

**Operator's Manual** 

# **Contents**

CHAPTER 1 SAFETY INFORMATION	5
1.1 Warnings	5
1.2 CAUTIONS	<i>6</i>
1.3 Notes	7
CHAPTER 2 GENERAL	7
2.1 INTRODUCTION	
2.2 FUNCTIONS AND FEATURES	
2.3 APPEARANCE	
CHAPTER 3 INSTALLATION	11
3.1 UNPACKING AND INSPECTION	11
3.2 CONNECT ACCESSORIES.	12
3.3 CONNECT AC POWER ADAPTOR.	12
3.4 POWER-ON.	
3.5 CONNECT COMPUTER	
CHAPTER 4 DISPLAY AND OPERATION	13
4.1 POWER-ON AND POWER-OFF	13
4.2 CHANGE DISPLAY VIEWS	14
4.3 MONITORING VIEW DISPLAY AND OPERATION	14
4.4 SYSTEM SETUP VIEW DISPLAY AND OPERATION	16
4.5 TREND VIEW DISPLAY AND OPERATION	18
CHAPTER 5 MONITORING	20
5.1 SPO2	20
5.2 TEMPERATURE.	26
5.3 Transferring data to your computer	27
CHAPTER 6 UTILITY PC SOFTWARE PACKAGE	28
6.1 DATA VIEWER USER GUIDE	28
6.1.1 DOWNLOAD DATA FROM THE MONITOR	29
6.1.2 SAVE AND LOAD DATA FILE	29
6.1.3 REVIEW THE DATA FROM THE MONITOR	
6.1.4 SYSTEM SETUP	32
6.1.5 PRINT AND PRINT PREVIEW	33
6.2 GUARDIAN 2009 - VITAL SIGNS MONITOR USER GUIDE	
CHAPTER 7 MAINTENANCE	43
7.1 SYSTEM CHECK	43
7.2 GENERAL CLEANING	44

7.3 DISINFECTION.	46
7.4 DISPOSAL	
CHAPTER 8 STORAGE	
CHAPTER 9 PACKING LIST	48
APPENDIX: SPECIFICATIONS	48

Instructions

This manual provides the instructions necessary to operate vital signs monitor

(hereinafter called as the monitor) in accordance with its function and intended use.

Observance of this manual is a prerequisite for proper performance and correct

operation, and ensures patient and operator safety.

This manual is an integral part of and should always be kept close to the monitor, so

that it can be obtained conveniently when necessary.

Content of this manual is subject to change without prior notice.

Issued date: 2010/09/20

Version:1.0

**Statement** 

The manufacturer is responsible for safety, reliability and performance of the monitor

only in the condition that:

♦ All installation operations, expansions, changes, modifications and repairs of the

monitor are conducted by manufacturer authorized personnel; And

♦ The electrical installation of the relevant room complies with the applicable national

and local requirements; And

♦ The monitor is operated under strict observance of this manual.

Guarantee

Free service scope

The manufacturer provides free service to any product which conforms to the

warranty regulations.

Chargeable service scope

♦ The manufacturer charges customers for service to any product which is outside

3

warranty regulations' range.

The manufacturer's obligation or liability under his warranty does not include the service of any factitious damage, or misuse, or the voltage of power supply network beyond the product's specification, or irresistible natural disaster, or delay resulting from the improper use or application of the product, or the use of parts or accessories not approved by the manufacturer, or repairs by people other than the manufacturer authorized personnel.

# **Return Policy**

In the event that it becomes necessary to return a unit to the manufacturer, please obtain a return authorization first. Please contact the manufacturer's Service Department and provides the model number, serial number, and a brief description of the reason for return. Return shipments will not be accepted if the serial number is not clearly visible.

The customer is responsible for freight charges when this product is shipped to the manufacturer for service (including any relevant customs fees or other freight related charges).

# **Chapter 1 Safety Information**

The safety statements presented in this chapter refer to the basic safety information that the operator of the monitor 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 followings, or specific to the operations.

The following safety terms warning and caution are used throughout this manual to point out hazards and to designate a degree or level or seriousness.

## **⚠ WARNING**

Indicates a potential hazard situation or unsafe practice that, if not avoided, could result in death or serious injury.

## **⚠** CAUTION

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

#### NOTE

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

## 1.1 Warnings

# **⚠ WARNING**

- The monitor is intended only as an adjunct in patient assessment. It must be used in conjunction with clinical signs and symptoms. It is not intended as a device used for treatment purposes.
- The monitor is intended for use only by qualified clinical physicians or well-trained nurses.
- To ensure patient safety, verify this device and accessories can function safely and normally before use.

- When using the monitor together with the electrical surgery equipment, the user should pay attention to and guarantee safety of the patient being measured.
- ◆ EXPLOSION HAZARD: Do not use the monitor in the presence of flammable anesthetics, explosive substances, vapors or liquids.
- ◆ Do not pull or lift the monitor by its connection cable. That may lead to falling and consequent patient injuries.
- ◆ It is not recommended to hang the monitor when transporting patients. Safety hazards may arise from the large amplitude swing during the transportation.
- Make sure not to use the monitor and it's transducer during MRI (magnetic resonance imaging) scanning because induced current could potentially cause burns. The monitor is capable of interfering with the proper performance of MRI, and MRI is capable of interfering with the measurement accuracy of the monitor.
- ◆ The monitor and its accessories may be contaminated by microorganism during transporting, use and storage. Use the recommended methods to sterilize and disinfect the monitor or its accessories when the packing material is damaged, or it has not been used for a long time.
- ◆ Do not touch, or rub the display screen with abrasive cleaning compounds, instruments, brushes, rough surfaced materials or make contact with anything that can scratch the panel.

#### 1.2 Cautions

## **⚠** CAUTION

- ◆The monitor is a commonly sealed device. Keep its surface dry and clean, and prevent any liquid from infiltrating it.
- ◆The device should be appropriately placed. Keep it from falling, strong vibration or other mechanical damage.
- ◆ Don't use mobile phones around when the monitor is in operation. Mobile phones may emit electromagnetic radiation which is capable of interfering with the proper performance of the monitor.

- ◆The monitor should only be maintained by personnel approved by our company.
- ◆ Before using the monitor on patients, the user should be familiar with its operation.

## 1.3 Notes

#### NOTE

◆Important! Before use, carefully read this manual, all safety information and specifications.

# **Chapter 2 General**

## 2.1 Introduction

The monitor is a non-invasive, vital signs patient monitor. It operates on AC or rechargeable battery power supply. It is compact, small, light, and easy for learning and handling. It is suitable for monitoring adult, pediatric and neonate patients. It is widely used in the hospital's operation room, ICU, clinic section office, out-patient department, sickroom, emergency treatment, and the recovery and health care organizations, or in the family nursing and in the process of transporting patients.

Parameters measured by the monitor include: arterial oxygen saturation (SpO2), pulse rate (PR), plethysmogram(PLETH), waveform and temperature (TEMP). The monitor measures these parameters through SpO2 sensor, TEMP probe and displays them on the color LCD screen and LED after certain further processing.

The monitor is operated and controlled by the buttons on the front panel. The color LCD screen displays measurements and waveforms, LED displays measurement Data. Two dual-color LEDs are used to indicate power status. It is also capable of managing measured data and transmitting the patient's trend via an USB cable to a PC for displaying, observation, saving and printing.

#### **Contraindications**

None

#### **Function structure**

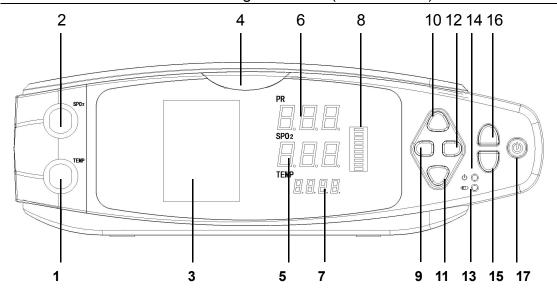
The monitor is composed of main unit, SpO2 sensor, TEMP probe, USB cable and AC power adaptor.

## 2.2 Functions and Features

- 1. Compact, easy for carrying and operation
- 2. Clear and bright color LCD with real time display
- 3. Friendly user interfaces
- 4. Intelligent Measuring of SpO2/PR/PLETH/TEMP
- 5. Storage/Review trend data up to 129 hours
- 6. Utility PC software package for long time monitoring, web transferring, history data uploading/review/printing/storage.
- 7. Audio and visual alarm
- 8. Built-in rechargeable Li-ion battery, up to 5-hour power supply
- 9. Automatic shutdown for power saving

To fulfill communication function, please install the allocated PC software in a PC which is equipped with a printer, and connect the monitor with the PC via an USB cable.

# 2.3 Appearance



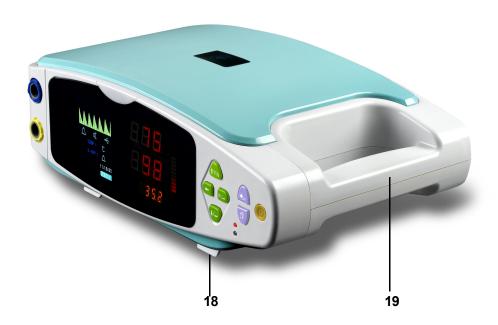


Fig.1 Front and side view

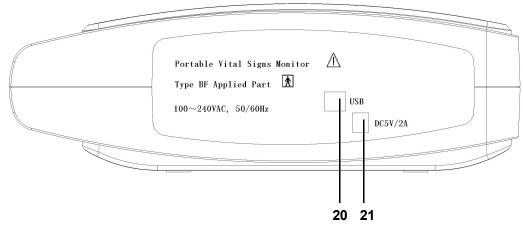


Fig.2 Back View

- 1. TEMP probe socket
- 2. SPO2 sensor socket
- 3. Color LCD screen: It displays SPO2 waveform, setup items and current time.
- 4. **Alarm light**: If the alarm function is on, when alarm happen, the alarm red light will light-up and flicker.
- 5. **SpO2**: It displays oxygen saturation value here.
- 6. **PR**: It displays pulse rate value here and is refreshed every second.
- 7. **TEMP:** It displays temperature value here.
- 8. **Pleth**: Pulse strength, it can display 8 segments at most to indicate real-time pulse strength. The more the stronger.
- 9. **button:** Press Fn button firstly, then press this button to select.
- 10. ↑ / Fn button: In monitoring view, this button works as function button the same as 16; in trend view, press this button can move the cursor 8 points ago so user can see the monitoring data at that time.
- 11. **button:** In setup view, press **button** to confirm clear data or begin to transfer the data to PC. In trend view, press this button can move the cursor to 8 points later so user can see the monitoring data at that time.
- $12. \triangle / \rightarrow$  **button:** Press the button to turn on/off the alarm sound and alarm light. If

Press Fn button firstly, then user can press this button to select too.

- 13. **Green LED:** It lights in green when the monitor is charged by AC adapter or charged from PC via USB cable.
- 14. **Power indicator LED:** When LED is red, it means the battery power is normal. When LED is red and green alternately light, it means the battery power is low, pls recharge it.
- 15. **Views switch button:** Press the button to display system setup view, press it again to display trend view. Then press it again to return monitoring view.
- 16. **Fn button:** Press the Function button to setup volume level, turn on/off USB port, Setup TEMP unit, Alarm on/off, setup current time and date in turn.
- 17. Dower ON/OFF button: Press this button to turn on the monitor, press the button for 3 seconds then loose it to power off the monitor.
- 18. **Underlay:** It can be open up to underlay the monitor for better view. It is very easy to be closed if no application.
- 19. **Handle:** Portable and easy to handheld the monitor.
- 20.**USB port**: It can be connected to the PC via an USB cable for data transferring or recharging.
- 21.**DC5V/2A socket:** It can be connected to the power adaptor for application or recharging.

# **Chapter 3 Installation**

# 3.1 Unpacking and Inspection

Please open the package and remove the instrument and accessories carefully. Check all materials against the packing list.

- ◆ Check the monitor for any mechanical damage.
- ◆ Check wires, sockets and the accessories.

Contact supplier immediately in case of any problem.

## **⚠ WARNING**

- ◆ Be sure to keep the packaging materials from children's reach.
- ◆ Disposal of the packaging materials shall comply with your local requirements.

## **NOTE**

◆Please save the packing case and packaging material for future transport and storage.

## 3.2 Connect Accessories

You can connect the TEMP probe and SpO2 sensor to the monitor by simply inserting their connectors to their sockets on the monitor's front panel as shown in Fig.1.

## **↑** NOTE

◆Please find the little gap on the socket and insert the connectors with correct direction to the corresponding socket directly. Don't go round and round the connector, or it will destroy the socket and the monitor.

# 3.3 Connect AC Power Adaptor

Insert adaptor's AC connector to the wall's AC power socket or to the transfer connector, then insert adaptor's D.C. connector (at the end of the adaptor's extension cable) to the DC socket on the monitor's back panel as shown in Fig.2.

The monitor can be recharged by USB cable from PC too. But it will take more time because the charge current from PC is weaker than that from AC adaptor.

#### 3.4 Power-on

Press the power button to turn on the monitor. The red LED lights up on the front panel. The LCD screen displays S-OFF and setup items.

## 3.5 Connect Computer

The monitor has unique Tele-monitoring and Synchronization retransmit function and allocated with an utility PC software package for long time monitoring, web transferring, history data uploading/review/printing/storage.

The monitor can be connected to a Personal Computer through an USB cable to transmit patient's trend to the computer for review and saving. The trend waveforms can also be printed out by a printer connected to the computer. Simply connecting the USB port on the monitor's back panel with the computer's USB port Via an USB cable and install the allocated PC software on your computer. Please see the operation details in Page27-28 and chapter 6.

# **Chapter 4 Display and Operation**

The LCD of the monitor can display three kinds of views. They are monitoring view, system setup view and trend view. User can switch the views by pressing the views button  $\Box$  on the front panel. For button details, please refer to Fig.1 and Page 11.

## 4.1 Power-on and Power-off

Press the power button to turn on the monitor. The red LED lights up on the front panel. The LCD screen appears display. When the monitor is on, press the power button for 3 seconds then loose it to turn off the monitor.

#### NOTE

◆The monitor is powered by the built-in rechargeable battery or external AC power supply. When powered by the battery, if the battery power is not enough, the monitor may fail to be turned on. At this moment, the monitor must be connected to the external power supply to charge the battery. The monitor will operate on the battery again after the battery is fully charged. The monitor can also operate on the external

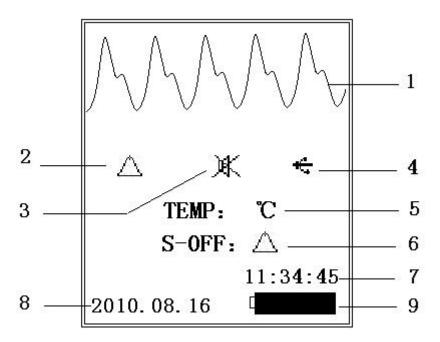
power supply meanwhile the battery is charged automatically.

## 4.2 Change Display Views

The LCD displays the monitoring view when the monitor is turned on. When the monitoring view is displayed, press views button once to change to the system setup view. When the setup view is displayed, press views button once to change to the trend view. When the trend view is displayed, press views button once to return the monitoring view. The views button can change view type cyclically in the above sequence in order to find the required view.

## 4.3 Monitoring View Display and Operation

The monitoring view is the waveform monitoring view, as shown in Fig. 3 as below.



**Fig.3 Monitoring View** 

**Operation guide**: Press FN button continues until the setup item turn to orange, then press ←button or →button to do the setup. At last press FN button to confirm the setup and jump to the next setup item.

- 1. Waveform display zone: It displays SPO2 waveform when normal measuring, if sensor off, it will display red "S-OFF" to alarm
- 2. Alarm ON/OFF △/邎: Press the 邎/→button on the front panel as shown in Fig.1 to turn on/off the alarm sound and alarm light, If display △ means alarm on, the alarm sound and alarm light is turning on. If display 邎 means alarm off, the alarm sound and alarm light is turning off
- 3. Pulse sound volume level: 

  means 0 level, silence, 
  means level 1, middle volume, 
  means level 2, the highest volume. Press FN button continues until this figure turn to orange, then press 

  button or 

  button can setup the volume level as you want. At last press FN button to confirm the setup and jump to the next setup item.
- 4. Real time data transferred function ON/OFF: Press FN button continues until this figure turn to orange, then press ←button or →button can setup real time data transferred function ON/OFF. At last press FN button to confirm the setup and jump to the next setup item. If OFF, real time data cannot be transferred to the PC now, but history data can.
  - Both real time data and history data can be transferred to the PC.
  - Real time data cannot be transferred to the PC now, but history data can.
- **5. TEMP unit**: °C or °F. Press FN button continues until the unit figure turn to orange, then press ←button or →button can setup the unit as you want. At last press FN button to confirm the setup.
- **6.** S-OFF alarm on/off: △ means S-OFF alarm on, △ means S-OFF alarm off
- 7. Current time: Hour: Minute: Second. Press FN button continues until the setup item turn to orange, then press ←button or →button can do the setup. At last press FN button to confirm the setup.
- 8. Current date: Year. Month. Day. Press FN button continues until the setup item

turn to orange, then press ←button or →button can do the setup. At last press FN button to confirm the setup.

**9. Battery capacity**: Display the remaining battery capacity which has four grades in all and it is detected every second

## 4.4 System Setup View Display and Operation

It will flicker to alarm when the measuring parameter is out of its alarm limits which can be setup in the system setup view as shown in Fig. 4.

**Operation guide**: Press FN button continues until the setup item turn to orange, then press ←button or →button to do the setup. At last press FN button to confirm the setup and jump to the next item.

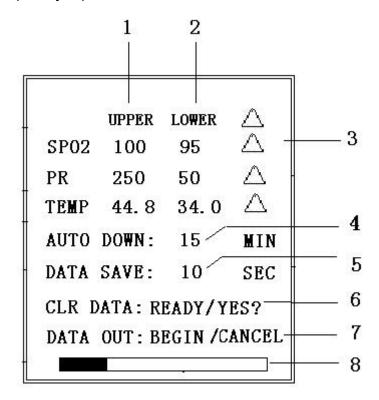


Fig.4 System Setup View

SETUP ALARM UPPER LIMITS: Press FN button and ←button or → button to setup corresponding parameter's alarm upper limits

- 2. SETUP ALARM LOWER LIMITS: Press FN button and ←button or → button to setup corresponding parameter's alarm lower limits
- **3. ALARM ON/OFF:** Press FN button and  $\leftarrow$  button or  $\rightarrow$  button to switch on/off  $(\triangle/\triangle)$  corresponding parameter's alarm sound and light. The measurement result is flickering always when alarm occur. For example, when certain parameter measurement result is out of its alarm limits, if this icon is display as  $\triangle$  and icon  $\triangle$  in Fig.4 is display as  $\triangle$  at the same time, you can hear alarm sound and see red alarm light flicker, the measurement result is flickering too. If this icon is turn off and display as  $\triangle$ , only the measurement result is flickering to alarm you, no alarm sound and light.
- **4. AUTO DOWN**: Press FN button and ←button or →button to setup AUTO DOWN time from 2 minutes to 15 minutes according to the monitoring requirement. If setup AUTO DOWN time as 15 minutes, the machine will be power off automatically after 15 minutes if there was not any measurement and operation during this period.
- **5. DATA SAVE**: Press FN button and ←button or →button to setup DATA SAVE time interval from 5 seconds to 120 seconds according to the monitoring requirement. Total data save capacity is 3888 groups, if save data every 60 seconds, the machine can record data 64.8 hours continuously, if save data every 5 seconds, the machine can record data 5.2 hours only, So we suggest you set up longer interval such as 60 seconds or 120 seconds to record longer time data if you have no particular requirement to watch data change in shorter time.
- **6. CLR DATA**: Press FN button continues until the setup item READY turn to YES? in yellow, press button to confirm clearing all of the data, then system start to clear the data in storage and display the process as 8 shown in Fig.4
- **7. DATA OUT:** Press FN button continues until the setup item BEGIN turn to BEGIN? in yellow, press button to confirm and start data transferring to the PC.

Pls wait with patience when data transferring, it will take about 4 minutes to fulfill.

If you want to cancel data transferring before fulfilling, press **\( \mu \) button**, it will stop data transferring at once.

8. Here display the process of data clearing or transferring.

The setup ranges of the items in Fig. 4 are listed in table 1 as below.

Table 1 Display information on the system setup view

	Upper limit	Lower limit	Alarm switch
SpO2	95~99	85~96	▲ or ※
PR	80~250	40~100	▲ or ×
TEMP	36.0~45.0	34.0~38.0	▲ or ×
DATA SAVE	5∼120 Sec.	AUTO DOWN	2∼15 Min.

#### NOTE

- ◆ Avoid adjusting system date and time randomly. Incorrect saved time interrupts the continuity of the trend time. The date or time needs to be adjusted only when it is not accurate and it is suggested to do so just after the monitor is powered on.
- ◆ Alarm limits setup is very important when monitoring. Avoid upper limits too high or lower limits too low. For example PR upper alarm limit should not be 20 bpm more than the patient's actual PR.

# 4.5 Trend View Display and Operation

The monitor can save parameter measurements from every 5 seconds to 120 seconds according to the monitoring requirement. Total data save capacity is 3888 groups, if save data every 60 seconds, the machine can record data 64.8 hours continuously, if save data every 10 seconds, the machine can record data 10.8 hours, So we suggest you set up longer interval such as 60 seconds or 120 seconds to

record longer time data if you have no particular requirement to watch data change in shorter time.

These saved data will never be lost even if the monitor is powered off. They can be displayed and observed on the trend view.

When the LCD appears the trend view due to the views button is pressed on the other view, the monitor draws the parameter trend waveforms on the time-measurement coordinate series. One screen can display 162 groups data which is defined as a page. The whole storage area is composed of 3888 groups data, that is 24 pages. The trend of one page data is shown in Fig.5.

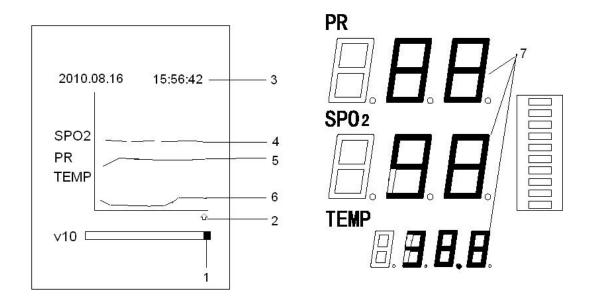


Fig.5 Trend View

- Current page display the corresponding page site, total 24 pages, it will move page by page when press button on the front panel.
- Cursor. LED will display the data recorded at the corresponding time which the cursor pointing.
- 3. Display the corresponding data record time which the cursor **û** pointing.
- 4. 5. 6. Trend waveform of current page. The colors are kept the same with the parameter's display color beside. Such as 4 is SPO2 trend, red. 5 is PR trend, yellow.

6 is TEMP trend, green.

7. Display the corresponding measure results of the cursor pointing data record time.

## **Operation Guide:**

Press - button on the front panel to move the cursor left one point.

Press → button on the front panel to move the cursor right one point.

Press † button on the front panel to Speed move the cursor left eight points.

Press ↓ button on the front panel to Speed move the cursor right eight points.

#### NOTE

- ♦ Obtaining stable measurements always need a period of time. When the monitor is powered on or the sensors are connected, the trend data may appear sudden change or transit because of the transition period. The measurements in this period can not be used as diagnostic basis.
- ◆When time indicator points to the time period without monitoring, the displays of measurements and the corresponding times are blank because nothing is saved.

# **Chapter 5 Monitoring**

# 5.1 SpO2

## 5.1.1 Principle

SpO2 is oxygen saturation of haemoglobin in the arterial blood. The SpO2/PLETH parameter can also provide a pulse rate signal, pulse strength and waveform. It is suitable for monitoring adult, pediatric and neonate patients.

# How the SpO2 / PLETH Parameter Works

◇ Arterial oxygen saturation is measured by a method called pulse oximetry. It is a continuous, non-invasive method based on the different spectra absorption of hemoglobin and oxyhemoglobin (called spectrophotometer principle). It measures how much light, sent from light sources on one side of the sensor, is transmitted

through patient tissue (such as a finger or a toe), to a receiver on the other side.

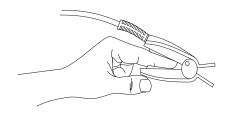
- ♦ The sensor measurement wavelengths are nominally 660nm for the Red LED and 940nm for Infrared LED. Maximum optical power output for LED is 4 mW.
- ♦ The amount of light transmitted depends on many factors, most of which are constant. However, one of these factors, the blood flow in the arteries, varies with time, because it is pulsating. By measuring the light absorption during a pulsation, it is possible to derive the oxygen saturation of the arterial blood. Detecting the pulsation gives a PLETH waveform, pulse rate signal and pulse strength.
- ♦ The SpO2 value, PR value, pulse strength and the PLETH waveform can be displayed on the main screen.
- ♦ SpO2 is a non-invasive measurement of the functional oxygen saturation.

## 5.1.2 Placing Adult Finger SpO2 Sensor

Sensor selection for SpO2 measurement depends on the patient's age. For an adult patient, you can choose an adult finger sensor; for a child patient, you can choose a child hand or toe sensor. The finger SpO2 sensor is a finger clip consisting of two parts. The LEDs are placed in one part and the photo detector is placed in another part.

Please follow the steps and Fig. 6 below to use the adult finger SpO2 sensor:

- ♦ Insert the sensor's connector to the monitor's SpO2 socket.
- ♦ Turn on the monitor. The LCD screen will display monitoring view.
- ♦ Attach the sensor to an appropriate site on the patient's finger.
- ♦ The waveform will be displayed on the color LCD screen and the readings will be displayed on the LEDs a moment later.



## Fig.6 Placing the SpO2 Sensor

#### NOTE

- ♦ Make sure to place the SpO2 sensor on the finger in a correct direction. The LED part of the sensor should be at the backside of the patient hand and the photo detector part at the inside. Make sure to insert the finger to a suitable depth into the sensor so that the fingernail is just opposite to the light emitted from the sensor.
- ◆ To acquire accurate results please read data until the sensor is steadily placed.
- Readings may not be accurate when either the sensor or the patient is moving.

## 5.1.3 Placing Neonate Wrap SpO2 Sensor

Neonate wrap SpO2 sensor consists of a Y-shape SpO2 sensor and its sheath. The Y-shape SpO2 sensor is consisting of two ends. The red and infrared LEDs are placed in one end and the photo detector is placed in another end. Insert the two ends of the Y-shape SpO2 sensor respectively into the upper and lower grooves on the sheath, as shown in Fig.7 and Fig.8 shows us the neonate wrap SpO2 sensor after assembling.

Wind the SpO2 sensor around a hand or foot of a neonate patient. Hold the sensor with one hand, first pull the belt on the one end of the sheath and put it into the "V" groove on the other end of the sheath with another hand. Loosen the belt and make it fit well into the "V" grooves. Then put the belt into the first lock bar to fasten the belt. See Fig.9. If the belt is too long, you may put it into the second lock bar. You must position the SpO2 sensor in this way so as to make the photoelectric component face the correct position. Besides, do not elongate the belt too much, which may lead to inaccurate measurement and block the blood circulation severely.

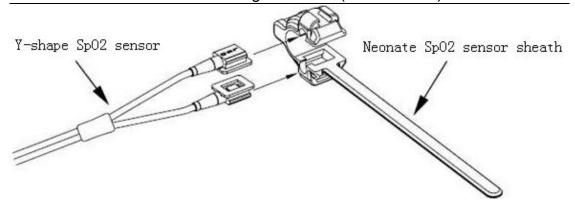


Fig.7 Assembling Neonatal Wrap SpO2 Sensor

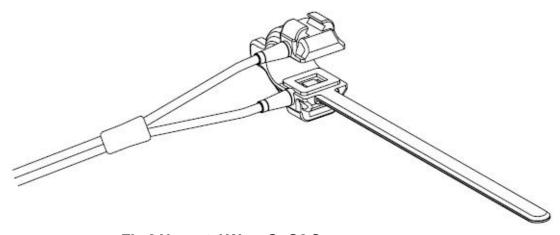


Fig.8 Neonatal Wrap SpO2 Sensor

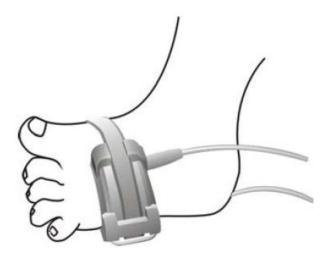


Fig.9 Placing Neonatal Wrap SpO2 Sensor

## **5.1.4 Measurement Limitations**

If the accuracy of any measurement does not seem reasonable, first check the patient's vital signs by an alternate method. Then check the instrument for proper function.

Inaccurate measurements may be caused by:

- ♦Incorrect sensor application or use;
- ♦ High-frequency electrical noise, such as noise from electrosurgical apparatus connected to the system.
- Significant levels of dysfunctional hemoglobin (e.g.,carboxyhemoglobin or methemoglobin);
- ♦ Significant concentrations of dysfunctional hemoglobin, such as carboxyhemoglobin and methemoglobin;
- ♦ Intravascular dyes such as indocyanine green or methylene blue;
- Excessive patient motion;
- Venous pulsations;
- ♦ SpO2 is too low;
- Improper sensor installation or incorrect contact position of the patient;
- Placement of a sensor on the same extremity with a blood pressure cuff, arterial catheter, or intravascular line.

Loss of pulse signal can occur in the following situation:

- The sensor is too tight;
- ♦ There is excessive illumination from light sources such as a surgical lamp, a bilirubin lamp, or sunlight;
- ♦ A blood pressure cuff is inflated on the same extremity as the one with a SpO2 sensor attached:
- ♦ The patient has hypotension, severe vasoconstriction, severe anemia, or hypothermia;
- ♦ There is arterial occlusion proximal to the sensor;
- The patient is in cardiac arrest or in shock.

#### 5.1.5 Precautions

## **↑** WARNING

- Check if the sensor cable is in normal condition before monitoring. Do not use the SpO2 sensor once the package or the sensor is found damaged.
- ◆ Remove the SpO2 sensor from the patient after measurement.
- ◆ As with any medical equipment, carefully route patient cabling to reduce the possibility of patient entanglement or strangulation. Cables of electrical surgical equipment should not be winded around that of the SpO2 sensor.
- ◆ Do not put the sensor on extremities with arterial catheter or venous syringe.
- If no pulse is found or the reading is unreasonable, first check the patient's condition, and then check the sensor installation and connection with the monitor, finally ask the qualified engineer to check the device and the SpO2 sensor for proper functions.
- Don't use the monitor to measure patients whose pulse rate is lower than 30bpm, which may cause incorrect results.
- Prolonged and continuous monitoring may increase jeopardy of unexpected change of dermal condition such as abnormal sensitivity, vesicle, repressive putrescence, and so on. It is especially important to check more frequently the sensor placement of child and patient of poor perfusion or immature dermographia by light collimation and proper attaching strictly according to changes of the skin. Check per 2~3 hours the sensor placement and move it when the skin deteriorates.
- Make sure no contamination or scar exists in the site where the sensor is placed. Otherwise, the measured result may be incorrect because the signal received by the sensor is affected.
- Please use the SpO2 sensor supplied by the monitor or confined to be used by the monitor.
- When used on different patients, the monitor is prone to crossed contamination, which should be prevented and controlled by the user. Disinfection is recommended before using the SpO2 sensor on other patients.

## 

◆ SpO2 sensors are precision and fragile. Avoid pressure and knock. Hold the probe

and cable carefully and lightly. If not use it, you should coil up the probe and cable into a loose circle. If the wire inside the cable is tensely pulled, it may cause mechanical damage to the probe and the cable.

## 5.2 Temperature

## 5.2.1 Principle

The device measures temperature of body surface by taking advantage of the characteristics of the thermal-sensitive resistor located in the temperature probe, whose impedance varies with the body temperature. The monitor measures the impedance of the resistor and then consults a resistance-temperature table stored in the device beforehand. The current temperature is displayed on the LED in orange. The monitor has only one TEMP measurement channel for measuring the body surface temperature of the patient.

## 5.2.2 Steps

The monitor uses a body surface TEMP probe to measure the patient's body temperature. Disposable or reusable probe can be selected according to your requirement. Please follow the steps below to use the body surface TEMP probe:

- ♦ Insert the probe's connector to the monitor's TEMP socket;
- ♦ Attach the probe to an appropriate site on the patient's body;
- ♦ Turn on the monitor. The LCD screen will display monitoring view;
- $\diamond$  Select the TEMP unit between  $^{\circ}$ C and  $^{\circ}$ F according to your requirement, details please refer to item 5 on page 15.
- ♦ Wait until the measurement does not change frequently, the stable readings will be displayed on the LED in orange.

#### NOTE

◆Because there is a isolation package outside the thermal-sensitive resistor in the temperature sensor, the impedance varies slowly with the temperature of the body. Thus an accurate result of temperature measurement is usually obtained after monitoring for more than 5 minutes.

#### 5.2.3 Precautions

## **↑** WARNING

- ◆Check if the probe cable is in normal condition before monitoring. Do not use the TEMP probe once the package or the probe is found damage.
- ◆Remove the TEMP probe from the patient after measurement.
- ♦As with any medical equipment, carefully route patient cabling to reduce the possibility of patient entanglement or strangulation. Cables of electrical surgical equipment should not be winded around that of the TEMP probe.
- ♦ If the reading is unreasonable, first check the patient's condition, and then check the probe installation and connection with the monitor, finally ask the qualified engineer to check the device and the SpO2 sensor for proper functions.
- ◆Do no reuse disposable TEMP probes.
- ◆When used on different patients, the monitor is prone to crossed contamination, which should be prevented and controlled by the user. Disinfection is recommended before using the TEMP probe on other patients.

## 

◆Hold the probe and cable carefully and lightly. If not use it, you should coil up the probe and cable into a loose circle. If the wire inside the cable is tensely pulled, it may cause mechanical damage to the probe and the cable.

## 5.3 Transferring data to your computer

Please install the PC software (Data Viewer) allocated with the monitor in your computer firstly, then follow the steps below to fulfill transferring data to your computer:

- 1. Open the data viewer software in your PC, then click the DOWNLOAD button in the Toolbar, one dialog box will pop up.
- 2. Connect the monitor with your computer via the USB cable allocated with the monitor;
- 3. Turn on the monitor, it display monitoring view;
- 4. Press FN button continues until the USB port figure turn to orange, press

- ←button or →button to open USB port, the figure should be displayed as then press FN button to confirm the setup;
- 5. Click "start" in your PC's dialog box;
- 6. Press D button on the monitor to enter system setup view;
- 7. Press FN button continues until the setup item BEGIN turn to BEGIN? in yellow, press button to confirm and start data transferring to the PC.

Pls wait with patience when data transferring, it will take about 4 minutes to fulfill.

If you want to cancel data transferring before fulfilling, press button, it will stop data transferring at once.

# Chapter 6 Utility PC software package

There are two PC software inside the CD. One is Data Viewer which can download and review the measuring data on your computer and print it out. One is Guardian 2009 which can help you to fulfill unique telemonitoring function and Synchronization retransmit function. Please refer to their user guide in detail as below.

#### 6.1 Data Viewer User Guide

**Running Condition** 

Download data from the monitor

Save and load data file

Review the data from the monitor

System setup

Print and print preview

## **Running Condition**

Operating system: Windows XP™, Windows 2003™, Windows Vista™

Executing flat top: Microsoft .Net Framework™ 2.0

Above trade mark and products are owned by Microsoft Co.

Hardware: 512M memory, 20G harddisk, 128M display memory

#### 6.1.1 Download data from the monitor

Click the DOWNLOAD button in the Toolbar, dialog box will pop up.



Operate according to the steps, the download process will be start up, and the download data will be displayed in the relative browse interface automatically.

#### Note:

When the download process start up, the software will search the serial ports from COM1 to COM16 automatically, and USB communicate port in the monitor if have. Once the connected device's Download function is actived, the software will enter the download process. If the connect is interrupt during the download process, the software will reenter searching status. User can click CANCEL button to stop the download process at any time.

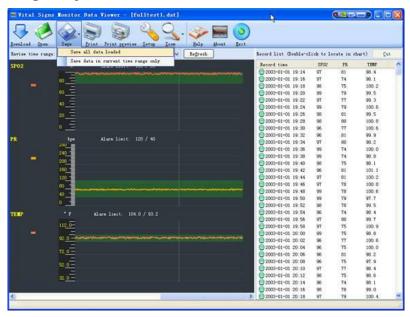
We suggest you to delete the monitoring data in your monitor after downloading them to the PC successfully, so it can avoid downloading repeat data records.

#### 6.1.2 Save and load data file

Press **SAVE** button in the toolbar after the download process and save the data with a certain file name.

If the user forgot to save it, the main window title will display NOT PRESERVED or PRESERVED PARTLY. When the user press **DOWNLOAD** or **OPEN** or **EXIT** button, system will prompt if you want to save the data.

There are two save modes: Save all data loaded and Save data in current time range only.



**Save all data loaded**: Save all data that has been downloaded from a device or loaded from a data file to a certain data file.

**Save data in current time range only**: Save the data in current reviewing range to the certain data file. For details of how to perfect current reviewing range, please refer to **Review the data from the monitor.** This function permit user to intercept valuable data record and save to the certain data file.

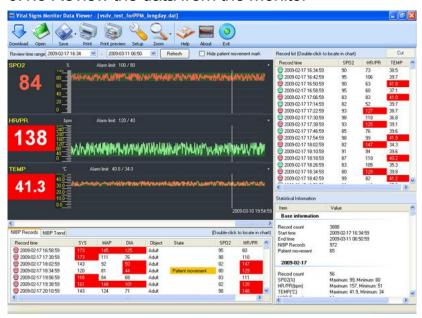
Saved data file will be named as \*.dat.

Press **OPEN** button in the toolbar, you can review the relative \*.dat file in relative window of the viewer.

#### Note:

Users should designate a file name which is easy understood and searched for each intercept valuable data record and save it to a organized document catalogues.

#### 6.1.3 Review the data from the Monitor



**Review time range**: there are two time selector on the top of viewer, they are used to display and setup current review time range separately. Press

**REFRESH** after setup, the viewer will display the data records in the selected time range. The default review time range is the time range of all loaded data after downloading or opening a data file.

**Trend chart**: There are trends of three vital signs parameters on the left side of the viewer. If light blue broken line appears, it means there was a period of power off time of the monitor at this position. Users can read relative records and time when clicking any position randomly on the trend chart. Green zone in the trend chart is the current setup of normal value range, which is relative with the alarm limits displaying on the topside of each channel. How to setup alarm limits please refer to **System Setup**. Temperature's default unit is °C, which can be changed to °F in the **SYSTEM SETUP** dialog box.

Press **ZOOM** dropdown menu in the toolbar, users can select the display unit in landscape orientation from 100% to 400%, and Zoom in or out the display unit in vertical orientation by pulling the concealed separated bar between each channel.

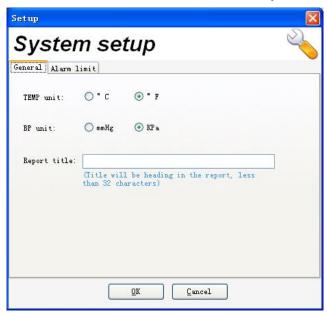
**Record list**: There is a record list on the right side of the viewer, to display efficient records in the current review time range. Inefficient records have been removed here. Double-click any record can locate the relative position in the trends display. Select two or more records, and click **CUT** button, users can setup review time range

according to the earliest and latest time in the selected records and refresh current review content. This function is the same with the time selector on the topside of the viewer introduced as above.

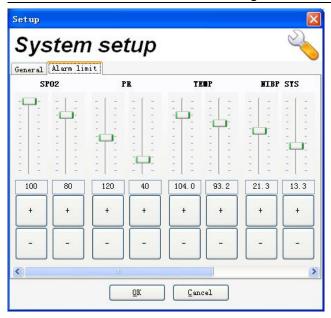
**Statistical information**: there is statistical information list on the right lower side. Here display the basic statistical information in the current review time range and the statistical information for every day.

# 6.1.4 System Setup

Press the SETUP button in the toolbar, system setup interface will pop up as below,



**General**: user can setup the unit of TEMP here. The report title will be saved as default for print report, it will be print out when each printing unless users change it in **Report setup** dialog box.



**Alarm limits**: User can setup the alarm limits of vital signs parameters here. Data viewer will alarm according to the setup and alarm information will be even printed out in the print reporter.

## 6.1.5 Print and Print preview

Press **Print** or **Print preview** button in the toolbar to enter **Report setup** interface as below, and startup printing in the end.



Title: If user have setup reporter title in SYSTEM SETUP, here will display it as

default title, users can modify the title here, but the content can be displayed in this

printing only. If you want to display the same report title in every printing, please

setup the title in the SYSTEM SETUP dialog box. The maximum number of

character is 32.

Patient name: The maximum number of character is 16, it will be print out in the

reporter.

Output content: Users can select 1 to several output contents according to different

data contents, at least one content should be selected to startup the printing.

**Printer:** Users can enter printer setup dialog box by pressing this button to select

printer to print the report and relative setup information. This software's report

requires A4 size printer paper.

Note:

Please look it over through print preview before every printing, because some reports

will be likely to require large qty. of paper. Users can setup the review time range you

require indeed in the data viewer firstly, then print report, it will save much more paper

for you.

6.2 Guardian 2009 - Vital Signs Monitor User Guide

Software: Guardian 2009

Issue version: V1.0.\*.\*

This software is allocated with certain model monitors, pls contact with your supplier.

**Running Condition** 

Operating system: Windows XP™, Windows 2003™, Windows Vista™

Executing flat top: Microsoft .Net Framework™ 2.0

Above trade mark and products are owned by Microsoft Co.

Hardware: 512M memory, 20G harddisk, 128M display memory

34

#### Connect to the monitor

- 1. Connect the monitor and the COMPUTER via an USB cable.
- Power on the monitor, enter relative menu and start retransmitting the monitor data.
- 3. Click button on the top tool line of this software, system will start to detect usable port and start monitoring process after receiving the monitoring data.

## View layout

System has two view layout, general view and big font view. General view display real time trend chart which can observe vital signs change trend in the near few minutes. Big font view zoom in the value to let user see the value from far distance.

Press dropdown-menu options to select view layout. If select full screen item, it will display monitoring content with full screen which is suitable to the COMPUTER with small screen.

## **User Management**

Regard to designate monitoring object

System support up to 1000 users login. All records will be saved in the system's own database. User can press button dropdown-menu to select "designate monitoring object" item before or during monitoring process, to change the current object, and all the monitoring data will be saved in the name of the designate object. System will build a unknown user object to save the monitoring data if no designated

System will build a unknown user object to save the monitoring data if no designated object before starting the monitoring.

The monitoring data from the start-up will be saved to the name of the new designate object if change monitoring object during monitoring process.

System will apply the last designated object before power-off automatically.

#### Add new user

Select button dropdown-menu "Add user" item, and enter "User info" dialog box, you can input new user's info here. Other info are optional input items except for user name is necessary input item.

If user need to apply Synchronization retransmit function, pls fill in "Tele-monitoring account "items' account name, password and password confirmation. Account name and password should be kept the same info with the register info on the Tele-host computer, then the user can login the Tele-host computer successfully and proceed Synchronization retransmit function.

Select button dropdown-menu "Amend user info"item, and enter "Query user" dialog box, you can query the certain user through any kind of query conditions. Click-up the object from the query result list and press confirm button, then enter **User Info** dialog box, you can amend the user information and save it.

Select button dropdown-menu "Cancel user" item, and enter "Query user" dialog box, you can query the certain user through any kind of query conditions. Click-up the object from the query result list and press confirm button, then system will cancel the designated user and all of its monitoring data.

#### **Setup**

Press setup button, enter Monitoring setup or Alarm setup dialog box.

# 1. Monitoring setup:

Click relative button every time, monitor will change to next option and the monitor Relative.

Setup will be adjust at the same time. All Synchronization retransmit cooperated computer will display the change at the same time.

Change waveform speed, it can only change the waveform speed displayed on the COMPUTER, but will not change the waveform speed displayed on other cooperated COMPUTER and monitor.

Synchronization retransmit page can set up object host-computer's information. If the host-computer is in the local area network, user can input host-computer's name or IP address. If the host-computer is connected via WEB, user should input its domain name. The port of host-computer is 50614 as default and needn't to be changed, unless telemonitoring supplier has designated special service port.

### 2. Alarm setup:

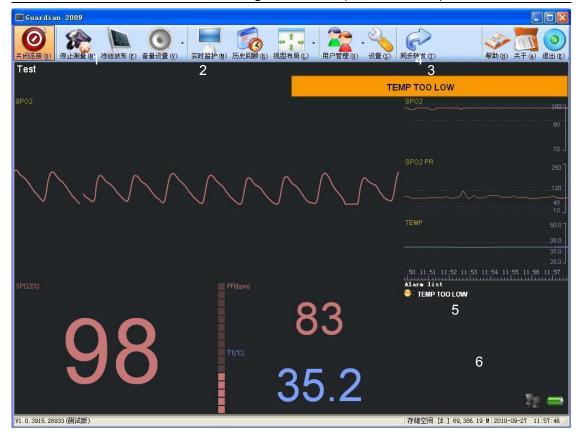
In this page, user can adjust different parameters' alarm level and alarm limit separately according to different requirements.

# Real time monitoring

The default view after system startup is real time monitoring view, user can press the

button to switch back real time monitoring view from other views.

The basic layout is as below,



- 1. Current designate user name
- 2. High alarm prompt line
- 3. warning alarm prompt line
- 4. prompt line
- 5. current alarm list
- 6. system status prompt

# [Waveform Freeze]

Press button can freeze the local COMPUTER's monitoring waveform only, just convenient for observation. This operation won't influence other synchronization retransmit cooperated computer's waveform. Press this button again, the waveform will be restored.

# [Volume setup]

Press button dropdown-menu, user can select high, middle, low alarm volume, and silence. Alarm status can be watched through displaying view while silence, this setup won't change monitor and other synchronization retransmit cooperated computer's setup.

#### [Monitor battery power status]

Under connect and startup monitoring status, system status prompt display a battery

icon, this icon indicate current monitor's battery power status. If prompt, pls insert the monitor to AC power supply, or the monitoring connect will be stop at any time.

#### [Alarm and prompt]

During real time monitoring process, system will detect every vital signs parameters according to their alarm limits, and monitoring the status of the connected patient monitor, once abnormity appear, or exceed alarm limits, system will alarm and prompt warning information accordingly.

NOTE: Thinking about the safety, system's alarm limits setup is independent with the patient monitor and other synchronization retransmit cooperated computers. Adjust system's alarm setup won't influence monitor and other computers' alarm setup.

Monitoring alarms will be prompt at High alarm prompt line and warning alarm prompt line according to alarms' setup level. If several same level alarms occur at the same time, prompt lines will display these alarms in turn and go with alarm sound. There will list all alarm and prompt info happen currently in the current alarm list, alarm will be cancel automatically when the alarm stop. Different colors prompt different alarm lever, red mean high alarm, orange mean warning alarm.

User can press button and enter monitoring setup dialog box to set up the alarm according to different requirements.

#### [Storage space limit]

System will check current disk prartition if the space is enough when startup monitoring and during monitoring process, if the space is less than 10M, the system will refuse startup new monitoring. If the space is less than 5M, the system will stop current monitoring, to make sure that the monitoring information will not be lost. If above status occur, pls clean up outdated data through "Cancel user" function.

### **History review**

Press 50 button to enter history review view.

It will display a smaller review toolbar on the top of each review page, click the button displayed with users' name, you can select review object. Click "refurbish" button to refresh the review content, if it is during monitoring process, this operation will lead to display current monitoring waveform and trend.

## Trend display and print

To trend review page, review toolbar will display up/down button: "|<",">|".

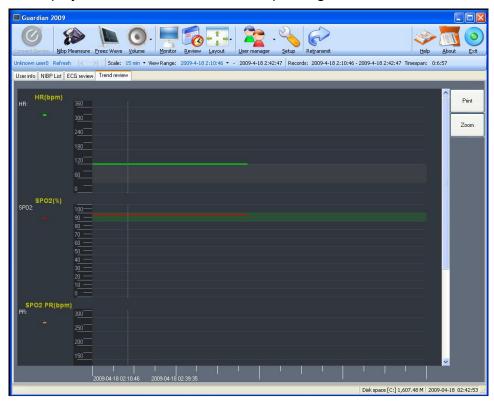
User can page up/down trend display through this two buttons. User can select trend display's time range through time unit dropdown-menu.

Orient the review to the appointed time range through setup the start time of review.

Monitor record and record time length display the startup time and stop time of this user's record, and each monitoring's time length in total.

There maybe include many times discontinuous monitoring processes inside the record of one user. The trend of these monitoring processes will be link to display, it



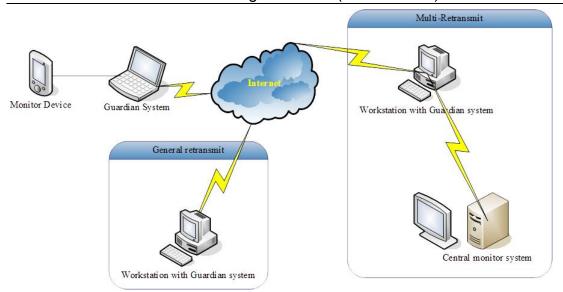


Click the "Print" button on the right side of the page, you can print out the content of current displaying trend.

Click the "Zoom" button on the right side of the page, it will prompt a dialog box which can adjust zoom unit, so user can adjust and select review trend content more convenient.

# Synchronization retransmit function

Our system supply unique Synchronization retransmit function, to realize that multi-doctors can real time monitor the same patient via internet.



The guardian system COMPUTER which is connect with patient monitor directly retransmit the monitoring data through web, so other observer in other place can observe and record the real time monitoring data and remote the patient monitor at the same time.

The guardian system which is running on the Tele-host computer, can retransmit the monitoring data to internet or other computers in LAN such as central monitoring system. This mode permit extending multi-observers in a simple way.

To apply retransmit function, please press" button and enter monitoring setup page, then enter "retransmit" page, input tele-host computer's address info, to the host COMPUTER inside LAN, input COMPUTER name or IP address, To the host COMPUTER via internet, input its domain name. The port of host-computer is 50614 as default and needn't to be changed, unless telemonitoring supplier has designated special service port.

After setup, user must confirm if current monitoring object has account which can log in the host computer. Press button dropdown-menu to select "amend user info"

item and enter amend page which can check and setup user's login account and password. User should gain the permit account and password from supplier of telemonitoring service.

After setup login account and password, start up the connect with patient monitor and start up real time monitoring, press button on the toolbar and start up retransmit function. Once connect with other computer, the system status bar will display icon on the right corner.

[Amend login account and password]

After build-up retransmit connect, user can press button dropdown-menu to select "Amend retransmit login password "item and enter corresponding page, input old password and new password, click ok, then the Login password in the local computer and host computer have been changed in the same time.

NOTE: Only when the retransmit function startup, and build-up retransmit connect status, the password can be amend.

When the connect with patient monitor break off and real time monitoring stop, the retransmit function will be shut off automatically.

# **Chapter 7 Maintenance**

# 7.1 System Check

# 7.1.1 Check Before Using

Before using the monitor, perform the following steps:

♦ Check if there is any mechanical damage;

- ♦ Check if all the outer cables and accessories are in good condition;
- ♦ Check if all the monitoring functions of the monitor can work normally so as to make sure that the monitor is in proper working condition.

In case of any damage, abnormal function, hidden safety danger or exception, do not use the device on patient. Contact the technician in your hospital or the supplier immediately.

#### 7.1.2 Routine Check

Make sure the qualified service personnel have implemented a complete inspection, including the functional safety check, after the monitor has been used for 6-12 consecutive months, or after monitor servicing or system upgrading. This is to ensure the normal operation of the system.

Store the device with a fully charged battery and charge the battery of the device every 3 months if leave the device unused for a long time. Otherwise the battery may be damaged because of being thoroughly exhausted.

### **⚠ WARNING**

- ◆ Failure on the part of the responsible hospital or institution employing the use of the monitoring equipment to implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazard.
- ◆The safety inspection or maintenance, which requires opening the monitor housing, must be performed by trained and authorized personnel only. Otherwise, equipment failure and possible health hazard may be caused.

# 7.2 General Cleaning

Your equipment should be cleaned on a regular basis. When it is polluted by dust, oil, sweat or blood etc. It should be cleaned at once. If there is heavy pollution or lots of dust and sand in your place, the equipment should be cleaned more frequently. Before cleaning the equipment, consult your hospital's regulations for cleaning, disinfecting and sterilizing equipment.

The exterior surfaces of the equipment may be cleaned gently with a clean and soft cloth, sponge or cotton swap, dampened with a non-erosive cleaning solution. Drying off excess cleaning solution before cleaning the equipment is recommended.

### 

◆Power off the monitor and stop charging the battery before cleaning.

Following are examples of cleaning solutions:

- ♦ Diluted soap water
- ♦ Diluted formaldehyde (35%~37%)
- Diluted ammonia water
- Hydrogen peroxide (3%)
- ♦ Alcohol
- ♦ Ethanol (70%)
- ♦ Isopropanol (70%)
- Diluted sodium hypochlorite solution (bleaching agent)

#### NOTE

♦ Sodium hypochlorite solution with a concentration of 500ppm(1:100 diluted bleacher solution used in family) ~5000ppm(1:10 diluted bleacher solution used in family) is very effective. How much ppm depends on how much organic matter (blood, propagation grume etc.) existing on the surface.

# **↑** CAUTION

- ◆ Never use strong solvent, such as acetone.
- ◆ALWAYS dilute the solutions according to the manufacturer's suggestions.
- ♦NEVER use abrasive, erosive cleaners, or cleaners containing acetone.
- ◆NEVER permit fluids run into the casing, switches, connectors, or any ventilation openings in the equipment.
- ◆NEVER submerge the equipment into water or any cleaning solution, or pour or spray water or any cleaning solution on the equipment.
- ◆ALWAYS wipe off all the cleaning solution with a dry cloth after cleaning and dry the

monitor in the air. Never dry the monitor in the violent sunshine or toast it under high temperature.

♦ If the monitor is polluted by chemical substance, the users should handle it effectively according to the properties of the chemical substance.

The probes and cables may be cleaned with a clean and soft cloth, sponge or cotton swap, dampened with ethanol.

## **⚠** CAUTION

◆ NEVER permit fluids run into the probes and cables. NEVER submerge the probes and cables into any liquid.

For more cleaning information of accessories, please refer to the instructions for use of the accessories.

### **↑** WARNING

◆ The cleaning solutions above can only be used for general cleaning. If you use them to control infections, the manufacturer shall assume no responsible for the effectiveness. Please consult your hospital's infection controllers or professionals.

#### 7.3 Disinfection

Disinfection may cause damage to the equipment. We recommend the disinfection is contained in the hospital's servicing schedule only when necessary. The equipment should be cleaned prior to disinfection.

Recommended disinfection material: Alcohol based (Ethanol 70%, Isopropanol 70%), and aldehyde based.

The probe cables may be disinfected with hydrogen peroxide (3%) or isopropanol (70%). Active reagents are also effective. The connecters can not be submerged into the above solutions.

#### NOTE

♦ ALWAYS dilute the solutions according to the manufacturer's suggestions and adopt lower concentration if possible.

- ♦ NEVER submerge the equipment into water or any solution, or pour water or any solution on the equipment.
- ♦ ALWAYS wipe off all the excess liquids on the equipment surface and accessory surface with a dry cloth.
- ♦ Never use EtO and formaldehyde to disinfect.
- ◇Never permit high-pressure and high-temperature disinfection of the equipment and accessories.

# **⚠ WARNING**

◆ Disinfection may cause damage to the equipment; Therefore, when preparing to disinfect the equipment, consult your hospital's infection controllers or professionals.

# 7.4 Disposal

To avoid contaminating or infecting personnel, the environment or other equipment, make sure you disinfect or decontaminate the device appropriately before disposing of it in accordance with your country's law for equipment containing electrical and electronic parts. For SpO2 sensor and TEMP probe, please follow local regulations regarding disposal of hospital waste.

# **Chapter 8 Storage**

Storage temperature: 5~50°C.

**EXPLOSION HAZARD** – Do not use the patient monitor in a flammable atmosphere where concentrations of flammable anesthetics or other materials may occur.

**ELECTRICAL SHOCK HAZARD** when cover is removed. Do not remove covers. Refer servicing to qualified personnel.

**BATTERY POWER** –The battery discharges even when the device is not in use. Store the device with a fully charged battery and check the battery status of devices in storage once a month.

At the end of the monitor or its accessory service life, they must be disposed in the same way of the same products. Battery disposal must be in compliance with the local recycling instructions and should not be fired or autoclaved.

# **Chapter 9 Packing list**

Standard Packing List	
Vital signs monitor main unit (SPO2/TEMP)	1 pc
Adult finger SpO2 sensor	1 pc
Temperature probe	1 pc
PC software CD	1 pc
USB cable	1 pc
AC power adaptor	1 pc
The operator's manual	1 pc
Optional Accessory	
Pediatric finger/toe SpO2 sensor	

# **⚠** CAUTION

♦ Using other accessories may cause damage to the device.

# **Appendix: Specifications**

Following is the specifications, which has complete configuration of TEMP and SpO2.

# 1. General Specifications:

Size: 300mm×183mm×99mm

Net Weight: 980g

# **Display Specification**

Measurement Display: color LCD screen & LED

Power Supply Indicator: Dual-color LED (red/green)

Classification: BF type applied part

#### 2. Power Supply

#### **AC Power Adaptor**

Input: 100~240VAC, 50/60Hz

Output: DC 5V, 2A

#### **Battery**

Li-ion rechargeable battery, 3.7V, 3AHr

Operating Time: 5-6 hours with full-charged battery (Condition: 25°C)

Recharge Time: 8 hours.

#### 3. Environment

#### **Temperature**

Working:0~45°C

Transport and Storage: -25~85°C

### **Humidity**

Working:30~85 %

Transport and Storage: 30~95 % (no condensation)

## 4. Monitoring Parameter

## SpO<sub>2</sub>

Measurement object: Adult, Pediatric, Neonate

SpO2%

Measuring Range:0∼100%

Resolution:1 %

Accuracy: $\pm 2\%(90\sim99\%)$ ,  $\pm 3\%(70\sim89\%)$ , unspecified (0 $\sim$ 69%)

Pulse Rate

Measuring and Alarm Range:30~250bpm

Resolution:1bpm

Accuracy: ±1bpm

# **Temperature**

Input: Body surface thermal-sensitive resistor temperature sensor

Measuring Range: 0~50°C

Accuracy: ±0.1°C

## 5. Storage and Review

Maximum Data Quantity: 3888 groups