphic Trends Report

To print a graphic trends report, follow this procedure:

1. Enter the graphic trends review page.
2. Select the  button in the upper right corner of this page. The **Print Setup** menu is displayed.
3. Set the desired options.
4. If you wish to preview the printout, select **Print Preview**.
5. Select **Print**.

### 4.7.4 Exporting Trend Data

When the CMS Viewer is connected to a storage device and exporting patients' data is allowed in the system setup menu, you can export patients' trend data from the graphic trends review page or the tabular trends

review page. Patients' trend data exported from these two review pages is the same. Exported trend data is saved in csv format.

After entering the graphic trends review page, export patients' trend data by following steps in Section 4.6.4 *Exporting Trend Data*.

## 4.8 Full Disclosure Review Page

On the full disclosure review page, you can view the compressed waveforms and detail waveforms for each patient.

### 4.8.1 Entering the Full Disclosure Review Page


To enter the full disclosure review page, follow this procedure:

1. Select the ▼ button in the upper left corner of the review screen.
2. From the drop-down list, select **Full Disclosure**.

### 4.8.2 Selecting Waveforms

If you wish to review waveforms other than the default waveform on the full disclosure review page, you need to select the desired waveforms.

To do so, follow this procedure:

1. Enter the full disclosure review page.
2. Select the  button.
3. Select **Setup**. The **Select Waveform** menu is displayed.
4. Select the **Storage** tab.
5. Configure the desired waveforms.
6. Select the **Display(Maximum: 3)** tab.
7. Enable the desired waveforms to be displayed on the review page.

In case of alarms, the background of compressed waveform block at the alarm time is marked with a special color:

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

#### NOTE


- **When there is sufficient space to display all the menu items, the  button is not displayed on the full disclosure review page. In this case, skip the procedure which instructs to select this button.**

### 4.8.3 Compressed Waveform

The full disclosure review page displays the compressed waveform.

#### 4.8.3.1 Setting the Scale of Compressed Waveform


To set the size of the compressed waveform, follow this procedure:

1. Enter the full disclosure review page.
2. Select the  button.
3. Set the ECG waveform size in either of the following ways:
  - ◆ Select the **Scale** button and then select the desired option.
  - ◆ Select the ECG lead label on the left side of the review page to enter the **Scale** menu. Then select the desired option.

4. Select other parameter labels on the left side of the review page to enter the **Scale** menu and set the scale for these parameters.

#### 4.8.3.2 Setting the Duration of Compressed Waveform

To set the length of the compressed waveform, follow this procedure:

1. Enter the full disclosure review page.
2. Select the  button.
3. Select **Duration**.
4. Configure the desired **Duration** time.

#### 4.8.3.3 Marking Arrhythmia

In the compressed waveform area, the background of compressed waveform segments at the arrhythmia alarm trigger time is marked with a specific color automatically to indicate the arrhythmia category. For details on how to set the arrhythmia mark color, see [7.3.3 Setting an Arrhythmia Mark Color](#).

#### 4.8.3.4 Selecting Compressed Waveform Segments

You can select one or more compressed waveform segments and print these segments. For details on how to print these segments, see [4.8.5 Printing Compressed Waveforms or Detail Waveforms](#).

To select compressed waveform segments, follow this procedure:


1. Enter the full disclosure review page.
2. Select compressed waveform segments in either of the following ways:
  - ◆ Using a mouse: In the compressed waveform area, hold down the right mouse button and select the desired waveform segment. If you wish to select multiple waveform segments, release the right mouse button and then select the desired waveform segments. You can move the screen up and down to select more waveform segments.
  - ◆ Using a touch screen: Press the **Select** button and then touch the waveform. Hold and drag your finger to select the desired waveform segment. If you wish to move the screen up and down, you need to re-select the **Select** button to exit the selected status.

If you wish to cancel current selection, select the  button in the upper right corner of the waveform segment selection window.

### 4.8.4 Detail Waveform Window

In the detail waveform window, you can view the full size waveforms and parameter numerics.

Access the detail waveform window in either of the following ways:

- Select the  button, and then select the **Detail** button in the compressed waveform window.
- Double click the desired compressed waveform.


In the detail review window:

- Timeline and waveforms are displayed in the upper part of the window.
- Numeric values are displayed in the lower part of the window. The background color of parameters indicate whether an alarm is triggered.
  - ◆ No 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.

If you wish to return to the compressed waveform window, select the **Overview** button in the detail waveform window.


#### 4.8.4.1 Setting ECG Gain

To set the ECG gain, follow this procedure:

1. Enter the detail waveform window.
2. Select the  button.
3. Select the **ECG Gain** button.
4. Configure the desired ECG gain.

#### 4.8.4.2 Setting Waveform Sweep Speed

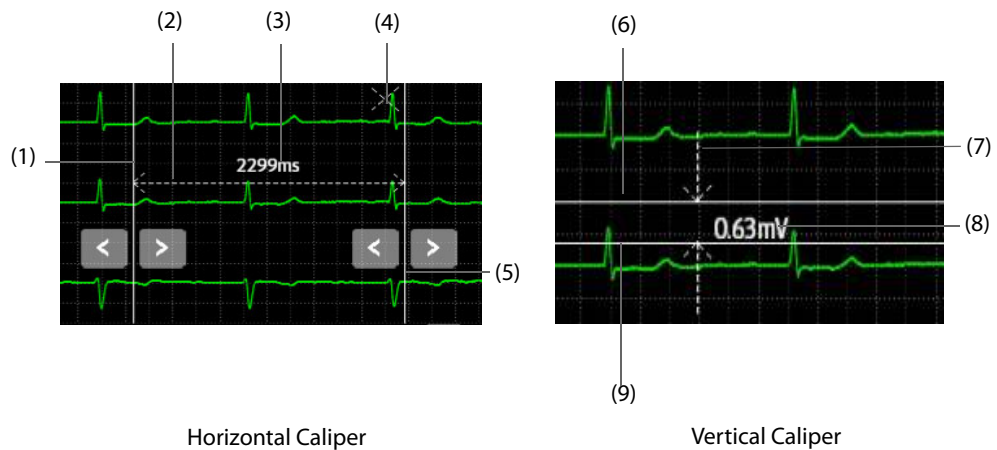
To set the waveform sweep speed, follow this procedure:

1. Enter the detail waveform window.
2. Select the  button.
3. Select the **Speed** button.
4. Configure the desired speed. The speed is applicable to all the ECG waveforms.

#### 4.8.4.3 Caliper Measurement

When full disclosure data is collected and stored in the CMS, horizontal calipers can be used to measure the PR, QRS, QT, and R-R waveform intervals, and vertical calipers can be used to measure the ST waveform amplitude in the detail waveform window.

Horizontal caliper and vertical caliper are as shown in the following figure.



(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

Choose either of the following ways to perform measurements using a horizontal caliper:

Option 1:

1. Enter the detail waveform window.
2. Select **Caliper**. The **Caliper** menu is displayed.
3. Display a horizontal caliper in either of the following ways.
  - ◆ Using a mouse: left or right click the mouse at a place in the desired waveform area and then drag the cursor horizontally until your desired location is reached.

- ◆ Using a touch screen: select a place in the desired waveform area and then drag your finger on the screen surface horizontally without losing the contact until the desired location is reached. If you need to adjust the caliper, slightly touch the left or right caliper arm and select the appropriate touchscreen control.
4. After finishing measurements, select **PR**, **QRS**, **RR**, and **QT** from the **Caliper** menu to obtain the measured values. The QTc value is calculated after RR and QT value have been acquired.
  5. If you need to clear measured values, select the **Reset** button.

Option 2:

1. Enter the detail waveform window.
2. Right click the mouse at a place in the desired waveform area and then drag the cursor horizontally until your desired location is reached. Measured values are displayed in real-time.








### Performing Measurements Using a Vertical Caliper

To perform measurements using a vertical caliper, follow this procedure:

1. Enter the detail waveform window.
2. Select **Caliper**. The **Caliper** menu is displayed.
3. Select **ST**.
4. Generate a vertical caliper in either of the following ways.
  - ◆ Using a mouse: left click the mouse at a place in the desired waveform area and then drag the cursor vertically until your desired location is reached.
  - ◆ Using a touch screen: select a place in the desired waveform area and then drag your finger on the screen surface vertically without losing the contact until the desired location is reached. If you need to adjust the caliper, slightly touch the left or right caliper arm and select the appropriate touchscreen control.
5. After finishing measurements, select **ST** from the **Caliper** menu to obtain the measured value.
6. If you need to clear measured values, select the **Reset** button.


### Moving the Caliper

After generating a caliper, you can also move calipers as shown below to measure the time difference between any two points:

- When the cursor is in the shape of , you can move the caliper horizontally.
- When the cursor is in the shape of , you can move the caliper vertically.
- When the cursor is in the shape of  inside the caliper, you can move the entire caliper window.
- Select the  button or the  button in the horizontal caliper measurement area. Select the  button or the  button in the vertical caliper measurement area.

### Canceling Caliper Measurements

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

- Select the **Caliper** button.
- Select anywhere in the waveform area.
- Select the  button in the caliper window.

#### 4.8.4.4 Setting Beat Annotation



When a bedside monitor and a telemetry device support the beat annotation functionality, you can enable or disable **Beat Annotation** to display or hide white beat labels above the first ECG waveform in the detail waveform window. The white beat labels indicate how the monitor or the telemetry device is classifying beats and may explain suspected, missed, or false arrhythmia calls.

- N = Normal

#### 4.8.5 Printing Compressed Waveforms or Detail Waveforms

To print the compressed waveform or detailed waveform, follow this procedure:

1. Enter the full disclosure review page.

2. Select the  button in the upper right corner of this page. The **Print Setup** menu is displayed.
3. Select the desired options. Only items that may need special remarks are described here.
  - ◆ **Print Waveform Overview:** prints the compressed waveform displayed on the full disclosure review page.
  - ◆ **Print Overview of Selected Waveforms:** prints the selected compressed waveform segments. For details on how to select compressed waveform segments, see Section 4.8.3.4 *Selecting Compressed Waveform Segments*.
  - ◆ **Print Details of Selected Waveforms:** prints the detail waveform for the selected compressed waveform segments according to the time period where selected waveform segments are located.
  - ◆ **Print Displayed Detailed Waveforms:** prints the detail waveform for the entire compressed waveform.
  - ◆ **Print Selected Detailed Waveforms:** prints the detail waveform for the selected waveform segments according to waveforms. If you select this option, you can further select **Select Waveform** to customize the number and sequence of waveforms which are output on a printout. After performing the desired settings, select the  button in the upper right corner of the **Select Waveform** menu.
4. If you wish to preview the printout, select **Print Preview**.
5. Select **Print**.


## NOTE

- **Print Displayed Waveform Detail and Print Selected Waveform Detail are selectable in the detail waveform window only. For information regarding accessing the detail waveform window, see Section 4.8.4 *Detail Waveform Window*.**

## 4.8.6 Exporting Waveform Data

When the CMS Viewer is connected to a storage device and exporting patients' data is allowed in the system setup menu, you can export patients' waveform data from the full disclosure review page. For more information on allowing exporting patients' data, see 7.3.4 *Setting Patient Data Export*.

To export patients' waveform data, follow this procedure:

1. Enter the full disclosure review page.
2. Select the  button in the upper right corner of this page. The **Export Setup** menu is displayed.
3. Set the desired options.

Menu Item	Description	Options
Date	Set the specific date on which you wish to export waveform data.	Default to the date for the data where the cursor stops.
Time	Set the export end time.	Default to the date for the time where the cursor stops.
Period	Select the period during which waveform data is exported.	30 min, 1 hr, 2 hrs, 4 hrs, 8 hrs, 12 hrs, 24 hrs, 48 hrs, 72 hrs, 96 hrs, All Default to 1 hr.
Select Waveform	Select the desired waveforms to be exported.	Enabling a waveform means this waveform will be exported.
Save Path	Select the path where exported waveform data is saved..	/
File Format	Select the desired format in which exported waveform data is saved.	csv, xml. csv is the default.

4. Select **Export**.

You can view export progress and results in the **Export Queue** menu. For more information on this menu, see *1.2 Example Main Screen*. The exported waveform data is saved in the sub-folder named as WaveformData under the patient's folder which is located in the selected **Save Path**.

## 4.8.7 Resting 12-Lead ECG Analysis

When it is impossible or inconvenient to do a real-time resting 12-lead ECG analysis on the bedside monitor, the CMS Viewer can be used to analyze the historical 12-lead ECG waveforms sent by the bedside monitor on the full disclosure review page. The CMS Viewer supports only Glasgow 12-lead ECG analysis algorithm. For more information on the Glasgow algorithm, refer to *12-Lead ECG Interpretive Program Physician's Guide (PN: 046-004817-00)*.

### NOTE

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- **Compatible monitors supporting this function include BeneVision N series, Passport series and ePM series monitors.**
  - **It's required that the waveforms selected to analyze are obtained using standard 12-lead electrode placement while the patient remains still and relaxed. Otherwise, the analysis result might not be correct.**
  - **Resting 12-lead ECG analysis is intended for online patients. It is not intended for discharged patients.**
  - **The offline waveform data sent after a reconnection is not intended for 12-lead ECG analysis.**
- 
- 

### WARNING

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- **The result of the resting 12-lead ECG analysis should be confirmed by the physician.**
- 
- 

### 4.8.7.1 Editing Patient Information

Some patient information may directly affect ECG analysis. Complete and correct patient information is helpful for accurate diagnosis and treatment of the patient. Enter patient information before taking an ECG measurement.

To enter patient information, follow this procedure:

1. Enter the full disclosure review page.
2. Select desired compressed waveform.
3. Double click the selected compressed waveform or select the **Detail** button to access the detail waveform window.
4. Select **Setup** to enter the **12-Lead Setup** menu.
5. On the **Patient Demographics** page, input or edit patient information.
6. Select **Save**.

### NOTE

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- **Modifying patient information in the 12-lead setup menu will synchronize to the monitor.**
- 

### 4.8.7.2 Setting Other Information for Resting 12-Lead ECG Analysis

1. To set other information for resetting 12-lead analysis, follow this procedure:
2. Enter the full disclosure review page.
3. Select desired compressed waveform.
4. Double click the selected compressed waveform or select the **Detail** button to access the detail waveform window.
5. Select **Setup** to enter the **12-Lead Setup** menu.
6. On the **12-Lead Setup** menu, Select **Setup** tab.
7. Set **High Freq Cut-off**: the high frequency filter attenuates muscle artifact by restricting the included frequencies. The setting of the high frequency filter is 35 Hz by default. The high frequency filter is a low-



pass filter. That is to say signal that exceeds the set frequency is filtered out. For example, if you set **High Freq Cut-off** to **35 Hz**, only signal at 35 Hz or less displays. Signal exceeding 35 Hz is attenuated.

8. Set **Baseline Drift Removal**: the baseline drift removal (BDR) suppresses most baseline drift interference and also is able to preserve the fidelity of the ST-segment level. BDR is switched on by default. If BDR is switched off, the 0.05 Hz high pass filter is used.
9. Set **Tachy** and **Brady**.

### 4.8.7.3 Initiating Resting 12-Lead ECG Analysis

To initiate 12-Lead ECG analysis, follow this procedure:

1. Enter the full disclosure review page.
2. Select desired compressed waveform.
3. Double click the selected compressed waveform or select the **Detail** button to access the detail waveform window.
4. In the detail waveform window, move the cursor to the desired time.
5. In the detail waveform window, select **Analyze**. The system selects 10 seconds of waveforms following the cursor to start analyzing automatically.

At the completion of the resting 12-lead ECG analysis, the report preview displays on the page.

#### NOTE

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- **Ensure that the waveform following the cursor is not less than 10 seconds; otherwise the analysis will not start.**
- 

### 4.8.7.4 Saving the 12-Lead Interpretation Report

At the completion of the 12-lead ECG interpretation, Select **Save** to save the report.

### 4.8.7.5 Printing the 12-Lead Interpretation Report

At the completion of the 12-lead ECG interpretation, Select **Print** to output the report.

## 4.9 Events Review Page

On the events review page, you can view physiological alarm events, manual events, and operational events.

### 4.9.1 Entering the Events Review Page

To enter the events review page, follow this procedure:

1. Select the ▼ button in the upper left corner of the review screen.
2. From the drop-down list, select **Events**.

### 4.9.2 Event List

In the event list:

- Events are displayed in descending chronological order. The most recent event is displayed at the top. Event lock status, trigger time, alarm priority, and event remarks if available are displayed for each event.
- Different color blocks are displayed on the left of each event to indicate different event types.
  - ◆ Red: high priority alarm event
  - ◆ Yellow: medium priority alarm event
  - ◆ Cyan: low priority alarm event
  - ◆ Green: manual event
  - ◆ White: operation-related event

### 4.9.2.1 Setting Filters


You can filter events by time, alarm priority, alarm category, and parameter group.

To filter events, follow this procedure:

1. Enter the event review page.
2. Select **Filter**. From the drop-down list, select the desired item.

You can customize two criteria. To do so, follow this procedure:


1. From the **Filter** drop-down list, select **Custom 1** or **Custom 2** to enter the **Filter Setup** menu.
2. Select the **Name** field to edit the name of the custom criterion.
3. Select desired items.

If you want to review events happened around certain time, select the  button → set the time → select **OK**. Then the cursor jumps to the event happened closest to the defined time.

### 4.9.2.2 Setting the Display of Disabled Arrhythmia Alarms

You can set to display arrhythmia events that have alarm turned off in the event list.

To do so, follow this procedure:

1. Enter the event review page.
2. Select the  button.
3. Set **Show Disabled Arrhythmia Alarms**: this option is unselected by default. Select this option and arrhythmia events that have alarms turned off display in the event list.


### 4.9.3 Event Detail Window

Enter the event detail window in either of the following ways:

- Double click the desired event from the event list.
- Select the **Detail** button on the event review page.


In the event detail window:

- The upper half of the window displays:
  - ◆ Event name: displays in the upper left corner.
  - ◆ Event triggered time: displays in red font.
  - ◆ Waveform: 16 seconds of waveforms before and after the event triggered time.
- Numeric values are displayed in the lower part of the window. The background color of parameters indicate whether an alarm is triggered.
  - ◆ No 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.

If you wish to return to the event list, select the  button and then select the **List** button.

#### 4.9.3.1 Configuring ECG Gain

To configure the ECG gain, follow this procedure:

1. Enter the event detail window.
2. Select the  button.
3. Select **ECG Gain**.
4. Select the desired gain.


## NOTE

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- When there is sufficient space to display all the menu items, the  button is not displayed in the event detail window. In this case, skip the procedure which instructs to select this button.
- 


### 4.9.3.2 Configuring Waveform Sweep Speed

To configure the waveform sweep speed, follow this procedure:

1. Enter the event detail window.
2. Select the  button.
3. Select the **Speed** button.
4. Configured the desired speed. The speed is applicable to all the ECG waveforms.

### 4.9.3.3 Caliper Measurement

To perform caliper measurement, follow this procedure:


1. Enter the event detail window.
2. Select the  button.
3. Select the **Caliper** button.
4. Perform caliper measurement by following steps in Section 4.9.3.3 *Caliper Measurement*.

### 4.9.3.4 Setting Beat Annotation

For details on how to set beat annotation, see Section 4.9.3.4 *Setting Beat Annotation*.

## 4.9.4 Printing Events

To print the desired event list or event details, follow this procedure:

1. Enter the event review page.
2. Select the desired events from the event list.
3. Select the  button in the upper right corner of this page. The **Print Setup** menu is displayed.
4. Select the desired options.
  - ◆ **Print All Event List:** print the entire event list.
  - ◆ **Print List of Selected Events:** print the selected events list.
  - ◆ **Print Overview of Selected Events:** when multiple events are selected from the event list, selecting this option prints these events on the same page and outputs an event overview report.
  - ◆ **Print Detail of Selected Events:** print the details of selected events.
  - ◆ **Print Displayed Event Detail:** print the details of the selected event. If you wish to select this option, you need to open the event detail window first. If waveform data is available for the selected event, 16 seconds of waveforms before and after the alarm trigger time are printed by default. The actual waveform data printed depends on the option selected for **Printing Duration**. For details on how to set **Printing Duration**, see Section 7.5.6 *Setting Other Print-Related Items*.
5. If you wish to preview the printout, select **Print Preview**.
6. Select **Print**.

## NOTE

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- **Print preview is not applicable for Print Detail of Selected Events.**
- 

## 4.10 12-Lead ECG Review Page


You can review 12-lead analysis events on the 12-lead ECG review page.

### 4.10.1 Entering the 12-Lead Review Page

To enter the 12-Lead ECG review page, follow this procedure:

1. Select the ▼ button in the upper left corner of the review screen.
2. From the drop-down list, select **12-Lead ECG**.


### 4.10.2 Median Complex Window (For Glasgow Algorithm Only)

On the 12-lead ECG review page, select the  button and then select **Median Complex** to enter the median complex window.

In the median complex window, the median complex template marks the start and end position of P-wave and QRS-wave and the end position of T-wave.


Selecting **Waveform** returns to the 12-lead ECG waveform page.

#### NOTE

- **When there is sufficient space to display all the menu items, the  button is not displayed on the 12-lead ECG review. In this case, skip the procedure which instructs to select this button.**

### 4.10.3 Configuring 12-Lead ECG Waveforms


To configure 12-lead ECG waveforms on the review page, follow this procedure:

1. Enter the 12-lead ECG review page.
2. Select the  button.
3. Configure **Speed** and **Gain**.
4. Configure **Layout**.
  - ◆ **12x1**: displays 12-lead ECG waveforms on one page in one column.
  - ◆ **6x2**: displays 12-lead ECG waveforms on one page in two columns, with 6 lines in each column.
  - ◆ **6x2+1**: displays 12-lead ECG waveforms on one page in two columns, with 6 lines in each column, and one rhythm lead waveform at the bottom.
  - ◆ **3x4+1**: displays 12-lead ECG waveforms on one page in 4 columns, with 3 lines in each column, and one rhythm lead waveform at the bottom.
  - ◆ **3x4+3**: displays 12-lead ECG waveforms on one page in 4 columns, with 3 lines in each column, and three rhythm lead waveforms at the bottom.

### 4.10.4 Caliper Measurement

Horizontal calipers can be used to measure the PR, QRS, QT, and R-R waveform intervals, and vertical calipers can be used to measure the ST waveform amplitude in the median complex window.

To perform measurements using a horizontal or vertical caliper, follow this procedure:

1. Enter the 12-lead ECG review page.
2. Select the  button.
3. From the drop-down list, select the desired option:
  - ◆ **Caliper**: perform measurement using a horizontal caliper.
  - ◆ **ST Caliper**: perform measurement using a vertical caliper.
4. Display a caliper.
5. Obtain measured values.

For details on how to display a horizontal or vertical caliper, how to obtain measured values, and how to move a caliper, see Section 4.8.4.3 *Caliper Measurement*.

## 4.10.5 Resting 12-Lead ECG Reanalysis

When the results of a resting 12-lead ECG analysis performed on the bedside monitor are in question due to incomplete or inaccurate patient demographics or configuration etc., the CMS Viewer can be used to reanalyze the original report waveform data sent by the bedside monitor. On the 12-lead ECG review page, fill in correct patient information and perform the reanalysis. For more information on the Glasgow algorithm, refer to *12-Lead ECG Interpretive Program Physician's Guide (PN: 046-004817-00)*.

### NOTE

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- **Compatible monitors supporting this function include BeneVision N series, Passport series and ePM series monitors.**
  - **Resting 12-lead ECG reanalysis is intended for online patients. It is not intended for discharged patients.**
  - **The offline waveform data sent after a reconnection is not intended for 12-lead ECG reanalysis.**
- 
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### WARNING

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- **The result of the resting 12-lead ECG reanalysis should be confirmed by the physician.**
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### 4.10.5.1 Editing Patient Information

Some patient information may directly affect ECG analysis. Complete and correct patient information is helpful for accurate diagnosis and treatment of the patient. Enter patient information before taking an ECG measurement.

To enter patient information, follow this procedure:

1. Enter the 12-lead ECG review page.
2. Select **Setup** to enter the **12-Lead Setup** menu.
3. On the **Patient Demographics** page, input or edit patient information.
4. Select **Save**.

### NOTE

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- **Modifying patient information in the 12-lead setup menu will synchronize to the monitor.**
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### 4.10.5.2 Setting Other Information for Resting 12-Lead ECG Reanalysis

To set other information for resetting 12-lead reanalysis, follow this procedure:

1. Enter the 12-lead ECG review page.
2. Select **Setup** to enter the **12-Lead Setup** menu.
3. On the **12-Lead Setup** menu, Select **Setup** tab. For more information on the setup options, see 4.8.7.2 *Setting Other Information for Resting 12-Lead ECG Analysis*.

### 4.10.5.3 Initiating Resting 12-Lead ECG Reanalysis

To initiate 12-Lead ECG reanalysis, follow this procedure:


1. Enter the 12-lead ECG review page.
2. Select  symbol to set desired report.
3. Select **ReAnalyze**.

At the completion of the reanalysis, the result displays on the page.

## 4.10.6 Printing 12-Lead Analysis Reports

To print a 12-lead ECG analysis report, follow this procedure:

1. Enter the 12-lead ECG review page.

2. Select the  button in the upper right corner of this page. The **Print Setup** menu is displayed.
3. Set the desired options.
4. Select **Print**.

## 4.11 ST Review Page

You can review ST templates on the ST review page.

### 4.11.1 Entering the ST Review Page

To enter the ST review page, follow this procedure:

1. Select the ▼ button in the upper left corner of the review screen.
2. From the drop-down list, select **ST**.

### 4.11.2 Setting ST Reference Templates

You can set the desired ST template as a reference template.

To do so, follow this procedure:

1. Enter the ST review page.
2. Select the desired ST template.
3. Select **Set Reference**.

### 4.11.3 Displaying/Hiding ST Reference Templates

On the ST review page, select **Display Reference** or **Hide Reference**.

- **Display Reference:** the ST template storage time is displayed on the right of current segment and ST values are also displayed on the reference template.
- **Hide Reference:** hides the ST reference template.


### 4.11.4 Displaying/Hiding Markers

On the ST review page, select **Display Marker** or **Hide Marker**.

- **Display Marker:** a white vertical bar appears above each waveform, marking the positions of ISO, J point, and ST point.
- **Hide Marker:** the positions of ISO, J point, and ST point are not displayed.

### 4.11.5 Printing ST Segment Waveforms

To print ST segment waveforms, follow this procedure:

1. Enter the ST review page.
2. Select the  button in the upper right corner of this page. The **Print Setup** menu is displayed.
3. Set the desired options.
4. Select **Print**.

## 4.12 Arrhythmia Statistics Page

On the arrhythmia statistics page, you can view the statistics about the HR value and the number of each arrhythmia category within a specific time period. The default for **Zoom** is **24 hrs**.

### 4.12.1 Entering the Arrhythmia Statistics Page

To enter the arrhythmia statistics page, follow this procedure:

1. Select the ▼ button in the upper left corner of the review screen.

2. From the drop-down list, select **Arrhy Statistics**.

## 4.12.2 Viewing Arrhythmia Statistics

To view arrhythmia statistics, follow this procedure:

1. Enter the arrhythmia statistics page.
2. If you wish to view arrhythmia statistics in a tabular format, select **Tabular** in the upper right corner of this page.
3. Select **Zoom** to view arrhythmia events within a specific time period. The default for **Zoom** is **24 hrs**.
4. If you wish to view arrhythmia statistics in a graphic format, select **Graphic**.


On the graphic arrhythmia statistics page:

- The left side displays the name, times of occurrence, and duration of arrhythmias. The right side displays the arrhythmia occurrence time and colored block which matches different alarm priorities.
  - ◆ Red: high alarm priority
  - ◆ Yellow: medium alarm priority
  - ◆ Cyan: low alarm priority
- Selecting the desired arrhythmia on the left displays the waveform area on the right side. After selecting the waveform area, you can view more details about this arrhythmia.

## 4.12.3 Setting the Display of Arrhythmia Events


### 4.12.3.1 Displaying Disabled Arrhythmia Alarms

To display arrhythmia events that have alarms turned off in the review, follow this procedure:

1. Enter the arrhythmia statistics page.
2. select **Graphic**.
3. select the  button.
4. Select **Show Disabled Arrhythmia Alarms**: this option is disabled by default. Enabling it, arrhythmia events that have alarms turned off displays are displayed in the review.


### 4.12.3.2 Displaying High Quality Arrhythmia Alarms Only

To exclude arrhythmia events with obvious noise or arrhythmia events without typical alarm characteristics in the review, follow this procedure:

1. Enter the arrhythmia statistics page.
2. select **Graphic**.
3. select the  button.
4. Select **High Quality Arrhythmia Alarms Only**: this option is disabled by default. Enabling it, events with obvious noise or events without typical alarm characteristics are excluded in the review.

## 4.12.4 Printing Arrhythmia Statistics Results

To print arrhythmia statistics results, follow this procedure:


1. Enter the arrhythmia statistics page.
2. Select the  button in the upper right corner of this page. The **Print Setup** menu is displayed.
3. Set the desired options.
4. Select **Print**.

## 4.13 aEEG Review Page

aEEG review page displays historical aEEG monitoring data.

### 4.13.1 Entering the aEEG Review Page

Enter the aEEG review page in either of the following ways:

- Select the  button in the upper left corner of the review screen → from the drop-down list, select **aEEG Review**.
- Select the **aEEG** quick key on the ViewBed screen → select the aEEG window area → in the aEEG setup menu, select **aEEG Review**.
- Select the **Screen Setup** quick key on the ViewBed screen → select the **Choose Screen** tab → select **aEEG** → select the aEEG window area → in the aEEG setup menu, select **aEEG Review**.
- Select the **Main Menu** quick key on the ViewBed screen → from the **Display** column select **Choose Screen** → select **aEEG** → select the aEEG window area → in the aEEG setup menu, select **aEEG Review**.


### 4.13.2 Setting the aEEG Review Display

You can set different aEEG review displays:

- **aEEG with EEG**: default option, displays up to four aEEG waveforms and up to four EEG waveforms in the first half and second half of the page respectively. And you can set the scale and speed for the aEEG and EEG waveforms.
- **aEEG with DSA**: displays up to four aEEG waveforms and DSA trends of up to four EEG channels in the first half and second half of the page respectively. And you can set the scale and speed for the aEEG waveforms, and power scale for the DSA trend.
- **aEEG with Trend**: displays up to four aEEG waveforms and HR/SpO2 trends in the first half and second half of the page respectively. And you can set the scale and speed for the aEEG waveforms.

### 4.13.3 Printing an aEEG Report

To print an aEEG report, follow this procedure:

1. Enter the aEEG review page.
2. Select the  button in the upper right corner of this page. The **Print Setup** menu is displayed.
3. Set the desired options.
4. Select **Print**.



# 5 Discharged Patients Management


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## 5.1 Overview

The CMS Viewer provides you the ability to search and review data of discharged patients in the target CentralStation.


## 5.2 Accessing the Discharged Patients Management Screen

To access the discharged patients management screen, follow this procedure:

1. Select the  button in the upper left corner of the main screen.
2. From the drop-down list, select **Discharged Patients**.

## 5.3 Searching Discharged Patients

To search discharged patients, follow this procedure:

1. Select the  button in the upper left corner of the discharged patients management screen.
2. From the drop-down list, select the department where the desired remote CentralStation is located.
3. Input query criteria. If you need to specify more criteria, select the **Filter** button and input more criteria.
4. Select the **Search** button. The eligible patients are displayed in the discharged patients list.



## 5.4 Viewing Patient Information and Historical Data of Discharged Patients

From the discharged patients list, select the **Details** button at the end of the discharged patient.

- In the **Patient Management** tab, you can view patient information.
- In the **Review** tab, you can review historical data of this patient. For more information on the **Review** tab, see Chapter 4 *Review Screen*.


## 5.5 Sorting Discharged Patients

You can sort all discharged patients in ascending or descending order by clicking the heading of any column. At the same time, the following symbols will appear to the right of the heading:

- : sort discharged patients in ascending order.
- : sort discharged patients in descending order.

By default, all discharged patients are sorted ascendingly by discharged date.

## 5.6 Refreshing Data

Selecting the  button in the upper right corner of the discharged patients list updates the patients list.

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# 6 Printing

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## 6.1 Printer

The CMS Viewer can be connected to a printer to output reports on A4 or Letter paper. The printer has a separate power supply. So far, the CMS Viewer supports the following printers:

- HP LaserJet 401n
- HP LaserJet M602
- HP LaserJet M605n
- HP LaserJet M608
- PDF printer

### NOTE

- **For more details about the printer, see the document accompanying the printer. With product upgrades, the CMS may support more printers and no prior notice will be given. If you have any doubt about the printer you have purchased, contact Mindray.**
- 

## 6.2 Starting Report Printouts

You can start a printing task manually or the printer will start a printing task automatically.

### 6.2.1 Manual Printing

You can manually start printing reports such as trends data.

#### 6.2.1.1 Printing Review Data

For details on how to print tabular trends, graphic trends, waveform review, waveform segment, event review, 12-lead analysis review, ST segment, and arrhythmia statistics result, see Chapter 4 *Review Screen*.

#### 6.2.1.2 Printing Realtime Waveforms

Choose one of the following ways to print real-time waveforms:

- Select the **Print** quick key at the bottom of the ViewBed screen.
- Select the **Print** button in the **Realtime Report** menu on the ViewBed screen. For details on how to access the **Realtime Report** menu, see Section 6.3.2 *Setting Realtime Reports*.
- Select the **Main Menu** quick key from the quick key area on the ViewBed screen → from the **Report** column select **Print**.

#### 6.2.1.3 Printing ECG Reports

When ECG monitoring with lead sets other than 3-lead is being performed, you can print corresponding ECG reports by following the procedures below.

1. On the ViewBed screen, access the ECG full screen by either of the following ways:
  - ◆ Select the **ECG Full-Screen** quick key at the bottom of the screen.
  - ◆ Select the **Screen Setup** quick key at the bottom of the screen → select the **ViewBed** tab → select the **Choose Screen** tab → select **ECG Full-Screen**. If you are performing 12-lead ECG monitoring, select the **Choose Screen** tab → select **ECG 12-Lead**.
  - ◆ Select the ECG parameter area or waveform area to access the ECG menu → select the **Full-Screen** button in the lower left corner of the menu. If you are performing 12-lead ECG monitoring, select the 12-Lead.


2. Select the **Main Menu** quick key from the quick key area on the ViewBed screen→ from the **Display** column select **ECG 12-Lead**. Select the print button in either of the following methods.
  - ◆ Select the **Print** quick key at the bottom of the ViewBed screen.
  - ◆ Select **Print** in the lower right corner of the **ECG Report** menu. For details on how to access this menu, see Section 6.3.3 *Setting ECG Reports*.
  - ◆ Select the **Main Menu** quick key from the quick key area on the ViewBed screen→ from the **Report** column select **Print**.

## NOTE

- For details on how to set the ECG reports, see Section 6.3.3 *Setting ECG Reports*.


### 6.2.1.4 Printing EEG Reports (BIS Module)

To print EEG reports, follow this procedure:

1. On the ViewBed screen, access the BIS menu in either of the following ways:
  - ◆ Select a BIS waveform or parameter area.
  - ◆ Select the **Parameter Setup** quick key at the bottom of the screen → select **BIS**.
2. Select the **BIS Expand** button at the bottom of the menu.
3. Select the **EEG** tab.
4. After selecting desired settings, select the  button in the upper left corner. The **Print Setup** menu is displayed.
5. After selecting desired settings, select **Print**.


### 6.2.1.5 Printing CCO-Related Hemodynamic Parameters

To print CCO-related hemodynamic parameters, follow this procedure:

1. On the ViewBed screen, access the CCO menu in either of the following ways:
  - ◆ Select the CCO parameter area.
  - ◆ Select the **Parameter Setup** quick key at the bottom of the screen → select **CCO**.
2. Select the **HemoSight** button at the bottom of the menu.
3. Select the **Diagnosis** tab.
4. Select the  button in the upper left corner. The **Print Setup** menu is displayed.
5. After selecting desired settings, select **Print**.

### 6.2.1.6 Printing ICG-Related Hemodynamic Parameters


To print ICG-related hemodynamic parameters, follow this procedure:

1. On the ViewBed screen, access the ICG menu in either of the following ways:
  - ◆ Select the ICG waveform or parameter area.
  - ◆ Select the **Parameter Setup** quick key at the bottom of the screen → select **ICG**.
2. After selecting desired settings, select the **Hemodynamic Parameters** button at the bottom of the menu.
3. Select the  button in the upper left corner. The **Print Setup** menu is displayed.
4. After selecting desired settings, select **Print**.

### 6.2.1.7 Printing SvO<sub>2</sub>/ScvO<sub>2</sub>-Related Hemodynamic Parameters


To print SvO<sub>2</sub>/ScvO<sub>2</sub>-related hemodynamic parameters, follow this procedure:

1. On the ViewBed screen, access the SvO<sub>2</sub> or ScvO<sub>2</sub> menu in either of the following ways:
  - ◆ Select the SvO<sub>2</sub> or ScvO<sub>2</sub> parameter area.
  - ◆ Select the **Parameter Setup** quick key at the bottom of the screen → select **SvO<sub>2</sub>/ScvO<sub>2</sub>**.
2. Select the **HemoSight** button at the bottom of the menu.

3. Select the **Diagnosis** tab.
4. Select the  button in the upper left corner. The **Print Setup** menu is displayed.
5. After selecting desired settings, select **Print**.


### 6.2.1.8 Printing QT Reports

To print a QT report, follow this procedure:

1. On the ViewBed screen, access **QT View** in one of the following ways:
  - ◆ Select the QT parameter area to access the QT menu → select the **QT View** button at the bottom of the menu.
  - ◆ Select the ECG waveform or parameter area to access the ECG menu → select the **QT** tab → select the **QT View** button at the bottom of the menu.
  - ◆ Select the **Parameter Setup** quick key at the bottom of the screen → select **ECG** → select the **QT** tab → select the **QT View** button at the bottom of the menu.
2. Select the  button in the upper left corner. The **Print Setup** menu is displayed.
3. After selecting desired settings, select **Print**.

### 6.2.1.9 Printing ST View

The ST View shows a complete QRS segment for each ST lead. To print ST View, follow this procedure:


1. On the ViewBed screen, access **ST View** in one of the following ways:
  - ◆ Select ST segment waveform area.
  - ◆ Select the ST parameter area to access the **ST** menu → select the **ST View** button at the bottom of the menu.
  - ◆ Select the ECG waveform or parameter area to access the **ECG** menu → select the **ST** tab → select the **ST View** button at the bottom of the menu.
2. Select the  button in the upper left corner. The **Print Setup** menu is displayed.
3. After selecting desired settings, select **Print**.

### 6.2.1.10 Printing Frozen Waveforms

For details on how to print frozen waveforms, see Section 2.7.5.1 *Freezing Waveforms*.

### 6.2.1.11 Printing Alarm Setup

To print alarm setup, follow this procedure:

1. Select the **Alarm Setup** quick key at the bottom of the ViewBed screen.
2. After selecting desired settings, select the  button in the upper left corner. The **Print Setup** menu is displayed.
3. After selecting desired settings, select **Print**.

## 6.2.2 Automatic Printing

You can set a printer to start printing automatically.

To do so, follow this procedure:

1. On the ViewBed screen, access the alarm setup menu in either of the following ways:
  - ◆ Select the desired parameter area or waveform area to access the parameter setup menu and then select the alarm-related tab such as the **Alarm** tab.
  - ◆ Select the **Alarm Setup** quick key at the bottom of the ViewBed screen.
2. Enable **Alarm Outputs** for the desired parameter. Once an alarm for this parameter is triggered, the parameter related data will be printed automatically.

## 6.3 Setting Reports

You can set report related contents such as patient information items on a report. For details, see Section 7.5 *Print Tab*. This section only describes how to set real-time reports and ECG reports in the **Print Setup** menu.

### 6.3.1 Accessing the Print Setup Menu

Access the **Print Setup** menu in either of the following ways:

- ◆ Select the **Print Setup** quick key at the bottom of the ViewBed screen. If this quick key is not available, configure it by following steps in 2.6 *Quick Keys*.
- ◆ Select the **Main Menu** quick key at the bottom of the ViewBed screen→ from the **Report** column select **Print Setup**.

### 6.3.2 Setting Realtime Reports

To set realtime reports, follow this procedure:

1. In the **Print Setup** menu, select the **Report Setup** tab.
2. Select the **Realtime Report** tab.
3. Set **Speed**.
4. Select waveforms to be printed.
  - ◆ **Current Waveforms**: print the realtime report for current waveforms.
  - ◆ **Selected Waveforms**: print the realtime report for the selected waveforms. If you wish to select this option, you need to further select **Select Waveform** and select the desired waveforms in the **Select Waveform** menu.

### 6.3.3 Setting ECG Reports

When ECG monitoring with lead sets other than 3-lead is being performed, you can set ECG reports.

To do so, follow this procedure:

1. In the **Print Setup** menu, select the **Report Setup** tab.
2. Select the **ECG Report** tab.
3. Set the desired options. Only items that may need special remarks are described here.

Menu item	Description	Options	Default
Auto Interval	Defines the spacing between the ECG waveforms on a printout	<b>On</b> : automatically adjusts the space between waveforms to avoid overlapping. <b>Off</b> : each waveform area has the same size on a printout.	Off
Note: This setting is only relevant when <b>12×1</b> is selected for <b>12-Lead Format</b> .			

Menu item	Description	Options	Default
12-Lead Format	Select the format of 12-lead ECG waveforms on a printout.	<p><b>12x1:</b> displays 12-lead ECG waveforms on one page in one column.</p> <p><b>6x2:</b> displays 12-lead ECG waveforms on one page in two columns, with 6 lines in each column.</p> <p><b>6x2+1:</b> displays 12-lead ECG waveforms on one page in two columns, with 6 lines in each column, and one rhythm lead waveform at the bottom.</p> <p><b>3x4+1:</b> displays 12-lead ECG waveforms on one page in 4 columns, with 3 lines in each column, and one rhythm lead waveform at the bottom.</p> <p><b>3x4+3:</b> displays 12-lead ECG waveforms on one page in 4 columns, with 3 lines in each column, and three rhythm lead waveforms at the bottom.</p>	3x4+1
Rhythm Lead 1 Rhythm Lead 2 Rhythm Lead 3	Select the lead that will be used as Rhythm Lead 1, 2, or 3.	I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6	Rhythm Lead 1: II Rhythm Lead 2: V2 Rhythm Lead 3: V5,
Note: This setting is only relevant when <b>6x2+1</b> , <b>3x4+1</b> , or <b>3x4+3</b> is selected for <b>12-Lead Format</b> .			
Format sequence	Select the recording method of ECG report generated by auto measurement	<p><b>Sequential:</b> 12-lead ECG data are recorded sequentially and displayed in 3 lines and 4 columns with 2.5 seconds of ECG data for each column.</p> <p><b>Simultaneous:</b> Record simultaneous 12-lead ECG data.</p>	Sequential

## 6.4 Printer Out of Paper

When the printer runs out of paper, the print request will not be acknowledged. If there are too many print jobs that are not acknowledged a printer error may occur. In this case, install paper and then re-send the print request. Restart the printer if necessary.

To avoid a printer error condition, ensure that there is enough paper in the printer before sending a print request.

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# 7 System Setup

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## 7.1 System Setup Overview

The CMS Viewer comes with factory set defaults that govern how your system operates. You can make changes to the configuration items to accommodate the needs of your unit. Changes made to the CMS Viewer take effective for the CMS Viewer only and do not affect the host CentralStation.

## 7.2 Display Tab

### 7.2.1 Accessing the Display Setup Page

To access the display setup page, follow this procedure:

1. Select the  button in the upper left corner of the main screen.
2. From the drop-down list, select **System Setup** to access the **System Setup** menu.
3. Select the **Display** tab.

### 7.2.2 Setting a Parameter Color

Parameter-related information such as realtime waveforms and parameter numerics are displayed in the same color on the screen.

To set the desired parameter colors, follow this procedure:

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

### 7.2.3 Setting a Screen Size

To set the screen size, follow this procedure:

1. On the display setup page, select the **Screen** tab.
2. Select **Screen Size**.
3. Select the desired option. If your screen size is not available, select **Others** and select the **+** or **-** button on the rulers to adjust the screen size.
4. Select **OK**.

#### NOTE

- **Restart the system after making a change in the screen size.**
- 


### 7.2.4 Setting a Patient Window

You can select the desired items displayed on the review screen. To do so, follow this procedure:

1. On the display setup page, select the **Patient Window** tab.
2. Select the desired items.

## 7.2.5 Setting Other Items


You can set the waveform sequence for multi-lead ECG, whether to enable soft keyboard, and Viewer auto exit. To do so, follow this procedure:

1. On the display setup page, select the **Other** tab.
2. Set **ECG Lead Sequence**. After changing the ECG lead sequence, the waveform sequence will be updated in the ECG waveform area, ST parameter area, ST View on the ViewBed screen, ECG waveforms on review pages, and printouts..
  - ◆ **Normal:** I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6
  - ◆ **Cabrera:** aVL, I, -aVR, II, aVF, III, V1, V2, V3, V4, V5, V6
3. Enable or disable **Soft Keyboard**. When this option is enabled, a soft keyboard displays when a field that requires manual input is selected.
4. Set **Auto Exit**. When it is set to **Never**, the CMS Viewer never exits automatically. When it is set to other options, it exits automatically once the selected time interval expires.
5. Enable or disable **Outline Font for Suspected Values**. This option is enabled by default. When it is enabled, if unreliable measurement values of HR, SpO<sub>2</sub>, or BIS are detected, these numerics will be displayed in outline font on the multibed or ViewBed screen or suffixed with the  icon on the review pages.

## 7.3 Review Tab

### 7.3.1 Accessing the Review Setup Page

To access the review setup page, follow this procedure:

1. Select the  button in the upper left corner of the main screen.
2. From the drop-down list, select **System Setup** to access the **System Setup** menu.
3. Select the **Review** tab.

### 7.3.2 Setting a Trend Group


In the **Trends** tab, you can set a trend group. A trend group defines the trend displayed on the trend review page and printed in trend reports.

#### NOTE

- 
- **In the Group Setup menu, HR is always displayed in the first row. It cannot be deleted or moved.**
- 

#### 7.3.2.1 Setting Trend Parameters

To add, delete, overlap, unoverlap, or move a parameter, follow this procedure:

1. On the review setup page, select the **Trends** tab.
2. Select **Group Setup**.
3. Select the desired tab and then the desired parameter.
4. Select the desired buttons. Only buttons that may need special remarks are described here.
  - ◆ **Overlap:** after selecting two parameters and the **Overlap** button, the  symbol displays on the right of overlapped parameters. The numeric values and trend curves of two parameters are displayed in one row on the screen.
  - ◆ **Unoverlap:** after two parameters are overlapped, select the **Unoverlap** button cancels the overlapping relation.

#### 7.3.2.2 Selecting Trend Group to Be Displayed

You can set what trend groups to be displayed in the Trend Group option in the tabular trends and graphic trends reviews. To do so, follow this procedure:

1. On the review setup page, select the **Trends** tab.
2. Select desired options in the **Display Default Trend Group** area.

### 7.3.3 Setting an Arrhythmia Mark Color

In the **Arrhy Mark** tab, you can set colors for arrhythmia marks that display in the compressed waveform.

To do so, follow this procedure:


1. On the display setup page, select the **Arrhy Mark** tab.
2. Select the desired arrhythmia category.
3. Select the color box on the right of the arrhythmia category.
4. From the drop-down list, select the desired color.


### 7.3.4 Setting Patient Data Export

In the **Export** tab, you can set to allow exporting patients' trend data and waveform data.

To do so, follow this procedure:

1. On the review setup page, select the **Export** tab.
2. Enable **Save As**.

Once **Save As** is enabled, the export symbol  is displayed at the top of the main screen. Selecting this symbol opens the **Export Queue** menu. In this menu, you can view the export progress, export task, and so on. For more information on this menu, see *1.2 Example Main Screen*.

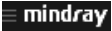
The export symbol  is also displayed on the tabular trends review page, graphic trends review page, and full disclosure review page. For more information on exporting patients' trend data or waveform data from these review pages, see *4.6.4 Exporting Trend Data*, *4.7.4 Exporting Trend Data*, and *4.8.6 Exporting Waveform Data*.

## 7.4 Network Tab

In the **Network** tab, you can set communication conditions between the CMS Viewer and the CentralStation, between the CMS Viewer and the MLAP server.

### 7.4.1 Accessing the Network Setup Page

To access the network setup page, follow this procedure:

1. Select the  button in the upper left corner of the main screen.
2. From the drop-down list, select **System Setup** to access the **System Setup** menu.
3. Select the **Network** tab.

### 7.4.2 Setting the General Tab

In the **General** tab, you can set the central monitoring network. For description of items in the **General** tab, see *BeneVision Central Monitoring System Viewer Installation Guide (PN: 046-011214-00)*.

#### NOTE

- 
- **Restart the CMS Viewer after making a change in the General tab.**
- 

### 7.4.3 Setting the Master Server Tab

In the **Master Server** tab, you can set the information of the CentralStation that is used as a master server. For details on the master server setup, see *2.4 Configuring the CMS Viewer Software*.

## 7.4.4 Setting the Central Station Connection Tab


In the **Central Station Connection** tab, you can see the list of available CentralStations and connect the CMS Viewer to the desired CentralStation. For details on how to establish a connection, see *BeneVision Central Monitoring System Viewer Installation Guide (PN: 046-011214-00)*.

If you need to disconnect the CMS Viewer from a CentralStation, select the **Disconnect** button at the end of the desired CentralStation.

## 7.5 Print Tab

### 7.5.1 Accessing the Print Setup Page

To access the print setup page, follow this procedure:

1. Select the  button in the upper left corner of the main screen.
2. From the drop-down list, select **System Setup** to access the **System Setup** menu.
3. Select the **Print** tab.

### 7.5.2 Setting a Printer

To set a printer, follow this procedure:

1. On the print setup page, select the **Printer** tab.
2. Set **Printer**.
3. Select the desired report type.
4. Set desired print-related properties.

#### NOTE

---

- **Only the following reports support color printing currently: vital sign summary report, ECG summary report.**
  - **PDF reports can be output by PDFCreator only.**
- 

### 7.5.3 Setting a Report Layout

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

To set the report layout, follow this procedure:

1. On the print setup page, select the **Report Layout** tab.
2. Select the desired items under **Report Name**. **N/A** indicates that this item is not displayed on a report.

#### NOTE

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- **Contents in the reports can be customized for each bed. For more information, see Section 7.5.4 Setting an ECG Report.**
- 

### 7.5.4 Setting an ECG Report

In the **ECG Report** tab, you can set the patient information displayed on ECG reports.

To set ECG reports, follow this procedure:

1. On the print setup page, select the **ECG Report** tab.
2. Select the desired items.

### 7.5.5 Setting PDF File Name

To set PDF file name, follow this procedure:

1. On the print setup page, select the **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**.

## NOTE

- **The directory must be consistent with the file saving directory configured in the PDFCreator.**

## 7.5.6 Setting Other Print-Related Items


To set other print-related items, follow this procedure:

1. On the print setup page, select the **Other** tab.
2. Set the desired option.
  - ◆ **Printing Duration on Alarm:** sets the desired length of waveforms that will be printed automatically when **Alarm Outputs** for a parameter is enabled and an alarm is triggered. 10 sec, 20 sec, and 30 sec means printing the waveforms 5 seconds, 10 seconds, and 15 seconds before and after the alarm triggered time respectively.
  - ◆ **Monitor Remote Print:** if you enable this option, the CMS automatically starts a printing task after the printing task is started at the patient monitor. **Second Mark (Printer):** if you enable this option, second marks will be displayed on the report printout.

## 7.6 Other Tab

### 7.6.1 Accessing the Other Setup Page

To access the other setup page, follow this procedure:

1. Select the  button in the upper left corner of the main screen.
2. From the drop-down list, select **System Setup** to access the **System Setup** menu.
3. Select the **Other** tab.

### 7.6.2 Setting a Unit of Measure

To set units, follow this procedure:

1. On the other setup page, select the **Unit** tab.
2. Set the desired units.

### 7.6.3 Setting the Module

To set the ECG standard, follow this procedure:

1. On the other setup page, select the **Module** tab.
2. Set **ECG Standard**.
3. Set **QTc Formula**. The CMS Viewer uses the Hodges correction formula by default to correct the QT interval for heart rate.
  - ◆ Hodges:  $QTc = QT + 1.75 \times (HeartRate - 60)$
  - ◆ Bazett:  $QTc = QT \times \left(\frac{HeartRate}{60}\right)^{\frac{1}{2}}$
  - ◆ Fridericia:  $QTc = QT \times \left(\frac{HeartRate}{60}\right)^{\frac{1}{3}}$
  - ◆ Framingham:  $QTc = QT + 154 \times \left(1 - \frac{60}{HeartRate}\right)$

## 7.6.4 Setting a Language

In the **Language** tab, you can select the desired language. When the CMS Viewer starts, it is displayed in the language selected at the time of installation.

To change a language, follow this procedure:

1. On the other setup page, select the **Language** tab.
2. Select the desired language. It is recommended to select the language supported by your operating system.
3. Restart the system.

## 7.6.5 Setting a Device Location

To set the the device location of the CMS Viewer, follow this procedure:

1. On the other setup page, select the **Device Location** tab.
2. Set **Facility Name**.
3. Set **Department**.

# 8 Default Settings

## 8.1 Overview

This chapter lists the default settings on the system setup screen.

## 8.2 Display Tab

Subtab	Item	Default
Patient Window	12-Lead ECG	Selected
	ST	
	aEEG	
	Arrhy Statistics	
Other	ECG Lead Sequence	Normal
	Soft Keyboard	Off
	Auto Exit	Never
	Outline Font for Suspected Values	On

## 8.3 Review Tab

Subtab	Item	Default
Display Default Trend Group	All	Selected
	Standard	
	Hemo	
	Cardiac	
	Pulmonary	
	RM	
	RM-Pressure	
	RM-Volume	
	RM-Time	
	Neuro	Selected
	Gases	
	Pump	
	Custom 1	
	Custom 2	

Subtab	Item	Default
Arrhy Mark	Asystole	Selected
	V-Fib	
	V-Fib/V-Tach	
	V-Tach	
	Vent Brady	
	Extreme Tachy	
	Extreme Brady	
	PVCs/min High	
	Vent Rhythm	
	R on T	
	Multiform PVC	
	Pauses/min High	
	Run PVCs	
	Couplet	
	PVC	
	Bigeminy	
	Trigeminy	
Tachy		
Supraventricular tachycardia		
SVCs/min High		
Arrhy Mark	Brady	Selected
	Pacer Not Capture	
	Pacer Not Pacing	
	Missed Beats	
	Nonsus V-Tach	
	Pause	
	A-Fib	
	Irr Rhythm	
Export	Save As	Disabled

## 8.4 Network Tab

Subtab	Item	Default
General	Central Station Address	Disabled
	Local IP address	Auto
	Encryption Connection Type	Only Private Encryption



## 8.5 Print Tab

Subtab	Item	Default
Printer	Paper Size	A4
	For General Report and Print on Alarm Report:	
	Printer	Blank
	Printer Resolution	300 dpi
	PDF Resolution	600 dpi
	Print Action	Paper
	Color Mode	Color
Report Layout	Patient Name	Displayed
	Patient Category	
	DOB	
	Gender	
	Patient ID	
	Bed No	
	Height/Weight	
	Paced	
	Department	
ECG Report	Patient ID	Selected
	Patient Name	
	Age	
	Gender	
Other	Printing Duration on Alarm	20 sec
	Monitor Remote Print	Enabled
	Second Mark (Printer)	Enabled

## 8.6 Other Tab

Subtab	Item	Default
Unit	Height Unit	cm
	Weight Unit	kg
	ST Unit	mV
	Hb Unit	g/dl
	CVP Unit	cmH <sub>2</sub> O
	ICP Unit	mmHg
	CO <sub>2</sub> Unit	
	O <sub>2</sub> Unit	%
	Temp Unit	°C
	Pressure Unit	mmHg
	SVR Unit	DS/cm <sup>5</sup>
	Caliper Unit	msec
	Module	ECG Standard
Qtc Formula		Hodges

# 9 Troubleshooting

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## 9.1 Connection Issues

When the CMS Viewer cannot be connected to the host CentralStation, do as follows:

- Ensure that the CMS Viewer software is configured properly.
- Ensure that the CentralStation you are connecting to authorize remote connections.
- Ensure that communication to the Master Server and the CMS Viewer is normal.

## 9.2 Unable to View History/Discharged Patients

When you could not view the historical data of discharged patients, do as follows:

- Ensure that the connected CentralStation supports CMS Viewer review.
- Ensure that the patient you are viewing is authorized to be viewed on the host CentralStation

## 9.3 Unable to Print

When you could not send a printing request at the CMS Viewer, do as follows:

- Ensure that printers are installed and functioning in the Windows operating system.
- Ensure that the intended printer is set as the default printer in the Windows operating system.
- Ensure that the printer/PDF writer/XPS writer is not displaying a popup behind the CMS Viewer.

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