

**BeneVision Ext**

**Remote Control System**

**Operator's Manual**





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- The electrical installation of the relevant room complies with the applicable national and local requirements;
- The product is used in accordance with the instructions for use.

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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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- Temporary or permanent serious deterioration in the medical condition of a patient, user, or another person
- A serious threat to public health

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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 product.

## 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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# Contents

|  |              |
|--|--------------|
| <b>1 Safety</b> .....  | <b>1 - 1</b> |
| 1.1 Safety Information .....   | 1 - 1        |
| 1.1.1 Warnings .....   | 1 - 1        |
| 1.1.2 Cautions .....   | 1 - 2        |
| 1.1.3 Notes .....  | 1 - 2        |
| 1.2 Equipment Symbols .....  | 1 - 3        |
| <b>2 System Overview</b> .....   | <b>2 - 1</b> |
| 2.1 Intended Use .....   | 2 - 1        |
| 2.1.1 Intended Purpose Statement .....                                       | 2 - 1        |
| 2.1.2 Indication for Use .....   | 2 - 1        |
| 2.1.3 Medical Conditions .....   | 2 - 1        |
| 2.1.4 Intended Users .....   | 2 - 1        |
| 2.1.5 Intended Patient Population .....                                      | 2 - 1        |
| 2.1.6 Contra-indications .....   | 2 - 1        |
| 2.1.7 Side Effects .....   | 2 - 1        |
| 2.1.8 Limitation .....   | 2 - 1        |
| 2.1.9 Clinical benefit .....   | 2 - 2        |
| 2.2 Network Components .....   | 2 - 2        |
| <b>3 Getting Started</b> .....   | <b>3 - 1</b> |
| 3.1 Overview .....   | 3 - 1        |
| 3.2 Equipment Preparation Safety Information .....                           | 3 - 1        |
| 3.3 Starting the System .....  | 3 - 2        |
| 3.4 Setting Network Connection .....   | 3 - 2        |
| 3.5 Viewing System Information .....   | 3 - 2        |
| 3.6 Turning Off the System .....   | 3 - 2        |
| <b>4 Screen Display</b> .....  | <b>4 - 1</b> |
| 4.1 Main Screen .....  | 4 - 1        |
| 4.2 Entering ViewBed Screen .....  | 4 - 1        |
| 4.3 Anesthesia ViewBed Screen .....  | 4 - 1        |
| 4.4 Ventilator ViewBed Screen .....  | 4 - 2        |
| 4.5 Pump ViewBed Screen .....  | 4 - 3        |
| <b>5 Remote Control</b> .....  | <b>5 - 1</b> |
| 5.1 Entering Remote Control .....  | 5 - 1        |
| 5.1.1 Entering Remote Control of the Ventilators or Anesthesia Systems ..... | 5 - 1        |
| 5.1.2 Entering Remote Control of the Pumps .....                             | 5 - 1        |
| 5.2 Anesthesia System Remote Control .....                                   | 5 - 2        |
| 5.3 Ventilator Remote Control .....  | 5 - 3        |
| 5.4 Pump Remote Control .....  | 5 - 3        |
| <b>6 Alarms</b> .....  | <b>6 - 1</b> |
| 6.1 Alarm Safety Information .....   | 6 - 1        |

|   |              |
|---|--------------|
| 6.2 Understanding the Alarms .....  | 6 - 1        |
| 6.2.1 Alarm Categories .....  | 6 - 1        |
| 6.2.2 Alarm Priorities .....  | 6 - 1        |
| 6.2.3 Alarm Indicators .....  | 6 - 2        |
| 6.2.4 Alarm Status Symbols .....  | 6 - 2        |
| 6.3 Viewing Alarms .....  | 6 - 2        |
| 6.4 Alarm Limit .....   | 6 - 3        |
| 6.5 Alarm Reset .....   | 6 - 3        |
| 6.6 Alarm Audio Pause .....   | 6 - 3        |
| 6.7 Testing Alarms .....  | 6 - 3        |
| <b>7 System Setup .....</b>   | <b>7 - 1</b> |
| 7.1 Network Settings .....  | 7 - 1        |
| 7.1.1 Accessing Network Setup Page .....  | 7 - 1        |
| 7.1.2 General Settings .....  | 7 - 1        |
| 7.2 Other Settings .....  | 7 - 1        |
| 7.2.1 Accessing the Other Setup Page .....  | 7 - 1        |
| 7.2.2 Authorizing Remote Control .....  | 7 - 1        |
| 7.2.3 Exporting Logs .....  | 7 - 1        |
| <b>8 Maintenance .....</b>  | <b>8 - 1</b> |
| 8.1 Overview .....  | 8 - 1        |
| 8.2 Maintenance Safety Information .....  | 8 - 1        |
| 8.3 General Inspection .....  | 8 - 1        |
| 8.4 Disposing of the Equipment .....  | 8 - 1        |
| <b>A Technical Specifications .....</b>   | <b>A - 1</b> |
| A.1 Requirements of the Computer .....  | A - 1        |
| A.2 Product Specifications .....  | A - 1        |
| A.3 Other Specifications .....  | A - 1        |
| A.4 Software Operating Environment .....  | A - 1        |
| <b>B Default Settings .....</b>   | <b>B - 1</b> |
| B.1 Other Tab .....   | B - 1        |
| <b>C Alarm Messages .....</b>   | <b>C - 1</b> |
| C.1 Overview .....  | C - 1        |
| C.2 Alarm Messages in the System Alarm Area .....                                 | C - 1        |
| <b>D Abbreviations .....</b>  | <b>D - 1</b> |
| <b>E Installing/Updating Operating System Security Patches (Windows 10) .....</b> | <b>E - 1</b> |

# 1 Safety

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## 1.1 Safety Information

The safety statements presented in this chapter refer to the basic safety information that the operator of the BeneVision Ext Remote Control System (hereinafter referred to as the system) shall pay attention to and abide by. There are additional safety statements in other chapters or sections, which may be the same as or similar to the following, or specific to the operations.

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### WARNING

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- **Indicates a potential hazard or unsafe practice that, if not avoided, could result in death or serious injury.**
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### CAUTION

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- **Indicates a potential hazard or unsafe practice that, if not avoided, could result in minor personal injury or product/property damage.**
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### NOTE

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- **Provides application tips or other useful information to ensure that you get the most from your product.**
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### 1.1.1 Warnings

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#### WARNING

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- **The physiological waveforms, parameters and alarms displayed on the system screen are for clinician's reference only and cannot be directly used as the basis for clinical treatment. Before giving invasive treatment to a patient, you must go to the corresponding devices to confirm the results you have obtained from the system.**
  - **If any value displayed on the system screen is abnormal or questionable, first determine the patient's vital signs by alternative means and then verify that the system and the devices connected to the system are working properly.**
  - **The system is a clinical information device. Except for using such components as the mouse, touchscreen and keyboard to perform normal operations, do not touch or disassemble any other component, especially the power component; otherwise, it may result in personnel injury.**
  - **The computer running the system software must comply with local relevant regulations.**
  - **The system software copyright is solely owned by Mindray. No organization or individual shall resort to altering, copying, or exchanging it or to any other infringement on it in any form or by any means without due permission.**
  - **Data communication must be performed within a closed network or within a virtually isolated network provided by a hospital for all network functions.**
  - **The physiological waveforms, parameters, alarms and so on displayed on the system screen come from connected devices. If network connection fails, data transmitted from the devices to the system might be lost or delayed. Thus keep patients under close surveillance.**
  - **Before connecting any storage device to the system, ensure that this storage device is free of viruses.**
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## 1.1.2 Cautions

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### CAUTION

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- The service life of the system depends on its hardware. Rough treatment, dropping or collision should be avoided in the operation on the keyboard, mouse and computer; otherwise, the service life of the system may be shortened.
  - Magnetic and electrical fields are capable of interfering with the proper performance of the system. For this reason make sure that all external devices operated in the vicinity of the system comply with the relevant EMC requirements. Mobile phone, X-ray equipment or MRI devices are a possible source of interference as they may emit higher levels of electromagnetic radiation.
  - Components of the system, such as the keyboard and mouse, may be contaminated by microorganisms during transport, storage and use. Before removing components of the system from their packaging, the packaging should be inspected for damage. In case of any damage, contact the carrier or Mindray immediately.
  - All system equipment must utilize the hospital emergency power system. Failure to do so will result in loss of monitoring during extended periods of power failure. Hospitals without an emergency power system should use an Uninterruptible Power Supply (UPS) to power the system. When there is a power failure, the system should be shut down by following the specified shutdown procedure before the UPS is turned off. If the system has a sudden power failure, system failure may occur and consequently the system will not work correctly next time or may even have a serious result.
  - Do not transport a system host or displays while they are running. Doing so may cause damage.
  - The system should be connected to the network utilizing a network designed according to the installation guide.
  - Restart the system every three months. Long time operation of the system may lead to a failure of the operating system.
  - The system should be installed only using Mindray provided Microsoft Windows operating system, service packs, and patches. Use of unauthorized software may lead to abnormal system operation or failure.
  - To sustain network security and network connection stability, make sure the system and the bedside devices communicate within a closed LAN network which forbids connecting to the Internet and other external networks. Physical environment or firewalls and so on can be used to implement this. When firewalls are used, make sure regarding configurations are made to forbid all the unexpected access to the system and bedside devices.
  - For host computers installing McAfee Application Control software, all the necessary software such as system or third-party software should be authorized through McAfee. Unauthorized software can not run in the host computer.
  - At the end of its service life, the system must be disposed of in compliance with the guidelines regulating the disposal of such products. If you have any questions concerning disposal of the equipment, please contact Mindray.
  - To avoid risk of electric shock, the equipment must only be connected to mains power with protective earth.
  - When disposing of the packaging material, be sure to observe the applicable waste control regulations and keep it out of children's reach.
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## 1.1.3 Notes














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### NOTE


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- For details on the computer, refer to its user manual.
  - This manual describes all features and options. Your equipment may not have all of them.
  - Keep this manual in the vicinity of the system so that it can be obtained conveniently when needed.
  - During normal use, the operator is expected to face the front of the equipment.
-

## 1.2 Equipment Symbols

| Symbol  | Description                            | Symbol  | Description   |
|---|--|---|---|
|    | Date of manufacture                    |    | Serial number   |
|    | Manufacturer                           |    | Authorized representative in the European Community   |
|    | Unique Device Identifier               |    | Medical Device  |
|    | Refer to instruction manual/booklet    |   | The product bears CE mark indicating its conformity with the provisions of the REGULATION (EU) 2017/745 on medical devices and fulfills the general safety and performance requirements of Annex I of this regulation.<br>Note: The product complies with the Council Directive 2011/65/EU. |
|    | Stacking limit by number               |    | Keep dry  |
|  | This way up                            |  | Fragile; handle with care   |
|  | General symbol for recovery/recyclable |   |   |

The general meaning assigned to geometric shapes, safety colors and contrast colors for safety signs are as follows:

| Geometric shape   | Meaning          | Safety color | Contrast color | Graphical symbol color |
|---|------------------|--------------|----------------|------------------------|
|  | Mandatory action | Blue         | White          | White                  |

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# 2 System Overview

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## 2.1 Intended Use

### 2.1.1 Intended Purpose Statement

The BeneVision Ext Remote Control System is intended for controlling medical devices remotely and viewing data.

### 2.1.2 Indication for Use

The BeneVision Ext Remote Control System is intended to remotely control ventilators, anesthesia machines and pumps from Mindray through network connection to:

- provide ventilation assistance and breathing support for patients;
- maintain a patient's ventilation;
- indicate infusion therapy.

### 2.1.3 Medical Conditions

It is intended for use in a hospital or other clinical environment.

### 2.1.4 Intended Users

It is intended for use by well-trained clinicians.

### 2.1.5 Intended Patient Population

Indicated for use when monitoring adult, pediatric and neonate patients as indicated by labeling of the medical device providing the data.

### 2.1.6 Contra-indications

None.

### 2.1.7 Side Effects

None.

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#### **WARNING**

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- **The system should be used along with ventilators, anesthesia systems and pumps from Mindray.**
- 

### 2.1.8 Limitation

Remotely controlling the ventilators is intended for isolation wards and has the following restrictions during use:

- The patient should be within the physician's visible range (either close enough to allow direct viewing through window or being able to remotely view through high-resolution video monitoring system).
- At least ventilators, monitors and high-resolution video monitoring system should be equipped beside the patient's bed and the BeneVision Central Monitoring System, the BeneVision Ext Remote Control System should be equipped outside the isolation wards.
- Do not support ventilators turning off or entering/exiting standby by remote control.
- Whether to perform remote control depends on the stability of the patient's status.

Remotely controlling the anesthesia systems is intended for hybrid operation rooms and has the following restrictions during use:

- The patient should be within the physician's visible range (close enough to allow direct viewing through window).
- At least anesthesia systems and monitors should be equipped beside the bed and the BeneVision Central Monitoring System, the BeneVision Ext Remote Control System should be equipped outside the hybrid operation room.
- Do not support anesthesia systems turning off or entering/exiting standby by remote control.

Remotely controlling the pumps is intended for isolation wards or hybrid operation rooms and has the following restrictions during use:

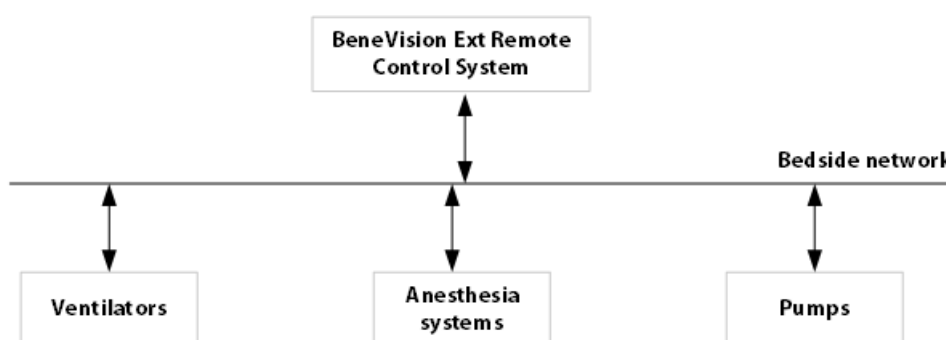
- When in isolation wards, the patient should be within the physician's visible range (either close enough to allow direct viewing through window or being able to remotely view through high-resolution video monitoring system).
- When in hybrid operation rooms, the patient should be within the physician's visible range (close enough to allow direct viewing through window).
- At least pumps and monitors should be equipped beside the bed and the BeneVision Central Monitoring System, the BeneVision Ext Remote Control System should be equipped outside the isolation ward/hybrid operation room.
- Do not support pumps turning off by remote control.

### 2.1.9 Clinical benefit

When a patient in an isolation ward or DSA operation room encounters a change in the patient's condition and needs to modify the parameters of the ventilator/anesthesia machine/infusion pump quickly, the medical personnel can modify the parameters through the Remote Control software within seconds, so as to reduce the time for wearing or removing the isolation gown, improve the work efficiency of the medical personnel, The product can reduce the time of well-trained clinicians to get in and out the operating room and the patients can be treated with less time.

## 2.2 Network Components

The system network consists of the BeneVision Ext Remote Control System and the bedside devices as shown below.



- BeneVision Ext Remote Control System: the system displays real-time data from the bedside devices and can remotely control the bedside devices.
- Bedside devices: bedside devices include ventilators, anesthesia systems and pumps. And they connect to the BeneVision Ext Remote Control System via LAN. Supported Bedside Devices are as below:

| Ventilators | Anesthesia Systems | Pumps         |                |
|-------------|--------------------|---------------|----------------|
|             |                    | Syringe Pumps | Infusion Pumps |



|  |  |   |   |
|--|--|---|---|
| SV300 series (version: V02 or above)       | A8/A9 series (version: V01 or above)                   | BeneFusion n series (version: V01 or above) | BeneFusion n series (version: V01 or above) |
| SV300 Pro series (version: V02 or above)   | A1/A3/A5/A7 series (version: V01 or above)             | BeneFusion e series (version: V01 or above) | BeneFusion e series (version: V01 or above) |
| SV600/SV800 series (version: V02 or above) | A10/A30/A40/A50/A60/A70 series (version: V01 or above) | BeneFusion i series (version: V01 or above) | BeneFusion i series (version: V01 or above) |
| SV700/SV900 series (version: V01 or above) |  | BeneFusion u series (version: V01 or above) | BeneFusion u series (version: V01 or above) |
| SV60/SV70 series (version: V01 or above)   |  |   |   |
| NB series (version: V02 or above)          |  |   |   |
| TV50/TV80 (version: V01 or above)          |  |   |   |

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# 3 Getting Started

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## 3.1 Overview

This chapter describes preparation before using the system and gives an overview of the system.

## 3.2 Equipment Preparation Safety Information

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### WARNING

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- The system software copyright is solely owned by Mindray. No organization or individual shall resort to altering, copying, or exchanging it or to any other infringement on it in any form or by any means without due permission.
  - Connect only approved devices to the system. Devices connected to the equipment must meet the requirements of the applicable IEC standards (e.g. IEC 60950 safety standards for information technology equipment and IEC 60601-1 safety standards for medical electrical equipment). The system configuration must meet the requirements of the IEC 60601-1 medical electrical systems standard. Any personnel who connect devices to the equipment's signal input/output port are responsible for providing evidence that the safety certification of the devices has been performed in accordance to the IEC 60601-1. If you have any questions, please contact Mindray.
  - If it is not evident from the system specifications whether a particular combination with other devices is hazardous, for example, due to summation of leakage currents, please consult the manufacturer or an expert in the field. A determination must be made that the proposed combination will not negatively affect the devices themselves or the patient's safety.
- 

### CAUTION

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- The system should be installed by authorized Mindray personnel.
  - Before unpacking, examine the packing case carefully for signs of damage. If any damage is detected, contact the carrier or Mindray.
  - Make sure that the system operating environment meets the specific requirements. Otherwise unexpected consequences, e.g. damage to the equipment, could result.
  - Components of the system, such as the keyboard and mouse, may be contaminated by microorganisms during transport, storage and use. Before removing them from their packaging, the packaging should be inspected for damage. In case of any damage, contact the carrier or Mindray immediately.
  - When disposing of the packaging material, be sure to observe the applicable waste control regulations and keep it out of children's reach.
  - Observance of this manual is a prerequisite for proper product performance and correct operation and ensures patient and operator safety.
  - This product has been analyzed and evaluated for risks, and the risks are all acceptable. The safety information used as risk control measures has been included in the manual.
  - This product is a software product. According to subsequent maintenance of the product and the operating system platform, the lifetime of the product is 10 years.
  - Once released, this product enters maintenance phase. All of its changes will be analyzed, assessed. The changes will be audited and controlled by change control procedures and service personals of Mindray will conduct on-site maintenance. When this product is discontinued, Mindray will inform the customers of the time of discontinuation of the service. Also, Mindray will help customers to export the software data, clear patients' data etc. and keep relevant records.
  - Mindray will analyze and evaluate all the patches of the operating system platform released every 6 months to confirm whether the patches affect this product's function, safety and performance etc. Then decide whether to update the patches and maintenance personnel of Mindray will conduct on-site maintenance. If current operating system cannot support this product, Mindray will update the
-

operating system platform or choose a new operating system platform; the system compatibility with this product will be tested and verified and maintenance personnel of Mindray will conduct on-site maintenance.

- Mindray will analyze and evaluate all the patches of all the SOUP software released every 6 months to confirm whether the patches affect this product's function, safety and performance etc. Then decide whether to update the patches and maintenance personnel of Mindray will conduct on-site maintenance. If current SOUP cannot support this product, Mindray will choose new SOUP software; the system compatibility with this product will be tested and verified and maintenance personnel of Mindray will conduct on-site maintenance.
- Lifetime of the computer this product is running on is decided by the computer's manufacturer. If the lifetime of the computer expires and this product still performs normally, customers can contact the manufacturer to change computer and ask assistance in installing the software, exporting data to the new computer, clearing patients' data etc. and keeping relevant records.


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## NOTE

- Never place the system within a patient environment.
  - Do not block the displays of the system.
  - Put the system in a location where you can easily view and operate the equipment.
  - Save the packing case and packaging material as they can be used if the system must be reshipped.
- 

## 3.3 Starting the System

Perform safety checks before starting your system. For more information, see Section 8.3 *General Inspection*.

To start the system, select the icon  on the desktop.

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## CAUTION

- To prevent damaging the system from a sudden power failure, it is recommended that the host of the system is equipped with a UPS.
- 

## 3.4 Setting Network Connection

When first time starting the system, you need to set network for the system and the bedside devices:

- the system: set **Bedside Monitoring Network Setup** for the system. For how to do this, see 7.1 *Network Settings*.
- the bedside devices: set **Central Station Setup** for the bedside devices. Fill in the IP address of the system.

## 3.5 Viewing System Information

To view system information such as version of the system, follow this procedure:

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

## 3.6 Turning Off the System

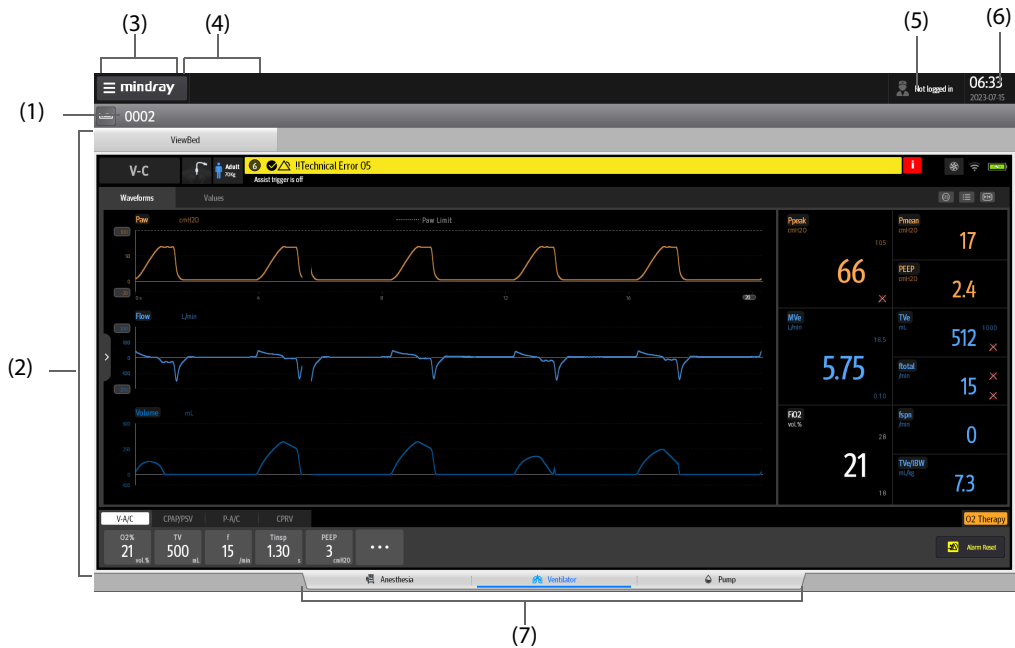
To turn off the system, follow this procedure:


1. Select the system menu area in the upper left corner of the screen.
2. From the drop-down list, select **System Setup** → Select **Factory Maintenance** → Enter password → Select **Exit to Windows**.

# 4 Screen Display

## 4.1 Main Screen

The following figure is an example of the main screen:



- (1) Patient location information area: displays the bed number, room number and patient name.
- (2) ViewBed area: displays realtime patient information, parameters, waveforms, alarms etc. sent by ventilators, anesthesia systems or pumps. For details, see [4.4 Ventilator ViewBed Screen](#), [4.3 Anesthesia ViewBed Screen](#), [4.5 Pump ViewBed Screen](#).
- (3) System menu area: selecting this area opens the drop-down list where you can select different functions.
- (4) System alarm area: this area displays system alarm information.
- (5) User login area: select the icon  to log in for remote control. This area also displays login status.
- (6) System time area
- (7) Switching screen area: selecting different tabs opens ViewBed screens of different devices.

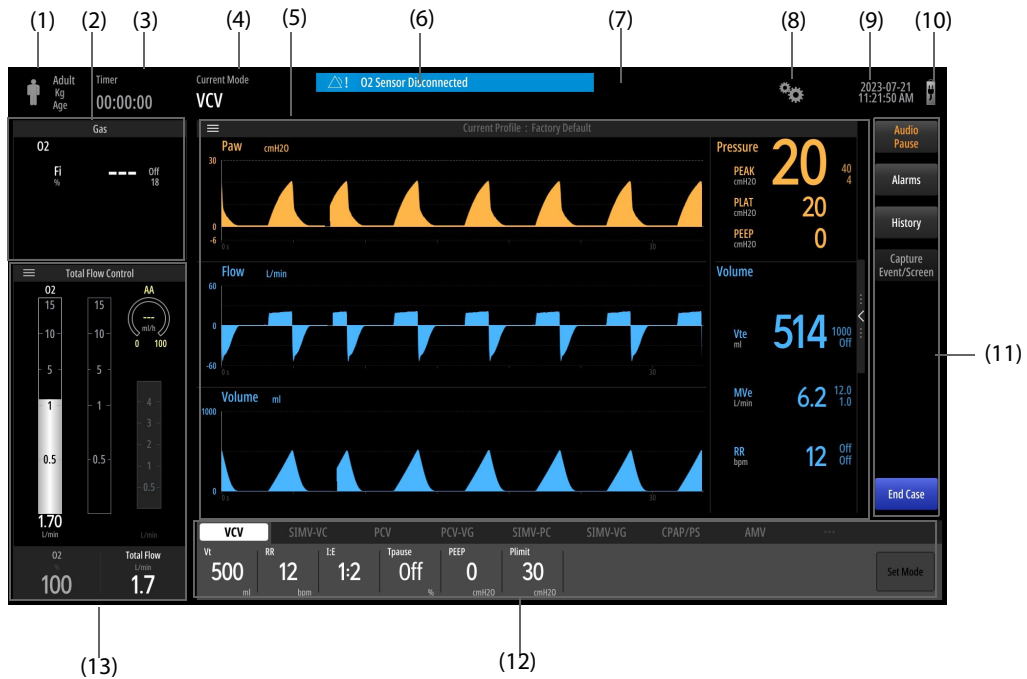
## 4.2 Entering ViewBed Screen

The ViewBed screen of the system displays realtime information sent by the bedside devices and can be used to specifically monitor one single patient.

## 4.3 Anesthesia ViewBed Screen

Anesthesia ViewBed screen simultaneously displays realtime anesthesia and ventilation information from the anesthesia systems.

The following figure is an example of the Anesthesia ViewBed screen:



- (1) Patient information: displays patient category, weight and age.
- (2) Gas parameter/ oxygen concentration area: displays realtime gas parameter/oxygen concentration.
- (3) Countdown timer: displays countdown time.
- (4) Ventilation mode: displays current ventilation mode.
- (5) Waveform/parameter/spirometry/trend/prediction display zone: displays the waveforms, monitoring parameters, spirometry, trends and predictions.
- (6) Alarm information area: displays current alarms. For more alarm information, select this area to display alarm list.
- (7) Number of active alarms: displays number of active alarms and prompts.
- (8) Setup symbol: selecting this symbol opens **Setup** menu.
- (9) System date and time: displays the current system date and time.
- (10) Main power supply and battery status symbol: displays the main power supply and battery status.
- (11) Quick key area: selecting different quick keys enables corresponding operation.
- (12) Ventilation mode and ventilation parameter areas: displays all the ventilation modes and corresponding parameters. You can change ventilation modes and ventilation parameters in this area.
- (13) Display area of fresh gas control/vaporizer/anesthetic agent consumption speed: displays the real-time flow and optimizer information of O<sub>2</sub> or balance gas, gas concentration of the vaporizer and anesthetic agent consumption speed. Select this area to set the fresh gas parameters, anesthetic agent concentration and automatic controlled anesthesia in the pop-up menu.

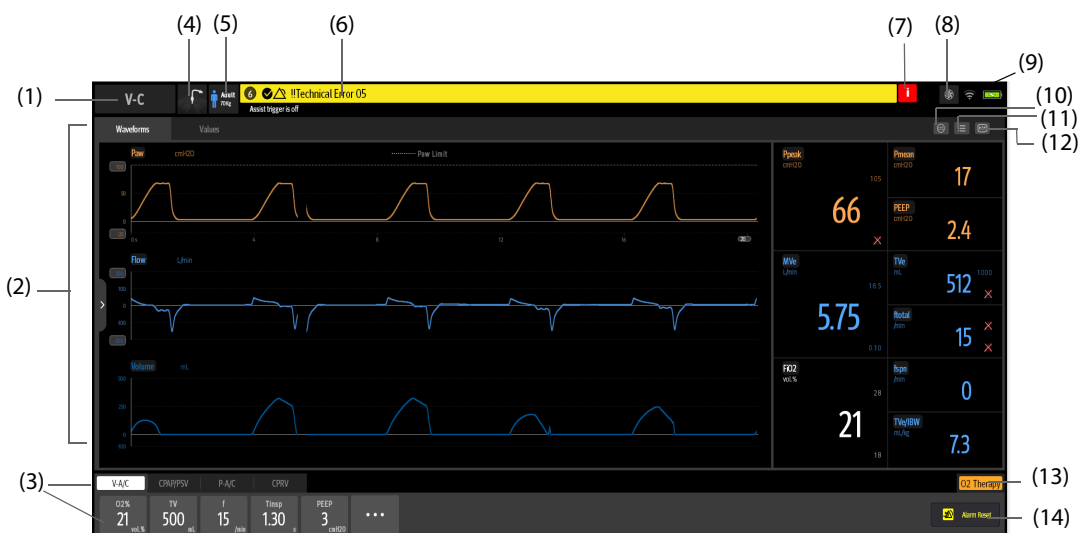
## NOTE


- **Anesthesia ViewBed screen is similar to the main screen of the anesthesia systems. For more details on the Anesthesia ViewBed screen, see the operator's manual of the corresponding ventilator.**
- **This system can display certain information/function only when the anesthesia system itself supports it.**

## 4.4 Ventilator ViewBed Screen

Ventilator ViewBed screen simultaneously displays realtime ventilation information from the ventilators.

The following figure is an example of the Ventilator ViewBed screen:



- (1) Ventilation mode area: displays current ventilation mode and ventilation assisting information.
- (2) Waveform/measured values area: displays waveforms and measured values. Selecting  displays PulmoSight information.
- (3) Ventilation mode and ventilation parameter areas: displays all the ventilation modes and corresponding parameters. You can change ventilation modes and ventilation parameters in this area.
- (4) Ventilation type prompt area.
- (5) Patient information/inspiration triggering prompt area.
- (6) Alarm information area: displays current alarms. For more information, select this area to display alarm list.
- (7) Inactivated alarm indicating symbol: indicates that there are most recent alarms but the alarm condition has disappeared. Selecting this symbol displays recent alarms.
- (8) Gas supply symbol: selecting this symbol displays gas supply and gas supply pressure.
- (9) Device status area: displays network connection status and power status.
- (10) Tools symbol: selecting this symbol enters tools screen in which users can perform manual breath, inspiration hold and weaning.
- (11) Screen setup area: selecting this symbol displays the screen to set waveform speed, number etc.
- (12) Freezing symbol: selecting this symbol temporarily stops the realtime refreshing of the waveform data.
- (13) O2 Therapy quick key: selecting this button enters O2 Therapy screen.
- (14) Alarm reset area: selecting this area resets ventilator alarms on the system.

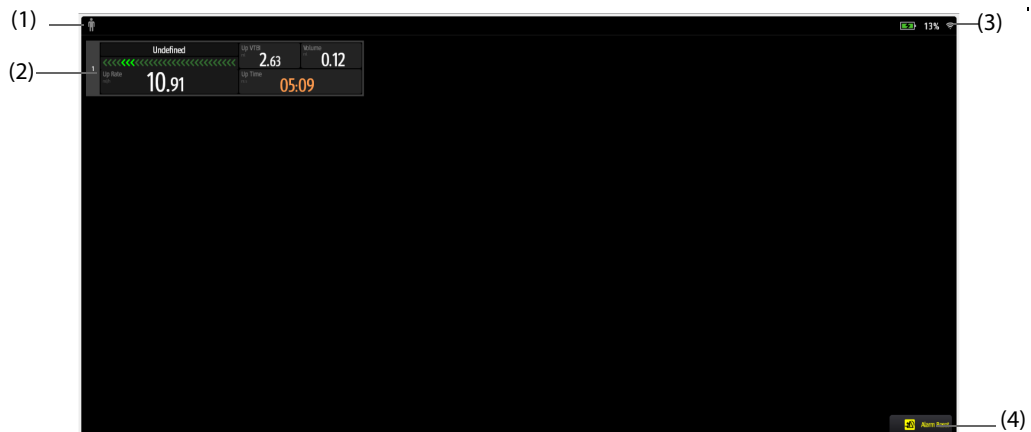
## NOTE

- **Ventilator ViewBed screen is similar to the main screen of the ventilator. For more details on the ventilator ViewBed screen, see the operator's manual of the corresponding ventilator.**
- **This system can display certain information/function only when the ventilator itself supports it.**

## 4.5 Pump ViewBed Screen

Pump ViewBed screen simultaneously displays infusion information from the pumps.

The following figure is an example of the Pump ViewBed screen:



- (1) Patient information area: displays patient category, height etc.
- (2) Infusion observation area: displays infusion details, including infusion status, drug names, flow etc. Selecting certain pump enters corresponding remote control window; for details, see 5.4 *Pump Remote Control*.
- (3) Device status area: displays the battery capacity and network signal strength.
- (4) Quick key area: select **Alarm Reset** to reset pump alarms on the system.

## NOTE

---

- **Pump ViewBed screen is similar to the main screen of the pump devices. For more details on the Pump ViewBed screen, see the operator's manual of the corresponding pump.**
  - **This system can display certain information/function only when the pump itself supports it.**
-



# 5 Remote Control

---

This system supports remotely controlling ventilators, anesthesia systems and pump devices. And changes made by remote control will synchronize to corresponding bedside devices. Remotely controlling the device is similar to controlling the device by its side. Thus, before remotely controlling on the system, please read the operator's manuals of the devices first and do as instructed in the operator's manual of the device.

---

## CAUTION

---

- **If the bedside devices themselves are being operated, users cannot remotely control them on this system.**
  - **Before remotely controlling, set correct location information such as department and bed number for the bedside device.**
  - **Use this system and bedside devices in a fixed location. If you need to move the system and the bedside devices, ask authorized maintenance personnel to reset location information.**
- 

## NOTE

---

- **After remotely changing settings for the bedside devices on this system, users should select OK to make the change effective.**
- 

## 5.1 Entering Remote Control

Before entering remote control, users need to set remote control authorization first. For details, see 7.2.2 *Authorizing Remote Control*.

### 5.1.1 Entering Remote Control of the Ventilators or Anesthesia Systems

To enter remote control of the pump, follow this procedure:

1. On the main screen, select **Ventilator** or **Anesthesia** on the switching screen area.
2. Select any area on the ViewBed screen.
3. Enter user name, password and device authorization code on the popup window.
4. Select **OK**.

After entering remote control, users can remotely modify certain settings on the ViewBed screen. For what settings users can remotely modify, see 5.2 *Anesthesia System Remote Control* and 5.2 *Anesthesia System Remote Control*; for details on viewing the ViewBed screen, see 4.4 *Ventilator ViewBed Screen* and 4.3 *Anesthesia ViewBed Screen*.

---

## NOTE

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- **Contact responsible maintenance personnel to obtain user name, password and authorization code.**
- 

### 5.1.2 Entering Remote Control of the Pumps

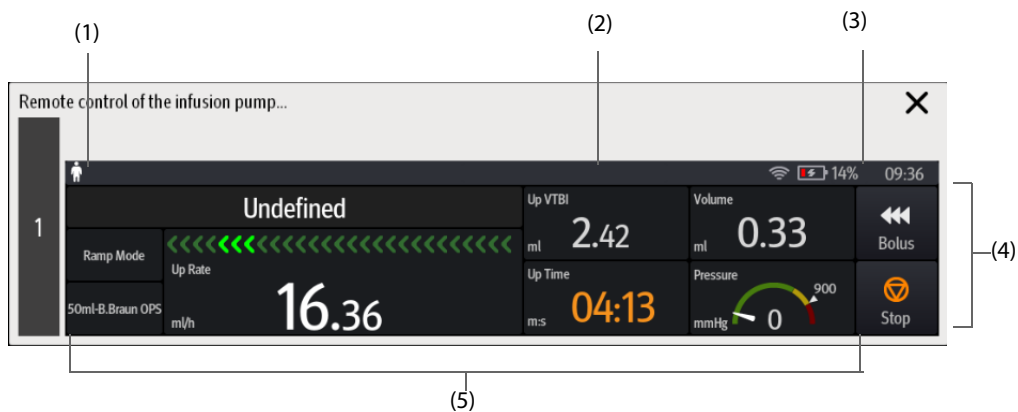
To enter remote control of the ventilators or anesthesia systems, follow this procedure:

1. On the main screen, select **Pump** on the switching screen area.
2. Select desired pump.
3. Enter user name, password and device authorization code on the popup window.
4. Select **OK**.

The remote control window simultaneously displays infusion information from the pump's main screen, including infusion mode, infusion parameters, secondary infusion, past 24h total infusion etc.

For what settings users can remotely modify on the remote control window, see 5.4 Pump Remote Control.

Take pump running in ramp mode as an example, here is an example of remote control window of the pump:



- (1) Patient information area: displays patient category, gender, bed number and name.
- (2) Alarm information area: displays alarm information
- (3) System information area: displays battery, network, relay status, system time etc.
- (4) Quick key area: selecting a certain key enables corresponding operation.
- (5) Infusion status area: displays current infusion mode, infusion parameters and infusion running status.

## NOTE

- **Contact responsible maintenance personnel to obtain user name, password and authorization code.**

## 5.2 Anesthesia System Remote Control

This system supports remotely controlling the anesthesia systems on the following items:

- Ventilation mode:
  - ◆ Volume control ventilation (VCV)
  - ◆ Pressure Controlled Ventilation (PCV)
  - ◆ Pressure Controlled Ventilation-Volume Guarantee (PCV-VG)
  - ◆ Synchronized Intermittent Mandatory Ventilation – Volume Control (SIMV-VC)
  - ◆ Synchronized Intermittent Mandatory Ventilation – Pressure Control (SIMV-PC)
  - ◆ Synchronized Intermittent Mandatory Ventilation – Volume Guarantee (SIMV-VG)
  - ◆ Continuous Positive Airway Pressure/Pressure Support Ventilation (CPAP/PS)
  - ◆ Airway Pressure Release Ventilation (APRV)
  - ◆ Adaptive Minute Ventilation (AMV)
- Ventilation parameters
- Fresh gas parameters
- Vaporizer
- AnaeSight
- Automatic Controlled Anesthesia (ACA)
- Inspiration hold
- Expiration hold
- Flow pause

- Alarm limit
- Alarm reset
- Alarm audio pause

## NOTE

---

- **This system supports remotely controlling the function listed above only when the anesthesia system itself supports corresponding function.**
- 

## 5.3 Ventilator Remote Control

This system supports remotely controlling the ventilators on the following items:

- Ventilation mode:
  - ◆ Volume-assist/control ventilation (V-A/C)
  - ◆ Pressure-assist/control ventilation (P-A/C)
  - ◆ Synchronized intermittent mandatory ventilation, including volume-synchronized intermittent mandatory ventilation (V-SIMV), pressure-synchronized intermittent mandatory ventilation (P-SIMV) and pressure regulated volume control -synchronized intermittent mandatory ventilation (PRVC-SIMV)
  - ◆ Continuous positive airway pressure (CPAP)
  - ◆ Pressure support ventilation, including pressure support ventilation (PSV), spontaneous/timed ventilation (S/T), spontaneous ventilation (S), timed Ventilation (T) and spontaneous/timed ventilation plus (S/T+), pressure support ventilation-spontaneous/timed ventilation (PSV-S/T)
  - ◆ Pressure regulated volume control ventilation (PRVC), volume assured pressure support ventilation (VAPS)
  - ◆ Dual level positive airway pressure (DuoLevel)
  - ◆ Airway pressure release ventilation (APRV)
  - ◆ Volume support (VS)
  - ◆ Adaptive minute ventilation (AMV)
  - ◆ Cardiopulmonary resuscitation ventilation (CPRV)
  - ◆ Nasal continuous positive airway pressure ventilation (nCPAP)
  - ◆ Proportional pressure ventilation (PPV)
- Ventilation parameters
- O<sub>2</sub> therapy
- Weaning tools
- Sigh
- IntelliCycle
- Manual breath
- Inspiration hold
- Alarm limit

## NOTE

---

- **This system supports remotely controlling the function listed above only when the ventilator itself supports corresponding function.**
- 

## 5.4 Pump Remote Control

This system supports remotely controlling the pumps on the following items:

- Infusion mode:
  - ◆ Rate mode

- ◆ Time mode
- ◆ Micro-infusion mode
- ◆ Drip mode
- ◆ Dose mode
- ◆ Dose Time Mode
- ◆ Ramp Mode
- ◆ TIVA mode
- ◆ TCI mode
- Infusion parameters
- Relay
- Secondary infusion selection
- Convert to TIVA mode
- Start infusion
- Pause infusion
- Standby
- Alarm limit
- Alarm reset
- Alarm audio pause

---

## CAUTION

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- **Before remotely controlling the pump, confirm that the name of the drug to be infused is correct.**
- 

## NOTE

---

- **This system supports remotely controlling the function listed above only when the pump itself supports corresponding function.**
-

# 6 Alarms

---

## 6.1 Alarm Safety Information

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### WARNING

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- This system only supports displaying visual alarm information from the bedside devices, but no audible alarm. Therefore, this system cannot be used as a main alarm device.
  - Setting alarm limits to extreme values may cause the alarm system to become ineffective.
  - Different devices in the same area may have different alarm settings to suit different patients. Before starting monitoring, check that alarm settings are appropriate for the patient. Always make sure that necessary alarm limits are active and set according to the patient's clinical condition.
  - A potential hazard can exist when remotely resetting alarm, pausing alarm audio or modifying alarm limit for the bedside devices on this system. Read the operator's manual of the bedside devices before you do so.
  - For details on the default alarm limit of the parameters on the ViewBed screen, see the operator's manual of corresponding bedside device.
  - The system can store up to 90 days of system log.
  - Alarm log is maintained when the system is powered down. The time of power down is also saved in the alarm log. And the power loss has no impact on the stored alarm log. Earlier alarm logs will be overwritten by later ones if the capacity is reached.
  - This system receives alarm settings from bedside devices and will not save alarm settings itself. And after a power down recover, this system re-receives alarm settings from the bedside devices.
  - Current ViewBed screen displays only alarm information of current bedside device. For alarm information of other bedside devices, please switch to its own ViewBed screen.
  - A potential hazard can exist if different alarm presets are used for the same or similar equipment in the same care area.
- 

## 6.2 Understanding the Alarms

Alarms triggered by a vital sign that appears abnormally or due to technical problems identified by the bedside devices are sent to the system. The system provides visual alarm indications.

Most of the alarms come from bedside devices. For alarms detected by the system, see *C Alarm Messages*.

### 6.2.1 Alarm Categories

The system's alarms can be classified into two categories: physiological alarms and technical alarms.

- Physiological alarms, also called patient status alarms, are triggered by a monitored parameter value that violates set alarm limits or an abnormal patient condition. Physiological alarm messages are displayed in the physiological alarm area.
- Technical alarms, also called system status alarms, are triggered by a device malfunction or a patient data distortion due to improper operation or mechanical problems. Technical alarm messages are displayed in the technical alarm area.

Apart from the physiological and technical alarm messages, some messages telling the system status will also be displayed.

### 6.2.2 Alarm Priorities




By severity, the alarms are classified into the following priority levels:

- High priority alarms: indicate a life threatening situation or a severe device malfunction. High priority alarms require an immediate response.

- Medium priority alarms: indicate abnormal vital signs or a device malfunction. Medium priority alarms require a prompt response.
- Low priority alarms: indicate a discomfort condition, a device malfunction, or an improper operation. Low priority alarms require you to be aware of this condition.
- Prompts: provide additional information on the patient or the system status.

### 6.2.3 Alarm Indicators

When an alarm occurs, the system gives different visual alarm indications as shown below.









| Alarm Indicator          | High Priority Alarm   | Medium Priority Alarm  | Low Priority Alarm  | Prompt     |
|--------------------------|---|--|---|------------|
| Simulated alarm lamp     | Red, flashing frequency 1.4Hz-2.8Hz, duty cycle 20%-60%   | Yellow, flashing frequency 0.4Hz-0.8Hz, duty cycle 20%-60%   | Cyan, not flashing, duty cycle 100%   | None       |
| Alarm message            | White text inside a red box   | Black text inside a yellow box   | For anesthesia systems: white text inside a cyan box;<br><br>For other devices: black text inside a cyan box                        | White text |
| Alarm priority indicator | For anesthesia systems: <br>For other devices: !!! | For anesthesia systems: <br>For other devices: !! | For anesthesia systems: <br>For other devices: ! | None       |

#### NOTE

- **Th visual alarms given by the system comply with the IEC 60601-1-8 standard. The hospital or institution employing the use of the system should give adequate training to the operators.**
- **When multiple alarms of the same priority levels occur simultaneously and are displayed in the same area, all the alarm messages will be scrolled in the display area.**

### 6.2.4 Alarm Status Symbols

The following symbols may appear on the ViewBed screen of this system, indicating current alarm status of the bedside devices:

- Ventilators:
  - ◆ : indicates that audible alarms are paused.
  - ◆ : indicates that individual measurement alarms are turned off.
- Anesthesia systems:
  - ◆ : indicates that audible alarms are turned off.
  - ◆ : indicates that the alarm system is reset.
- Pump devices:
  - ◆ : indicates that individual measurement alarms are turned off or the system is in the alarm off status.
  - ◆ : indicates that audible alarms are paused.
  - ◆ : indicates that the alarm system is reset.
  - ◆ : indicates that the alarms are confirmed.

## 6.3 Viewing Alarms

Select alarm information area on the ViewBed screen of the corresponding bedside devices to view detailed alarm information.

## **6.4 Alarm Limit**

When parameter values are higher than the high limit or lower than the low limit, alarms will be triggered. You can set alarm limit for the ventilators, anesthesia systems and pumps on this system. The procedure is the same as setting alarm limit on the bedside devices. For details, see operator's manual of the corresponding bedside devices.

## **6.5 Alarm Reset**

You can reset alarms for the anesthesia systems and pumps on this system. The procedure is the same as resetting alarms on the bedside devices themselves. For details, see operator's manual of the corresponding devices.

If a new alarm is triggered after the alarm system is reset, the alarm indicators will be reactivated.

## **6.6 Alarm Audio Pause**

You can pause alarm audio for the anesthesia systems and pumps on this system for 120 seconds.

The procedure is the same as pausing alarm audio on the bedside devices. For details, see operator's manual of the corresponding bedside devices.

When the audio pause time expires, the audio paused status is automatically deactivated.

## **6.7 Testing Alarms**

Use related simulators to test alarms. Set alarm limits and see if correct alarms can be triggered.

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# 7 System Setup

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## 7.1 Network Settings

### 7.1.1 Accessing Network Setup Page

To access the network setup page, follow this procedure:

1. Select the system menu area in the upper left corner of the screen → select **System Setup** to access the System Setup menu.
2. Select the **Network** tab → enter the required password → select the **OK** button.

### 7.1.2 General Settings

To configure general network settings in the network setup page, follow this procedure:

1. On the network setup page, select the **General** tab.
2. Set **Local IP address** in the **Bedside Monitoring Network Setup** section. The IP address should be the IP address of this system.
3. In the **Multicast Setup** section, set **Multicast Address** and **Multicast TTL** values. These values are used for communication between this system and bedside devices.
4. In the **Information Security** section, set **Encryption Connection Type** when connecting devices:
  - ◆ **Only Private Encryption:** Mindray private encryption is used to encrypt the transmitted data. You cannot connect devices supporting SSL (secure sockets layer) encryption.
  - ◆ **SSL Encryption Priority:** for devices supporting SSL encryption, SSL encryption is used when connecting the devices. For devices not supporting SSL encryption, private encryption is used when connecting the devices.

#### NOTE

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- **Network modification will trigger corresponding alarms. Please do as the alarm instructed.**
- 

## 7.2 Other Settings

### 7.2.1 Accessing the Other Setup Page

To access the other setup page, follow this procedure:

1. Select the system menu area in the upper left corner of the screen → select **System Setup** to access the System Setup menu.
2. Select the **Other** tab → enter the required password → select the **OK** button.

### 7.2.2 Authorizing Remote Control

To remotely control the bedside devices, you need to authorize first. To do so, follow this procedure:

1. On the other setup page, select the **Authorization Setup** tab.
1. Set **Remote Control** as **User Password** in the **Remote Control** area.)

### 7.2.3 Exporting Logs

In the **Log** tab, you can export the following items:

- logs and parameter data collected by local system
- logs and patient data of the connected bedside devices

To export logs, follow this procedure:

1. On the other setup page, select the **Log** tab.
2. On the right of **Device Name**, select the source where data is to be exported. **Local** is the default option which is to export data from current system.
3. Select **Export**. The Log Export Tool page is displayed.
4. Select **Setup**. After finishing configurations, select **OK**.
5. Select the desired device from the device list on the Log Export Tool page. If the desired device is not in the device list, select **Add Device Manually**. Then add the device info.
6. Select the desired export items: **Export Log** or **Export Clinical Data**
7. Upon completion of export, select **Quit**.

# 8 Maintenance

---

## 8.1 Overview

Regular maintenance is essential to ensure that this system functions properly.

## 8.2 Maintenance Safety Information

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### WARNING

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- Follow the maintenance and testing schedule or local regulations to perform testing and maintenance. Not implementing the maintenance schedule may cause equipment failure and possible health hazards.
  - The service personnel must be properly qualified and thoroughly familiar with the operation of the system.
  - No modification of this system is allowed.
  - This equipment contains no user serviceable parts.
  - The safety checks or maintenance involving any disassembly of the system should be performed by professional service personnel. Otherwise, undue equipment failure and possible health hazards could result.
- 

### CAUTION

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- If needed, contact Mindray for information concerning the repair of the system.
  - If problems are found on this product, contact the service personnel trained and authorized by Mindray.
  - All servicing and future upgrades must be carried out by the service personnel trained and authorized by Mindray.
  - When disposing of the packaging material, be sure to observe the applicable waste control regulations and keep it out of children's reach.
  - At the end of its service life, the system must be disposed of in compliance with the guidelines regulating the disposal of such products. If you have any questions concerning disposal of the equipment, please contact Mindray.
- 

## 8.3 General Inspection

Whenever your system is first installed, repaired, upgraded, a thorough inspection should be performed by qualified service personnel to ensure its reliability.

## 8.4 Disposing of the Equipment

Dispose of the equipment when its service life is reached. Follow local regulations regarding the disposal of such products.

---

### WARNING

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- Unless otherwise specified, dispose of this equipment in accordance with local regulations regarding disposal of hospital waste.
-

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# A Technical Specifications

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## A.1 Requirements of the Computer

The computer of this system should be highly reliable, stable and meet the following requirements:

- Operating system: Windows 10 or compatible version
- CPU: four cores or above
- Memory: 8GB or above
- Hard disk: 250GB or above
- Network adapter: 100M, self-adapting, Ethernet 802.3
- Anti-virus software: McAfee Application Control software

## A.2 Product Specifications

The system supports following product specifications:

- Provide following ViewBed screens: Anesthesia ViewBed screen, Ventilator ViewBed screen and Pump ViewBed screen.
- Support display and remote control of ventilation modes and ventilation parameters of the ventilators.
- Support display and remote control of ventilation modes and ventilation parameters of the anesthesia systems.
- Support display and remote control of infusion modes and infusion parameters of the pumps.
- Support display of alarms from the ventilators, anesthesia systems and pumps.

## A.3 Other Specifications

The system meets following specifications:

- Connect to at most three kinds of bedside devices (include ventilators, anesthesia systems and pumps)
- Alarm delay from bedside devices to the system is less than three seconds.
- Able to remotely control one device at a time.
- At most three seconds is needed for the remote control operation to take effect on the bedside devices.
- Report network connection error if not receiving data from bedside devices for more than eight seconds.

## A.4 Software Operating Environment

Software operating environment: Windows, McAfee Application Control.

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# B Default Settings

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This chapter only describes default settings in the **System Setup** menu. For the default settings of ViewBed screen of different bedside devices, see operator's manual of corresponding devices.

## B.1 Other Tab

| Subtab              | Item           | Default |
|---------------------|----------------|---------|
| Authorization Setup | Remote Control | Disable |
| Log                 | Device Name    | Local   |

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# C Alarm Messages

---

## C.1 Overview

This chapter only lists technical alarms coming from this system.

For physiological and technical alarm messages coming from bedside devices, see appropriate operator's manuals for these devices.

## C.2 Alarm Messages in the System Alarm Area

The following table lists alarm messages in the system alarm area at the top of the main screen.

| Alarm Message  | Default Priority | Cause and Solution  |
|--|------------------|---|
| Network is disconnected. Please check.                     | High             | Network of this system is disconnected. Check the network connection.                   |
| The settings have been changed. Please restart the system. | High             | Network related settings are changed. Restart the system to make the changes effective. |

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# D Abbreviations

| Abbreviation | In Full  |
|--------------|--|
| AMV          | adaptive minute ventilation  |
| APRV         | airway pressure release ventilation  |
| CPAP         | continuous positive airway pressure  |
| CPAP/PS      | continuous positive airway pressure/pressure support ventilation                               |
| CPRV         | cardiopulmonary resuscitation ventilation  |
| DuoLevel     | duo level ventilation  |
| G            | giga   |
| GB           | giga bytes   |
| Hz           | hertz  |
| IP           | internet protocol  |
| M            | mega   |
| nCPAP        | nasal continuous positive airway pressure ventilation  |
| P-A/C        | pressure -assist/control ventilation   |
| PCV          | pressure control ventilation   |
| PCV-VG       | pressure controlled ventilation-volume guarantee   |
| PPV          | proportional pressure ventilation  |
| P-SIMV       | pressure – synchronized intermittent mandatory ventilation                                     |
| PRVC         | pressure regulated volume control ventilation  |
| PRVC-SIMV    | pressure regulated volume control ventilation- synchronized intermittent mandatory ventilation |
| PSV          | pressure support ventilation   |
| S            | spontaneous ventilation  |
| S/T          | spontaneous/timed ventilation  |
| S/T+         | spontaneous/timed ventilation plus   |
| SIMV-VC      | synchronized intermittent mandatory ventilation - volume control                               |
| SIMV-PC      | synchronized intermittent mandatory ventilation - pressure control                             |
| SIMV-VG      | synchronized intermittent mandatory ventilation - volume guarantee                             |
| T            | timed ventilation  |
| TCI          | target controlled infusion   |
| TIVA         | total intra venous anesthesia  |
| UPS          | uninterruptible power supply   |
| V-A/C        | volume - assist/control ventilation  |

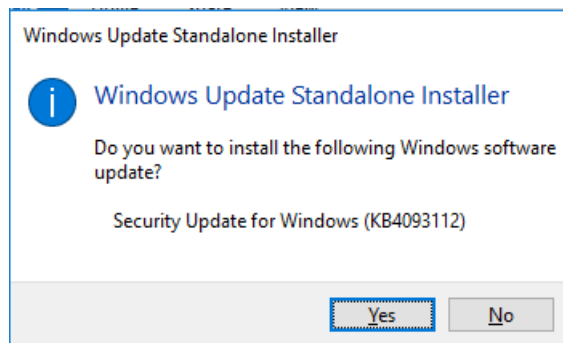
| Abbreviation | In Full  |
|--------------|--|
| VCV          | volume control ventilation                               |
| V-SIMV       | volume - synchronized intermittent mandatory ventilation |
| VS           | volume support ventilation                               |
| VAPS         | volume assured pressure support ventilation              |

# E Installing/Updating Operating System Security Patches (Windows 10)

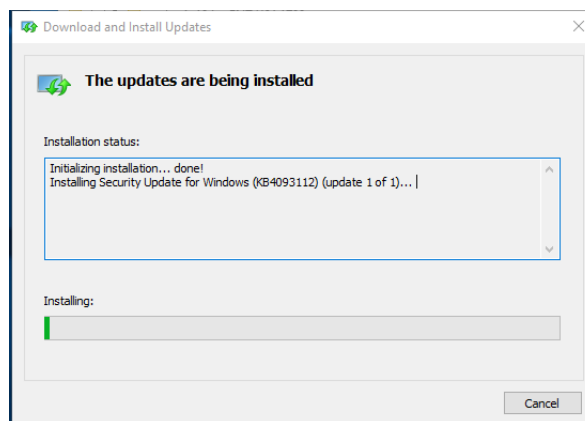
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The procedure of installing/updating operating system (OS) security patches for Windows10 is as below. And you need to contact Mindray to do this.

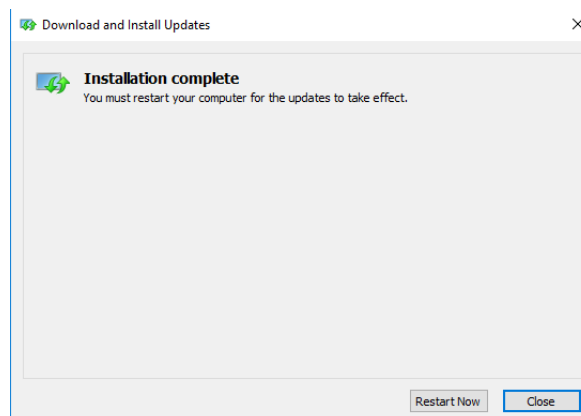
1. Obtain OS patches from Mindray.
2. Copy the OS patches into your computer and copy the "WIN10 hotfix" folder to the desktop.
3. Run the "windows10-kbxxxxxxx-x64.msu".
4. In the pop-up Windows Update Standalone Installer dialog, select **Yes**.



The OS patches will be installed automatically.



5. Upon completion of installation, select **Restart Now**.



## **NOTE**

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- **Do not shut down your computer until the installation window is closed.**
-



