User Manual

Handheld Vital Signs Monitor

Directory

Statement of responsibility

The Company does not guarantee any form of error, installation error, operation error in this manual, and does not bear any legal liability for accidental or inevitable damage.

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The Company considers that it should be responsible for the reliability, safety and performance of the instrument only if the assembly operation, expansion, readjustment, performance improvement and maintenance are carried out by the Company's approved personnel or institutions; the relevant electrical equipment conforms to the relevant national standards; and the operating instrument is carried out in accordance with the guidance of this Manual.

The contents of this manual may be changed without notice.

⚠Warning⚠

For the safe and continuous use of this equipment, the listed instructions must be followed. The instructions listed in this manual can not replace the medical steps already in place.

Do not rely only on audible alarm system to monitor patients, when monitoring patients, if the volume is too low or completely turned off will lead to disaster. Remember that the most reliable method of patient monitoring is to combine the correct use of monitoring equipment with close personal monitoring of patients.

This equipment is intended to be used only by trained health care professionals in health care institutions.

In order to reduce the risk of electric shock, do not turn on the equipment. If necessary, please qualified personnel maintenance.

The device may interfere with the ultrasonic imaging system, as shown by the interference signal on the ultrasonic display screen. The farther the distance between the two devices, the better.

It is dangerous to expose electrical contacts or connectors to saline or other liquids with conductive glue.

Electrical contacts and connections such as cable connectors, power supplies, parameter modules inserted into connectors, rack connectors, etc. must be kept clean and dry. If they are contaminated

with liquid, they must be thoroughly dried. For further decontamination, please contact the seller or our company.

⚠Warning⚠

This is not a therapeutic device.

If each hospital or medical institution responsible for the use of this instrument fails to achieve a satisfactory maintenance plan, it will cause abnormal instrument failure and may endanger personal health.

Quality Assurance:

Free Service:

All equipment in accordance with the scope of our warranty service regulations can enjoy free service.

Fee range:

(1) Any equipment beyond the scope of the Company's warranty service regulations, the Company will carry out charge services;

(2) Even during the warranty period, the product needs to be repaired due to: man-made damage; over-voltage of the grid

The prescribed scope of equipment; irresistible natural disasters.

The Company is hereby not responsible for direct, indirect or final damage and delay caused (including but not limited to) by the following: components being disassembled, stretched, re-commissioned; replacement of accessories without the Company's permission or maintenance of the machine by a person not authorized by the Company.

Introduction

This manual introduces the monitor's performance, operation method and other safety information in detail. This is the best starting point for new users to start using monitors.

The following symbols represent some important tips that users should note:

⚠⚠Warnings are information about how to avoid injury to patients and medical staff.

⚠⚠Care is the information you should know how to avoid damage to your equipment.

⚠⚠attention is to emphasize important information.

This manual is read by people who are familiar with the various measurements carried out and have experience in the use of monitoring equipment.

This monitor is a hand-held vital signs monitor, can be used in the day of surgery, surgery / anesthesia recovery, emergency room and other occasions, monitoring the vital signs of adults, children, newborns.

The monitor can be powered by built-in batteries. It has the characteristics of convenient carrying.

Scope of application:

This monitor is suitable for monitoring and measuring vital signs such as heart rate / pulse rate, non-invasive blood pressure (systolic blood pressure, diastolic blood pressure, mean pressure), electrocardiogram, oxygen saturation and body temperature.

Contraindications and warnings:

● this device is not a therapeutic device.

If ● equipment is not fixed, it may fall, resulting in injury or equipment damage. In order to prevent injury or equipment damage, install the equipment to a fixed position.

● this device should not be used in the presence of magnetic resonance imaging (MRI) equipment, otherwise the induced current will cause burns to the patient.

● this equipment shall not work in flammable anesthetic or other gases.

● this equipment can not be used in situations with electromagnetic radiation, for example, where mobile phones are used.

● in order to avoid personnel injury, other than qualified technical personnel can not repair the equipment.

● do not replace the power adapter of this equipment.

● defibrillation shall not be in contact with the patient, this equipment or hospital bed.

Notes:

Before ● use, verify that the calibration is correct and ensure that the equipment works properly.

● pay attention to the placement of power adapters, catheters and all cables to avoid the risk of strangling patients or tripping other people.

● this equipment is strictly forbidden to block in order to emit heat.

● if the liquid falls into the housing of the equipment, please disconnect the power immediately and contact the maintenance personnel immediately.

一、Product Overview

■ a comprehensive understanding of the monitor, please read the monitor overview.

■ get an introduction to the various information displayed on the screen, please read the screen display introduction.

■ master the operation method, please read the monitor button function and basic operation.

■ understand the location of various interfaces, please read the external interface of the monitor.

■ know the precautions for using the monitor when the battery is powered, read the built-in rechargeable battery.

⚠Warning⚠

Do not open the enclosure of the instrument to avoid possible electrical hazard. Any maintenance and upgrade of the monitor must be through this

Company training and authorized service personnel.

⚠Warning⚠

Do not use this instrument where flammable substances such as anesthetics are placed to prevent explosion.

⚠Warning⚠

Before use, the user should check whether the instrument and its accessories can work properly and safely.

⚠Warning⚠

To prevent delay in treatment, adequate alarm settings are provided for each patient. At the same time, ensure that the alarm can be issued

Police voice.

⚠Warning⚠

Do not use mobile phones near the monitor. Mobile phones can generate excessive radiation fields that interfere with the work of the monitor

Yes.

⚠Warning⚠

When the monitor is shared with the electrosurgical equipment, the user (doctor or nurse) should pay attention to the safety of the monitored patient.

⚠Warning⚠

Packages must be treated in accordance with the currently implemented waste control code and placed in areas not accessible to children

Fang.

⚠Be careful⚠

When the products and accessories described in this manual are about to exceed the service life, they must be handled in accordance with the relevant product handling specifications

To deal with them. If you wish to have further information, please contact our company or its representative body.

⚠Be careful⚠

When there is doubt about the perfection and arrangement of the external grounding of the monitor, the internal battery must be used to operate.

1.1 Monitor Overview

Hand-held vital signs parameter monitor is a new structure, small size equipment, with built-in batteries, easy to transfer patients, carrying visiting rounds. vital signs such as heart rate/pulse rate, non-invasive blood pressure (systolic, diastolic, mean), electrocardiogram, oxygen saturation and body temperature can be monitored and measured in adults, children and neonatal patients.

Hand-held vital signs monitor has the following characteristics:

☆4 inch large screen, true color, wide view, high brightness LCD display.

☆ display interface operation is simple and convenient, intuitive and friendly.

☆ built-in rechargeable battery for easy movement and carrying.

☆ long-term monitoring data record browsing function.

☆ automatic acousto-optic double alarm.

Working environment:

Temperature

Working temperature 0 ～ 40 (℃)

Transport and storage temperature -20 ～ 60 (℃)

Humidity

Working humidity ≤ 85 %

Transport and storage of humidity ≤ 93 %

Altitude

Working altitude -500-4,600 m (-1,600-15,000 ft)

Transport and storage altitude -500-13,100 m (-1,600-43,000 ft)

Power adapter:INPUT： 100-240(V) AC ,50/60(Hz)

OUTPUT：5.0(V) DC ,2.0(A)

Built-in lithium battery: V-2000mAh 3.7

⚠Attention⚠

Do not use this monitor outside the manufacturer's specified temperature and humidity range, otherwise the performance specifications claimed in Appendix II will not be met.

Hand-held vital signs monitor is functional and (as shown in Fig .1-1) can be used for sign monitoring in adults, children and newborns. Users can also choose different measurement parameters according to different needs.

This monitor can monitor ECG (ECG), oxygen saturation (SpO2), non-invasive blood pressure (NIBP), body temperature (TEMP) and other main parameters. It integrates the function of parameter measurement module, display and record output, and forms a compact and portable monitor. its built-in battery facilitates patient movement and can clearly display 2~3 waveforms and all monitoring parameter information on its high-resolution display interface.

1.1.1 Key and light

Figure 1-1 Hand-held Vital Signs Monitor

- Power key

  Switch button.

- Silent key

  Press the mute and press the sound again.

- Function key 1

  The text prompt of the corresponding position on the screen (left position at the bottom of the screen) is the function of this button.

- Function key 2

  The corresponding position on the screen (the right side of the bottom of the screen) text prompt for this button function.

- Select key

  Select different menus in the settings menu.

- Alarm light

  The red light flashes when alarm.

- Power indicator

  When charging or when the power is insufficient, the red light flashes, and the charge is full of green lights.

1.1.2 Power interface

Figure 1-2 Power Interface

⚠Attention⚠

Must use the power adapter provided by our company, do not use when charging.

1.1.3 Reset key

Figure 1-3 Reset keys

Open the protection when using, use the tip to insert the reset hole, press hard, you can reset.

⚠Attention⚠

USB function has not been enabled.

1.1.4 Sensor jack

Figure 1-4 Sensor Jack

NIBP: blood pressure cuff interface.

TEMP: temperature probe interface.

S &E: the interface between the oxygen probe and the ECG lead line.

1.1.5 Fixed hole

Figure 1-5 Fixed holes

⚠Attention⚠

Need to cooperate with fixed seat use, used to fix in infusion rack and other places, choose accessories.

Definition abbreviations:

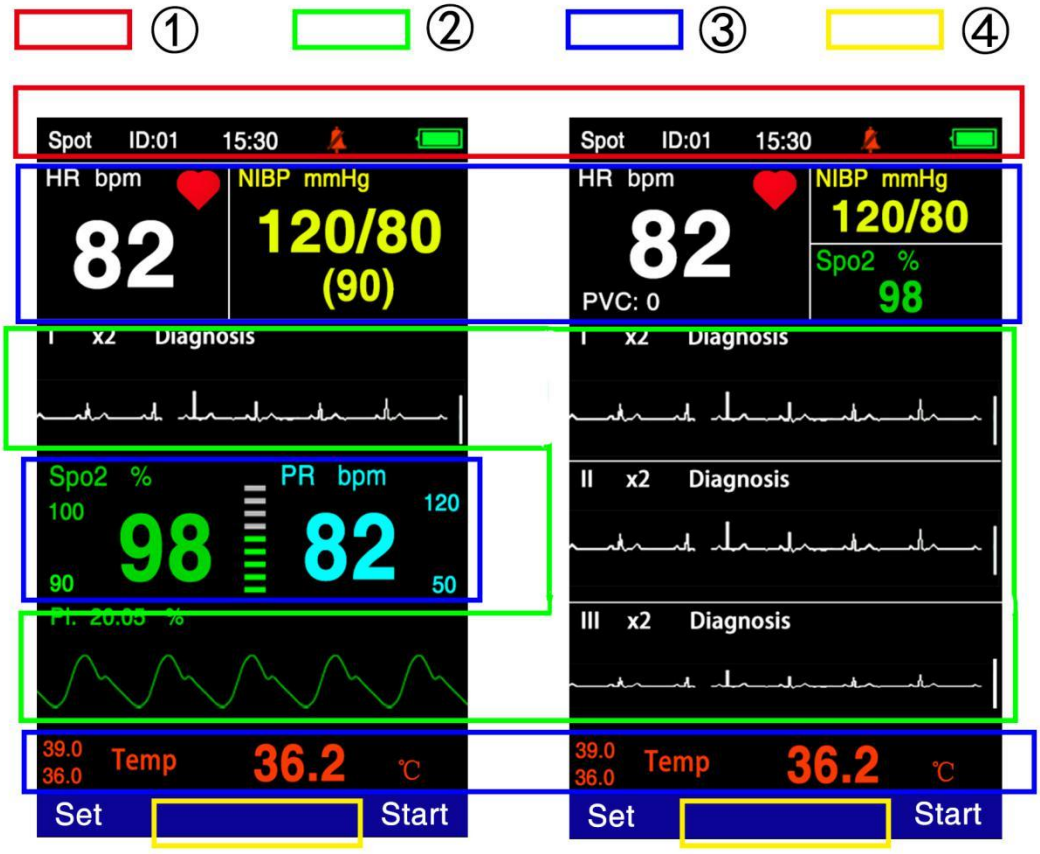
Name of name	Definitions, abbreviations
ECG	ECG
TEMP	Temperature
NIBP	Non-invasive blood pressure
SPO2	Oxygen saturation
HR	Heart rate
PR	Pulse rate
PI	Perfusion index
PVC	Ventricular premature beats
SYS	Shrink pressure
DIA	diastolic blood pressure
MAP	Average pressure
Monitor	Monitoring Mode
Spot	Field mode (multi-user measurement)

1.2 Display Interface Introduction

Display screen of this monitor is a color LCD screen, which can display the waveform parameters of the collected patient ID、 and the alarm information, monitor status, clock and other prompt information provided by the monitor at the same time.

The main screen is divided into three areas (as shown in Figure 1-6):

1. Information Area 1 4
2. Waveform Area 2
3. parameter area 3



Electrocardiogram three lead interface Electrocardiogram five lead interface

Figure 1-6 shows the main interface

Information area presentation (14):

The information area is located at the upper end of the screen, showing the status of the monitor and the current user. The content of the information area is as follows:

"Spot": refers to the current mode of operation of the instrument.

"ID: 01": means the current user serial number.

"15:30" means the current time.

 Battery power status.

Other prompt information in the information area appears and disappears at the same time as the reported state, according to the content:

Monitor prompt information, physiological alarm fixed in the area 4; NIBP technical alarm fixed in the NINP mmHg below; ECG three-lead interface SpO2 technical

alarm fixed after the PI value, ECG five-lead interface SpO2 technical alarm fixed in the SpO2% below; Temp technical alarm fixed behind the Temp;

Monitor alarm information (see "alarm setting" chapter for specific setting methods);

 It's an alarm mute sign. This sign appears when pressing the mute button, indicating that all alarm sounds have been artificially turned off. The sound prompt is not restored until the operator presses the mute button again.

⚠Attention⚠

 When the sign appears, the system will not be able to give an alarm sound prompt, so the operator should be particularly careful to use this function.

Waveform area description (2):

The waveform region of ECG three-lead interface shows 2 waveforms, and the waveform display sequence of ECG five-lead interface can be adjusted. The name of the waveform is displayed on the upper left of each waveform. ECG leads can be selected according to requirements. The gain of the channel and the filtering mode of ECG wave are also shown on each ECG wave. The left side of the ECG waveform has a scale bar of 1 millivolt. When the menu pops up in the screen operation, the menu always occupies a fixed position in the middle of the waveform area, making a part of the waveform temporarily invisible. After exiting from the menu, restore the original screen display. The waveform is refreshed at a set rate, and the adjustment of each waveform refresh rate is shown in the settings of each parameter.

Description of parameter areas (3):

The parameter area and waveform are basically placed accordingly. The parameters shown in the parameter area are:

ECG ECG

Heart rate (unit: stroke/min)

SpO2 blood oxygen saturation

- Oxygen saturation SpO2(units:%)

Pulse rate (in beats/min)

NIBP of non-invasive blood pressure

Systolic pressure, diastolic pressure, mean pressure in order from left to right ;(in mmHg mmHg or kPa)

TEMP temperature

Temperature (in degrees Celsius ℃ or ℉ degrees Fahrenheit)

Alarm lamp and alarm status:

In normal condition, the alarm lamp is not on.

When an alarm occurs, the alarm lights flicker red lights, see the alarm Settings section.

Please refer to the relevant contents of the parameters in the relevant chapters.

二、Installation of monitor

2.1 Open box and check

Carefully remove the monitor and accessories from the packing box and keep the packaging materials for later transportation or storage. Please click the packing list to clear the attachment.

■ check for any mechanical damage.

■ check all exposed wires and insert some accessories.

When installed, leave at least 2 inches (5 cm) space around the monitor to ensure air circulation. Monitor should be used in a reasonable environment to avoid vibration, dust, corrosive or explosive gases, extreme temperature and humidity and so on.

If you have any questions, please contact our sales department or agent immediately.

2.2 Electrical connection

Connect AC power cord step:

■ confirm AC power supply meets the following specifications: VAC,50/60Hz 100-240

■ use the power cord with the monitor. Plug the power cord into the power interface of the monitor and put the other end of the power cord

Insert a grounded power outlet.

⚠Attention⚠

Connect the power cord to a special socket.

⚠Attention⚠

When there is a battery configuration, the instrument must be charged after transportation or storage. So no AC connection

Direct boot, may be due to insufficient battery power, so that the instrument can not work properly. Switch on AC, either

Turn on the monitor to charge the battery.

2.3 Power on

Turn on the power switch after the system self-check successfully into the monitor home screen, this time the user can operate.

⚠Attention⚠

Don't use this monitor to monitor illness if there are signs of damage to the monitor's function or an error prompt

Person, and please contact the seller or our company.

⚠Attention⚠

If a fatal error is found during self-examination, the system will alarm.

⚠Attention⚠

Check all monitoring functions that can be used to ensure that the monitor function is normal.

⚠Attention⚠

If a battery is configured, the battery must be charged after each use to ensure adequate storage.

2.4 Sensor connection

Connect the required sensor to the monitor and patient monitoring site.

⚠Attention⚠

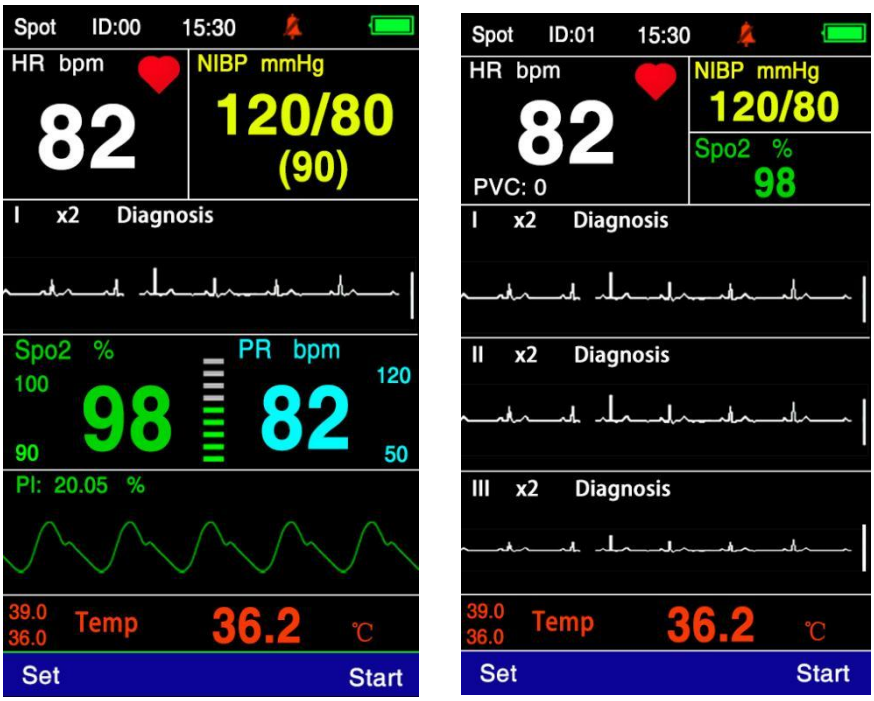
For correct connection methods and requirements for various sensors, see the relevant sections.

三、System menu

- boot interface
- Settings menu
- work model
- user settings
- Alarm Settings
- blood pressure settings
- blood oxygen settings
- ECG settings
- temperature units
- System Settings
- data review

3.1 Boot interface

Press the power button, lift the button, the system into the boot interface. Pop up the menu shown in Figure 3-1:



Electrocardiogram three lead interface Electrocardiogram five lead interface

Figure 3-1 Boot Interface

According to the ECG set lead type to determine whether the boot interface is a three-lead or five-lead interface. The three-lead ECG can only display the waveform of one channel and one blood oxygen waveform, while the five-lead mode can display the waveform of three channels, and the blood oxygen waveform is not.

Under SP OT mode (energy saving mode open state), within 1 Min time, no key operation will close the LCD screen display, automatically close the instrument.

At low power, the battery progress bar is empty, sound alarm is generated, ALARM red light flashes regularly.

The upper left corner of the screen displays the status of the alarm switch, which can be set in the system settings.

The mute key can mute or cancel the mute.

At the top of the display test mode, user ID, time, mute sign, Bluetooth, power sign.

⚠Attention⚠

The earliest records after memory overflow will be overwritten.

3.2 Setup menu

In the boot interface, select the upper left corner of the settings key, enter the settings menu.Pop up the menu shown in Figure 3-2:

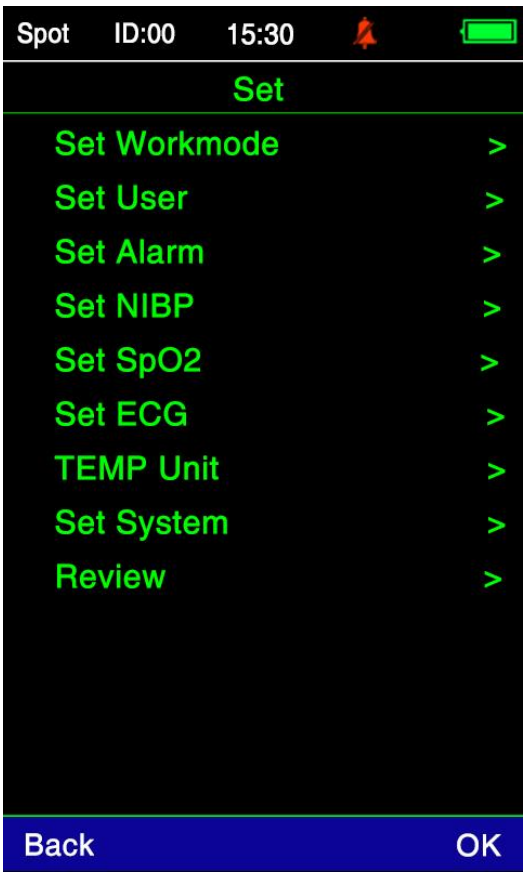


Figure 3-2 Settings menu

3.3 Working model

Under the settings menu, select work mode and press confirm key, then enter work mode to select drop-down box.Pop up the drop-down box shown in Figure 3-3:

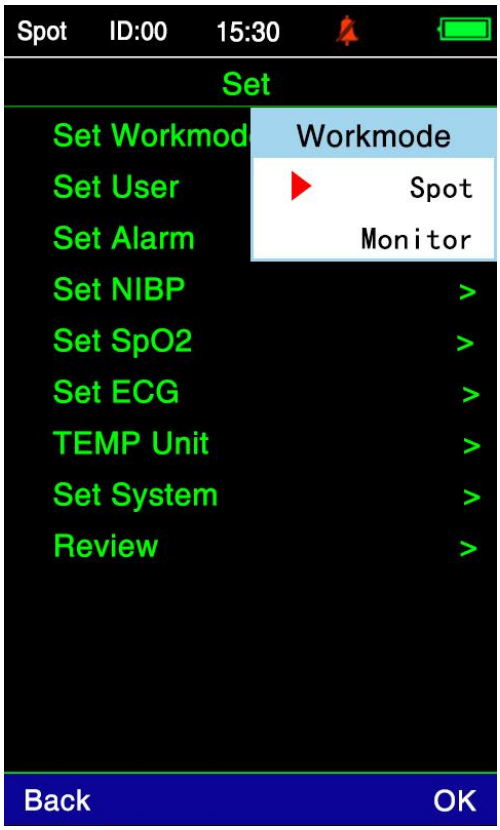


Figure 3-3 Working Mode Select Drop-down Box

Work mode: Spot mode and Monitor mode.

Spot mode automatically sleeps for 1 minute without measurement operation (power saving mode is turned on); Monitor mode does not automatically sleep.

When you switch from Spot mode to Monitor mode, a prompt pops up to select whether to keep the data in Spot mode. Pop up the drop-down box shown in Figure 3-4:

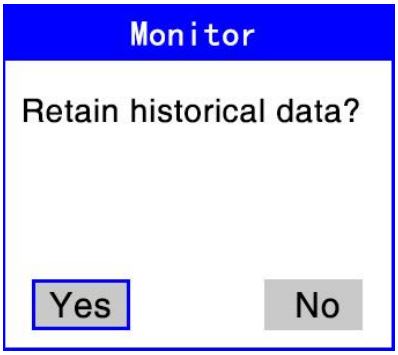
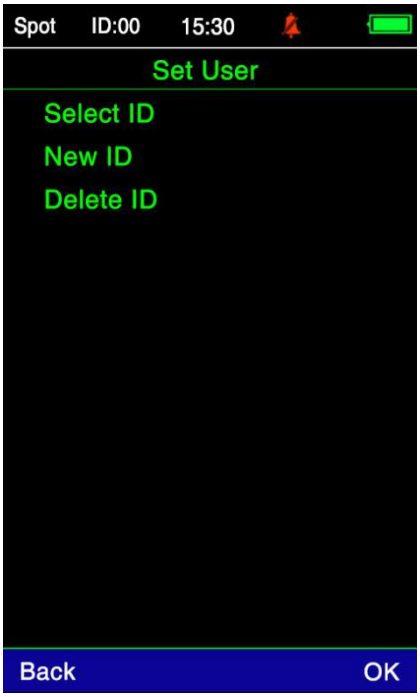


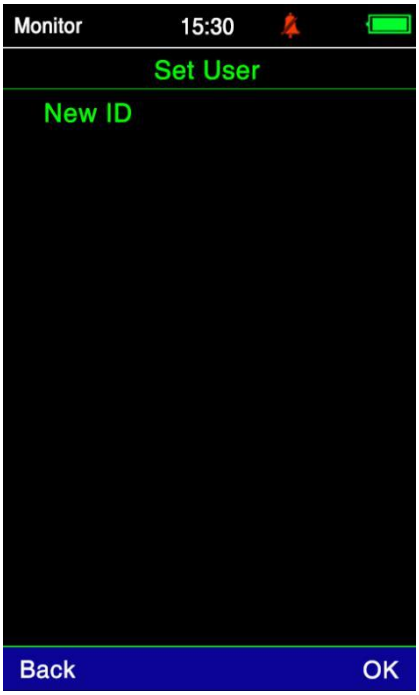
Figure 3-4 Monitor Tips

3.4 User settings

Under the settings menu, select the user settings and press the confirmation key to enter the user settings interface menu.Pop up the menu shown in Figure 3-5:



Spot mode



Monitor mode

Figure 3-5 User Settings menu

The user settings interface displays different interfaces according to different working modes.

User Settings: user selection, add user, delete user.

Spot mode can store up to 100 users (200 records per user), monitoring mode is a single user data storage 48 hours of measurement data.

If the storage user has reached the maximum value in Spot mode, the "user is full" is prompted. As shown in figure 3-6, only some users can continue to add users.

Figure 3-6 Add User Menu

Each time a user is added in Monitor mode, the previous data is prompted, as shown in figure 3-7.

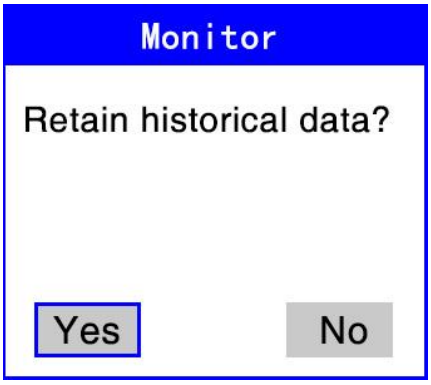
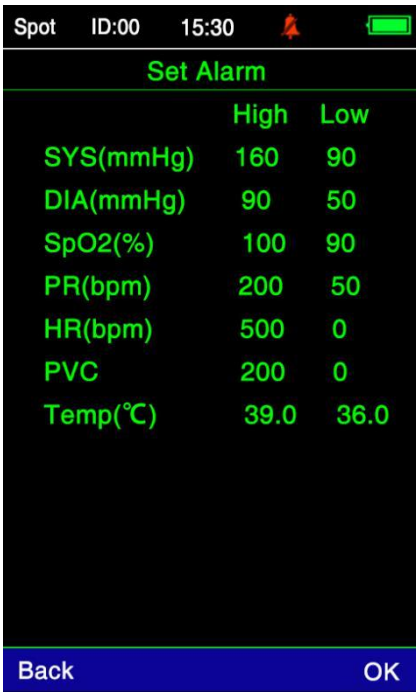


Figure 3-7 Adds User Menu

3.5 Alarm settings

Under the settings menu, select the alarm settings and press the confirmation key to enter the alarm settings interface menu.Pop up the menu shown in Figure 3-8:

ECG Three Lead Mode



ECG five-lead mode

Figure 3-8 Alarm Settings menu

The alarm setting interface displays different interfaces according to the different types of ECG leads.

ECG three-lead mode is not PVC, so there is no alarm upper and lower limit settings. Only in ECG five lead mode.

The alarm setting can select the modified value according to the upper and lower buttons, the upper limit of the same parameter can not be lower than the lower limit, and the lower limit can not be higher than the upper limit.

Shrink pressure alarm upper and lower limit adjustment range :40 mmHg ~280 mmHg

The upper and lower limit adjustment range of diastolic pressure alarm :10 mmHg ~220 mmHg

Adjusted range of upper and lower limits of blood oxygen saturation alarm :100~0

Pulse rate alarm upper and lower limit range :250 bpm ~0 bpm

Body temperature alarm range :45 degrees Celsius ~18 degrees Celsius

Upper and lower limit range :500 bpm ~0 bpm

PVC alarm upper and lower limit range :500 bpm ~0 bpm

3.6 Blood pressure settings

Under the settings menu, select the blood pressure settings and press the confirmation key to enter the blood pressure settings interface menu.Pop up the menu shown in Figure 3-9:

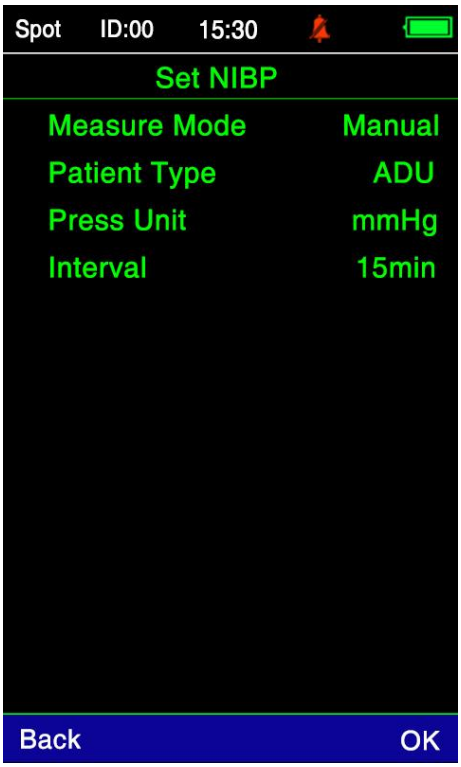


Figure 3-9 Blood pressure settings menu

"Blood pressure settings ":

blood pressure measurement mode: Manual(manual), Auto(automatic), Continual(continuous)

Patient pattern: ADU(adults), PED(children), NEO(newborns)

Pressure unit: mmHg(mmHg), KPA

Measurement interval :1 min、2min、3min、5min、10min、15min、30min、60min、90min. Auto(automatic mode) to measure the interval.

3.7 Blood oxygen settings

Under the settings menu, select the oxygen settings and press the confirmation key to enter the oxygen settings interface menu.Pop up the menu shown in Figure 3-10:

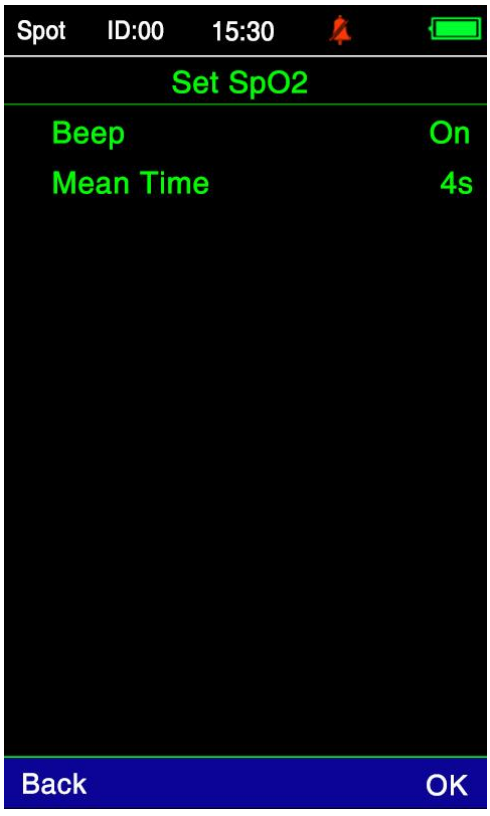


Figure 3-10 Blood oxygen setup menu

"Blood oxygen settings ":

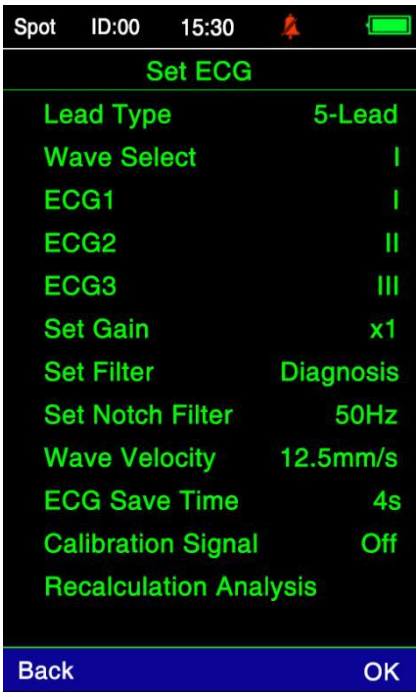
Pulse tone: on, off.

Average time :4 s、6s、8s、10s、12s、14s、16s、30s、60s、120s.

3.8 ECG settings

Under the settings menu, select ECG settings and press the confirmation key to enter the ECG settings interface menu.Pop up the menu shown in Figure 3-11:

ECG Three Lead Mode



ECG five-lead mode

Figure 3-11 Alarm Settings menu

"ECG settings ":

Lead type: three lead, five lead.

Waveform selection: Three leads: I、II、III

Guide V: I、II、III、AVR、AVL、AVF、V1

ECG1：I、II、III、AVR、AVL、AVF、V1

ECG2：I、II、III、AVR、AVL、AVF、V1

ECG3：I、II、III、AVR、AVL、AVF、V1

Gain settings: x0.25、x0.5、x1、x2

filtering settings (Diagnosis(diagnostic mode), Monitor(monitoring mode), Surgery(operation mode), Strong(strong wave mode).

Fall setting :50 Hz、60Hz、.

Waveform velocity: mm/s、12.5mm/s、25mm/s.6.25

Storage time :4 s、6s、8s、10s、12s、14s、16s、30s、60s、120s.

Calibration signal: on and off.

Recalculate the analysis.

3.9 Body temperature units

Under the settings menu, select the body temperature unit and press the confirmation key to enter the body temperature unit interface menu.Pop up the menu shown in Figure 3-12:

Figure 3-12 Temperature Settings menu

"Body temperature units ": degrees Celsius, Fahrenheit

3.10 System setup

Under the settings menu, select the system settings and press the confirmation key to enter the system settings interface menu.Pop up the menu shown in Figure 3-13:

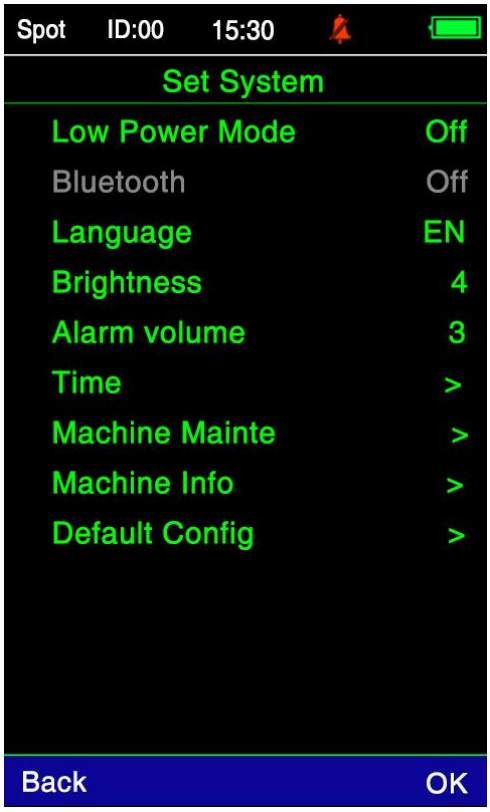


Figure 3-13 System Settings menu

The System Settings menu includes:

"Energy-saving mode ": on, SPOT mode will automatically shut down; off, SPOT mode will not automatically shut down.

⚠Attention⚠

Energy saving mode does not work on monitoring mode.

Bluetooth: Bluetooth module switch.

⚠Attention⚠

Bluetooth mode is not currently supported.

Language options: Chinese, English.

Brightness option :1~4, the larger the series, the brighter the screen.

Alarm volume option :1~3, the higher the series, the louder the sound.

Time: Time adjustment.

Equipment maintenance: maintenance equipment information.

"Equipment Information ": Equipment ex-factory date, version number.

Restore factory settings: restore default factory settings.

3.11 Data review

Under the settings menu, select the data Review and press the confirmation key to enter the data Review Interface menu.Pop up the menu shown in Figure 3-14:

Choose View ID

Select View Listings

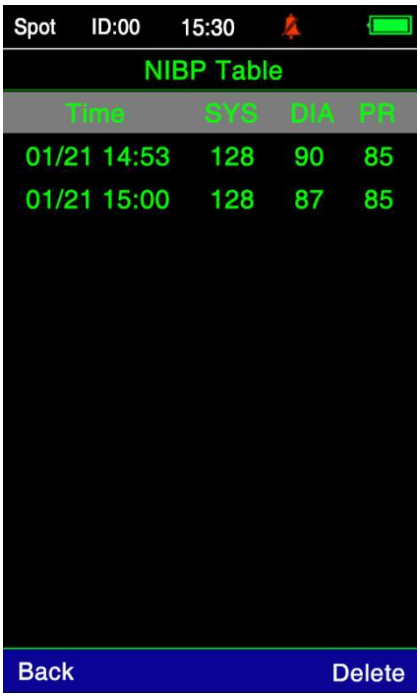
Figure 3-14 Data Review Menu

When the current mode of work is Spot, select the ID number you want to view before entering the view list. If the current working mode is Monitor mode, go directly to the Select View list because the mode is a single user.

3.11.1 List description

"Blood pressure list ": Time(time), SYS(systolic blood pressure), DIA(diastolic blood pressure), PR(pulse rate). As shown in figure 3-15.

"Blood oxygen list ": Time(time), SPO2(blood oxygen), PR(pulse rate). As shown in figure 3-16.



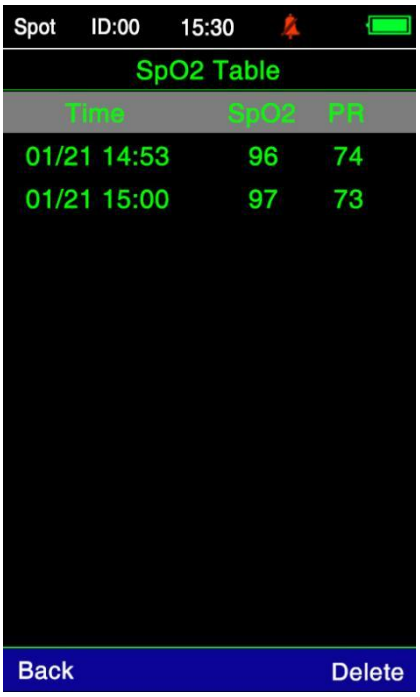
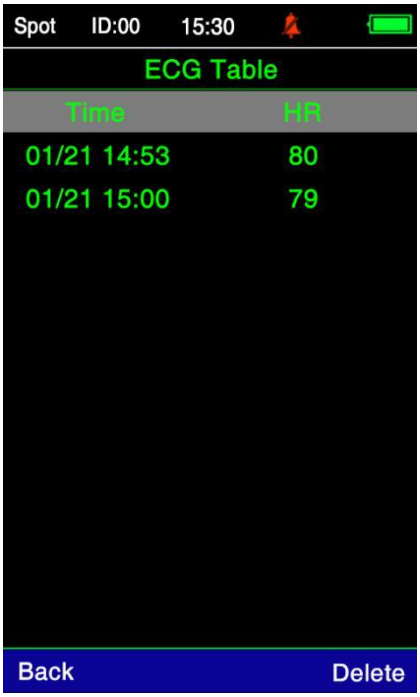


Figure 3-15 Blood pressure list Figure 3-16 Blood oxygen list

HR (heart rate (Time(time). As shown in figure 3-17.

Temperature list: Time(time), TEMP(temperature). As shown in figure 3-18.



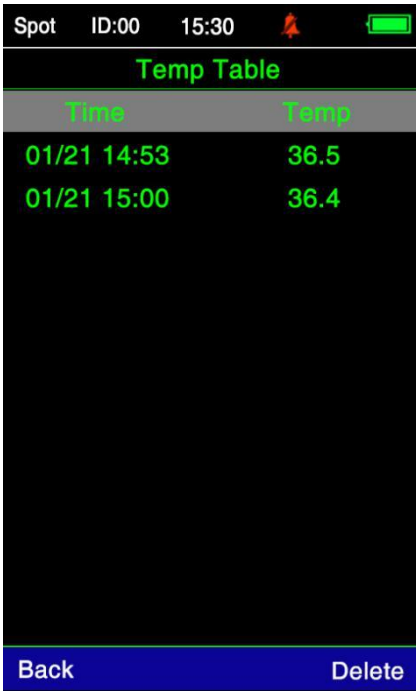
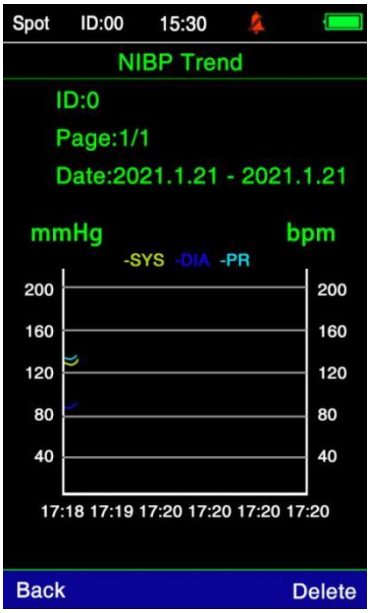


Figure 3-17 Electrocardiogram 3-18 body temperature list

3.11.2 Trends chart

Blood pressure trend chart

The trend chart shows systolic blood pressure, diastolic blood pressure, pulse rate, different color differentiation, the vertical axis on the left represents pressure, the vertical axis on the right represents pulse rate, the horizontal axis below shows time, and the trend also includes ID, pages. Date(the time range of this page data. as shown in Figure 3-19.



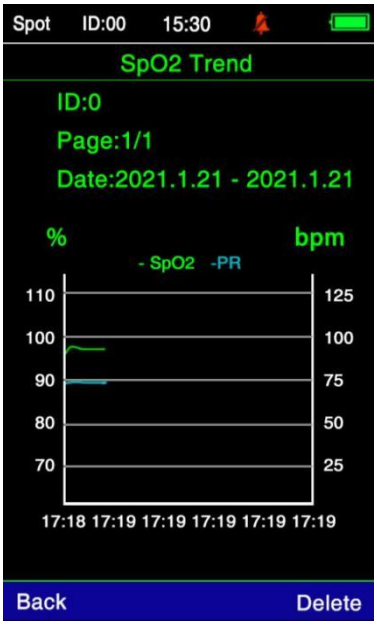


Figure 3-19 Blood pressure trend chart

Blood oxygen trend chart

The trend chart shows blood oxygen, pulse rate, left transverse axis unit, right pulse rate, transverse axis is measurement time. as shown in Figure 3-20.

ECG trend chart

Heart rate is shown in the trend chart, the left horizontal axis unit is bpm, the horizontal axis is the measurement time.As shown in figure 3-21.

Body temperature trend chart

The trend chart shows body temperature, the left horizontal axis is degrees Celsius or Fahrenheit, and the horizontal axis is the measurement time.As shown in figure 3-22.

⚠Attention⚠

Each page displays 11 groups of data, looking at all the data through page turning.

Figure 3-21 Electrocardiogram

四、Maintenance and cleaning

4.1 Maintenance inspections

Before using this equipment, the following checks must be carried out:

- check for any mechanical damage.
- check all exposed conductors, insert parts and accessories.
- check all possible instrument functions for monitoring patients and ensure that the instrument is in good working condition.

If you find any evidence of damage to the instrument, you may not use this monitor to monitor the patient. Please contact the seller or our company.

4.2 General cleaning

Warning: Power must be turned off and AC power must be disconnected before cleaning this equipment, sensor.

This equipment should be placed in a dust-free environment. It is recommended to clean the outer surface of the housing and the display screen. Clean the casing with a non-etching cleaner, such as soap and water. Do not use strong solvents such as acetone. Be careful to prevent damage to the monitor, most cleaners must be diluted to use. Dilute according to manufacturer's instructions and never use worn materials (such as wire velvet or silver polishing agent).

Do not allow any liquid to enter the housing, do not immerse any part of the system into the liquid.

Do not leave any cleaning fluid on any part of the surface of the instrument.

4.3 Use of cleaning agents

In addition to the solutions listed in the "careful" section, any solution that can be specified as a product of the following attributes can be used as a cleaner:

Dilution of ammonia

Diluted sodium hypochlorite (bleach for washing)

The concentration range is about 500 ppm(1：100 diluted household bleach) sodium hypochlorite to 5000 ppm(1：10 diluted household bleach) is very effective. How much ppm depends on how much organic matter (blood, movement) exists on the surface of cleaning and disinfection

Plant mucus) depends.

Diluted formaldehyde 35~37 per cent

Hydrogen peroxide 3

Ethanol

isopropyl alcohol

Monitor and its sensor surface can be wiped with medical alcohol, natural air drying or clean with clean, dry cloth.

The Company is not responsible for the effectiveness of these chemicals as a means of infectious disease control.Please consult with the relevant infectious disease control person or infectious disease expert.

4.4 Sterilization

In order to avoid long-term damage to the equipment, we recommend that the product be sterilized only if deemed necessary. We also suggest that germicidal products should be cleaned first.

Recommended sterilization materials: ethanol, acetaldehyde.

⚠Be careful⚠

Dilute or adopt the lowest possible concentration according to the manufacturer's instructions.

Do not let the liquid into the housing.

Never soak any part of the system.

Do not dump liquid on the system during sterilization.

Do not let the fungicide remain on any surface of the equipment, if there is residue, please wipe it immediately with a wet cloth.

4.5 Disinfection

In order to avoid long-term damage to the product, we recommend that the product be disinfected only if deemed necessary. We also suggest that disinfection products should be cleaned first.

See the relevant sections for ECG leads, SpO2 sensors, blood pressure cuff, temperature probes, respectively.

⚠Be careful⚠

Do not use gas (EtO) or formaldehyde to sterilize the monitor to prevent damage to the monitor.

五、Alarm

This chapter introduces the general information about alarm and the measures to be taken when alarm occurs. You can get each parameter alarm and prompt information in the section about each parameter setting.

5.1 Summary

The so-called alarm refers to the prompt of the monitor to the user when the patient under supervision has enough vital signs to attract the attention of the user or the failure of the machine itself makes the monitoring of the patient not going smoothly.

5.2 Alarm attributes

5.2.1 alarm type

The alarm is divided into two categories: if the alarm originates from the change of the patient's vital signs, that is, the physiological parameters of the monitored patient exceed a specific range or the patient can not be measured by a single physiological parameter overrun, it is called physiological alarm.

5-1 Examples of physiological and technical alarms

Patient or machine condition	Type of alarm generated
The patient's heart rate was measured to be 114 BPM, beyond the range of heart rate alarm set by the user.	Physiological alarm
The patient was found to have ventricular fibrillation	Physiological alarm
ECG measurement module found ECG lead shedding	Technical alarm
Failure of SpO2 measurement module	Technical alarm

5.2.1.1 Physiological alarm classification

Physiological alarm can be divided into two situations: one is that the physiological parameters of the monitored patients exceed the specific range, the other is that the patients can not be measured by a single physiological parameter overrun.

The latter belongs to can temporarily block the former alarm, for example, there are the following:

ECG signal is too weak;

Stopping;

Ventricular fibrillation / ventricular tachycardia;

Pulse not detected;

5.3 Warning Form

When alarm occurs, acousto-optic and text prompts will be carried out.

5.3.1 acoustooptic properties

5-2 Alarm sound and light characteristics

Alarm sound characteristics	Alarm Lighting Features
The mode is "drop-drop" and sounds every 30 seconds (the interval count starts from this sound to the next sound).	Alarm lights flashing red, flashing slow

5.3.2 Text Features

Background color: alarm background color is red.

Color of string: white.

5.4 Alarm status

5.4.1 overview

For each alarm, in two states: trigger state, and clear state. Each moment can only be in one state.

Trigger state: the state when an alarm exists.

Clear status: the state in which the alarm does not exist.

All possible alarms are cleared at the beginning of work, and when the alarm condition is satisfied in the subsequent time, the alarm enters the trigger state.

For the entire alarm system (i.e. for all alarms), there are the following states:

1. normal state: the state in which the alarm can make all hints (including sound, light and text) in the trigger state.

2. alarm mute state: refers to the alarm in the trigger state, light, text prompt but not sound prompt state.

At each moment, the entire alarm system can only be in one state.

5.4.2 alarm mute

Alarm mute state means that any sound prompt (including alarm, keystroke, pulse, etc.) of the monitor is turned off.

5.5 Parameter Alarm

The alarm parameters can be set independently in the alarm setting menu, and the user can set the upper and lower limits of the alarm. For the parameters of setting alarm, when the value of one or more parameters exceeds the alarm limit, the monitor automatically alarm, the following processing:

1) prompt appears on the screen in the form described in the alarm prompt form;

2) if the alarm volume is set, the alarm sound is issued according to the set alarm volume;

3) alarm lights flashing;

5.6 Measures to be taken when alarm occurs

Attention

When a certain alarm occurs, the patient's condition should be checked first.

The alarm information is displayed in the system information area or the system alarm information area. It is necessary to identify the alarm and take corresponding measures according to the cause of the alarm.

1) check the patient condition.

2) identify which parameter is alarming or which alarm is happening.

3) identify the cause of the alarm.

If 4) need, alarm mute.

5) when the alarm condition is lifted, check whether the alarm is eliminated.

Alarm information and prompt information about parameters can be found in each parameter monitoring section.

六、ECG

6.1 ECG monitoring instructions

6.1.1 ECG Monitoring Definition

ECG monitoring produces continuous waveforms of ECG activity to accurately assess the physiological state of the patient at that time. Therefore, the normal connection of ECG cable should be ensured so as to obtain the correct measurement value. The portable monitor displays only one ECG waveform in the three-lead state.

■ monitoring shows parameters including heart rate (HR).

■ the above parameters can be used as alarm parameters.

Attention 6.1.2 ECG monitoring

⚠Warning⚠

ECG cables provided by our company must be used for ECG signal monitoring using portable monitors.

⚠Warning⚠

When you connect electrodes or patient cables, you should ensure that there is absolutely no connection with any other conductive parts or to the ground Touch. Especially be sure that all ECG electrodes, including neutral electrodes, are attached to the patient to prevent their contact with conductive parts or ground.

⚠Warning⚠

Interference and ESU interference from ungrounded instruments near the patient may cause waveform problems. It is recommended not to use devices with electrical radiation near electrocardiogram / respiratory measurements.

6.2 Method of ECG monitoring

6.2.1 ready

1) prepare the patient's skin before placing the electrode.

● the skin is a bad conductor, it is important to obtain good contact between the electrode and the skin.

If ● necessary, shave the body hair at the electrode placement.

● wash skin thoroughly with soap and water. (Do not use ethers and pure alcohol as this increases skin impedance).

Dry ● skin to increase tissue capillary blood flow and remove skin debris and grease.

2) place the electrode on the patient, such as the electrode without conductive paste, apply the conductive paste before placement.

3) connect the electrode lead to the patient cable.

4) confirm the monitor power supply is normal.

⚠Warning⚠

Be careful to stick the discharge pole and make sure the contact is good.

⚠Warning⚠

Check the ECG electrode patch daily for irritation of the skin. If there are signs of allergy, replace the electrode or change the position every 24 hours.

⚠Warning⚠

In order to protect the environment, used electrodes must be recycled or properly treated.

⚠Warning⚠

Check that the lead is normal before starting monitoring. After unplugging the ECG cable, the screen will display the error message of lead shedding and trigger the sound alarm at the same time.

6.2.2 installation of ECG leads

ECG position of the monitoring electrode, the electrode of the five-lead device, as shown in figure 6-1.

■RA white (right arm) electrodes should be placed under the clavicle near the right shoulder.

■LA black (left arm) electrodes should be placed under the clavicle near the left shoulder. Place on the chest wall as shown below.

■RL green (right leg) electrodes should be placed in the lower right abdomen.

■LL red (left leg) electrodes should be placed in the left lower abdomen.

■V brown (chest) electrodes should be placed on the chest wall as shown in Figure 6-2.

⚠Attention⚠

The following table lists the lead names in European and American standards. (R、L、N、F、C in European standards and RA、LA、RL、LL、V in American standards)

United States	Europe
Lead Name Color	Lead Name Color
RA white	R red
LA black	L yellow
LL red	F green
RL green	N black
V brown	C white

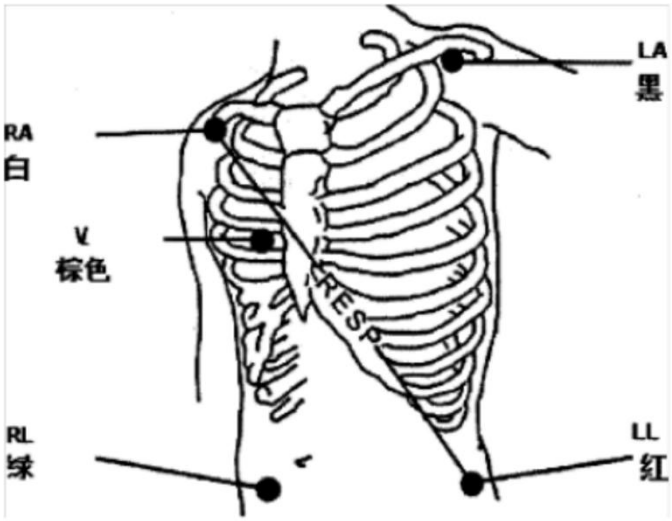


Figure 6-1 Position of lead electrode

⚠Attention⚠

To ensure patient safety, all leads must be connected to the patient.

■ for the five-lead configuration, place the chest (V) lead electrode in one of the following locations, as shown in Figure 6-2:

■V1 in the 4th intercostal of the right margin of the sternum.

■V2 in the fourth intercostal margin of the left sternum.

■V3 in the middle of V2 and V4.

■V4 in the fifth intercostal line of the left clavicle midline.

■V5 at the left axil front, V4. horizontal

■V6 in the middle line of the left axil at V4. same level

■V3R-V7R is located on the right side of the chest wall and its position corresponds to the position on the left.

■VE is located at the uplift of the sword process. for the back "V" lead placement, to place the" V" electrode in one of the following locations.

■V7 in the 5th intercostal of the left posterior axillary line on the back.

■V7R in the 5th intercostal of the right posterior axillary line on the back.

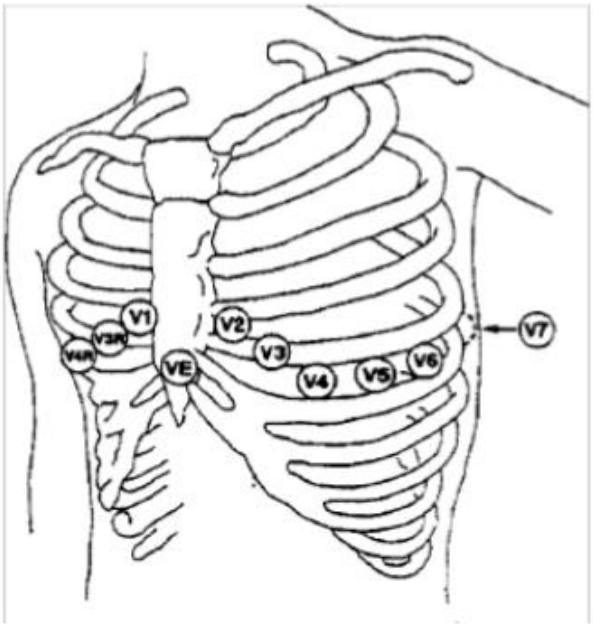


Fig .6-2 Position of thoracic electrode in lead

ECG lead connections recommended for surgical patients.

⚠Warning⚠

When using the electro-surgical (ES) equipment, place the ECG electrode in the middle position between the ES floor and the electro-surgical knife to avoid burns. Cable of electrical surgical equipment can not be wound with ECG cable.

ECG placement of the lead depends on the type of operation performed. For example, for thoracotomy, electrodes can be placed on the side or back of the chest. in the operating room, because of the use of surgical scalpel equipment, sometimes the pseudo-difference may affect the ECG waveform. in order to help reduce the pseudo-difference, the electrode can be placed on the left and right shoulder, close to the left and right side of the abdomen, while the chest lead can be placed on the left side of the middle of the chest. avoid placing the electrode on the upper arm, otherwise the ECG wave will become very small.

⚠Warning⚠

When using electrical surgery (ES) equipment, do not put the electrode on the grounding plate near the surgical equipment, otherwise there will be a lot of interference in the ECG signal.

Features of a good signal:

Tall and narrow without trace.

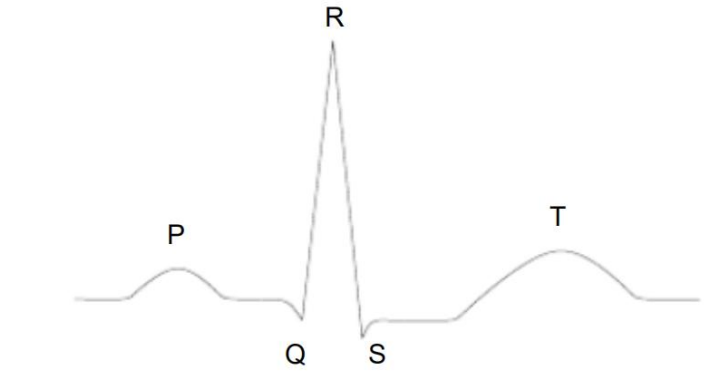
R waves are tall and completely above or below the baseline.

pacing signal is not greater than the height of the R wave.

T wave is less than 1/3 height of R wave.

P waves should be much smaller than T waves.

To obtain a calibrated ECG wave of 1 millivolt, a ECG calibration should be performed, at which time the screen prompts ″calibration can not be guardian



″.

Figure 6-3 Standard ECG Wave

A five-lead ECG device

Users can arrange channel 1, channel 2, channel 3 leads according to their own needs. Guide names on the three channels are displayed above the corresponding waveform and can be changed ECG the menu. appropriate leads can be selected from the I 、II 、III、AVR、AVL、AVF、V for channel 1, channel 2, channel 3, as shown in figure 6-4.

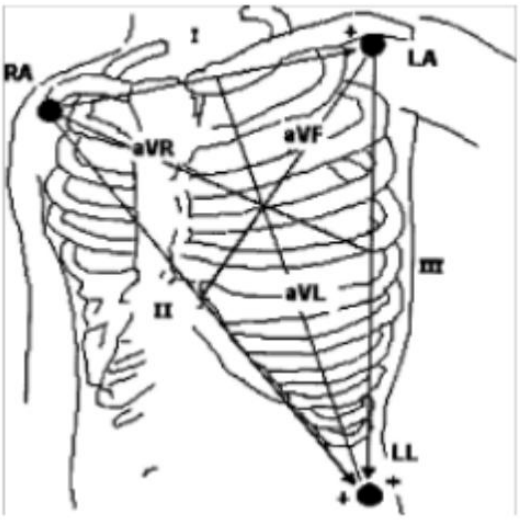


Figure 6-4 ECG leads

⚠Attention⚠

If the electrode is pasted correctly and the ECG waveform is inaccurate, replace the lead.

⚠Attention⚠

Interference and ESU interference from ungrounded instruments near the patient may cause waveform problems.

6.3 ECG operation

■ECG alarm

Alarm when the guard rate exceeds the upper limit or below the lower limit.

⚠Attention⚠

The upper and lower limits of the alarm should be set according to the clinical conditions of each patient.

The upper limit of heart rate alarm is very important in monitoring. The upper limit should not be set too high. Considering the changing factors, the upper limit of heart rate alarm should not be 20 beats / min higher than the patient's heart rate.

■ Lead Type

Optional 5 or 3 leads

■ Waveform Selection

Choose which ECG wave waveform data to calculate the heart rate.

■ Waveform Speed

ECG waveform scanning speed of 12.5,25.0 and 50.0 mm/s three files can be selected.

■ECG 1,ECG 2,ECG 3

Alternative leads are I, II, III, AVR,AVL,AVF,V.

■ gain settings

When the input signal is too large, the peak may be truncated. At this point, the user can manually change the ECG with reference to the actual waveform
The gain file of the waveform to avoid incomplete waveform display.

Each channel gain can be selected, the gain has x0.25、x0.5、x1、x2 four gears, and a scale of 1 millivolt is given on the left side of each channel. The height of a scale of 1 millivolt is proportional to the amplitude.

■ Filter Settings

Diagnosis(diagnosis mode), Monitor(monitoring mode), Surgery(operation mode), and Strong(strong wave mode).

The system can only provide unprocessed real signals when diagnosing. In the "monitoring" and "operation" filtering mode, the ECG waveform will be distorted to varying degrees. At this time, the system can only provide the basic condition of ECG, which will have a great impact on the analysis results of ST segment. ARR analysis results may also have partial effects in surgical mode. Therefore, it is suggested to use diagnostic mode to monitor patients when interference is small. A cleaner or more accurate waveform can be obtained by filtering.

An unfiltered ECG wave is displayed in the diagnostic mode; the monitoring mode will filter out the pseudo-difference that may lead to false alarm; the operation mode in the operating room can reduce the pseudo-difference and interference from the electrosurgical equipment.

6.4 ECG alarm and warning information

Alarm information

The possible alarm in ECG measurement can be divided into physiological alarm and technical alarm. At the same time, ECG measurement process may also produce various prompt information. When these alarms or prompts appear, the visual and auditory representations of the monitor can be referred to the description in the alarm setting section. On the display screen, the physiological alarm and general warning information (general alarm) are displayed in the alarm area of the monitor, while the technical alarm is displayed in the information area of the monitor.

The following classification list describes the part of the alarm that the measurement may produce.

Physiological alarm:

Prompt information	Causes
HR High	HR measurements are higher than the set alarm limit
HR Low	HR measured values are below the set alarm limit
PVC High	PVC measurements are higher than the set alarm limit

Technical alarm:

Prompt information	Causes	Countermeasures
RA shedding	Electrocardiogram electrodes fall off the patient or ECG cables fall off the monitor	Make sure all electrodes, leads and cables are connected properly.
LA shedding		
LL shedding		
V1 shedding		

6.5 Maintenance and cleaning

Maintenance and cleaning

⚠Warning⚠

Turn off the power and disconnect the AC power before cleaning the monitor or sensor.

If ECG cable is damaged or aged, a new cable should be replaced.

⚠Cleaning⚠

The surface of the monitor and its sensor can be wiped with medical alcohol, air-dried or clean with clean, dry cloth.

⚠Sterilization⚠

In order to avoid long-term damage to the product, we recommend that the product be sterilized only if deemed necessary.

We also suggest that germicidal products should be cleaned first.

Recommended sterilization material for monitor:

Ethanol group :70% alcohol ,70% ethyl propyl.

Acetaldehyde group

⚠Disinfection⚠

In order to avoid long-term damage to the product, we recommend that the product be disinfected only if deemed necessary.

We also suggest that disinfection products should be cleaned first.

七、Blood oxygen saturation (SpO2)

7.1 Oxygen saturation monitoring instructions

7.1.1SpO2 guardianship definition

SpO2 volume tracing parameters measure arterial oxygen saturation, which is the percentage of total oxyhemoglobin. For example, if 97% of the hemoglobin molecules in arterial blood bind to oxygen, the blood has 97% oxygen saturation, and the SpO2 reading on SpO2 monitor should be 97%. SpO2 values show the percentage of oxygen-carrying hemoglobin molecules that form oxygenated hemoglobin. SpO2 volumetric parameters also provide pulse rate signals and volumetric tracing waves.

7.1.2SpO2 principles for measuring volumetric parameters

Blood oxygen saturation was determined by pulsating blood oxygen quantitative method. This is a continuous, noninvasive method for measuring hemoglobin oxygenation saturation. It measures how much light emitted from one side of the sensor light source passes through the patient's tissue (such as fingers or ears) to the receiver on the other side.

The wavelength that the sensor can measure is usually red LED 660 nm, infrared LED 940 LED maximum optional output power is 4 mW.

The amount of light passing through depends on a variety of factors, most of which are constant. However, one of these factors, arterial blood flow, varies with time because it is pulsating. By measuring the light absorbed during pulsation, the oxygen saturation of arterial blood may be obtained. Detection of pulsation itself can give a volumetric recording waveform and pulse rate signal.

SpO2″ values and volume tracing waveforms can be displayed on the home screen.

⚠Warning⚠

If there is carboxyhemoglobin, methemoglobin or dye diluted chemicals, the SpO2 value will be deviated.

7.1.3SpO2 volumetric parameter measurement

Sp02″ values and waveforms can be displayed on the home screen.

⚠Warning⚠

If there is carboxyhemoglobin, methemoglobin or dye diluted chemicals, the Sp02 value will be deviated. Blood oxygen saturation / pulse monitoring.

⚠Warning⚠

The cable of the electrical surgical equipment can not be wound with the sensor cable.

⚠Warning⚠

Do not place the sensor on a limb with an arterial or intravenous catheter.

⚠Attention⚠

Do not place the blood oxygen probe on the same limb as the blood pressure cuff because blood flow is blocked during blood pressure measurement

will affect the oxygen saturation reading.

⚠Attention⚠

■ make sure the nails cover the light.

■ probe line should be placed on the back of the hand.

⚠Attention⚠

■Sp02 values are always displayed in a fixed place.

⚠Attention⚠

Sp02 waveform is not proportional to pulse volume.

⚠Warning⚠

Before starting monitoring, check that the sensor cable is normal. when pulling the Sp02 sensor cable from the socket, the screen will display the error message of ″probe shedding″ and trigger the sound alarm at the same time.

⚠Warning⚠

If the sensor packaging or sensor has signs of damage, do not use this Sp02 messenger, should contact the seller to handle.

⚠Warning⚠

Continuous, prolonged monitoring may increase the risk of undesired changes in skin characteristics, such as abnormal sensitivity, redness, blistering, or compressive necrosis, especially in newborns or patients with perfusion disorders and altered or immature skin morphology. Special attention should be paid to checking the location of the sensor according to the quality change of the skin, the correct optical alignment and attachment method. Check the sensor attachment position regularly and change the attachment position when the skin quality drops. Due to the different status of individual patients, more frequent examinations may be required.

7.2 Operation method of blood oxygen saturation monitoring

Volume Measurement SpO2 7.2.1 Adults

1) turn on the monitor;

2) attach the sensor to the proper position of the patient's finger;

3) plug the connector at one end of the sensor cable into SpO2 hole.

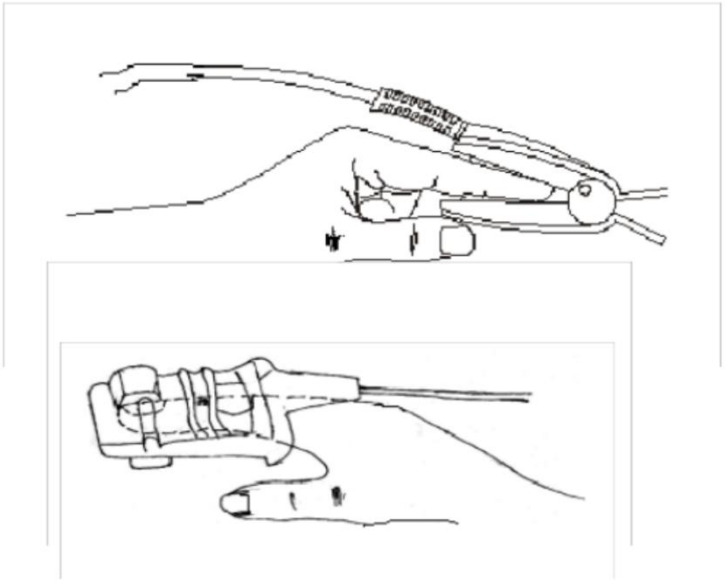


Figure 7-1 Adult oxygen probe

7.2.2 Neonatal SpO2 Volume Measurement

Neonatal SpO2 volume measurement process and adult measurement process is basically the same. The following is a description of neonatal blood oxygen probe and placement method.

1. neonatal blood oxygen probe

Neonatal oxygen probe is composed of Y oxygen probe and neonatal oxygen probe sheath. The LED and PD ends of the Y oxygen probe are embedded in the upper and lower grooves of the sheath of the newborn oxygen probe (as shown in figure 7-2), and the neonatal oxygen probe after embedding is shown in figure 7-3.

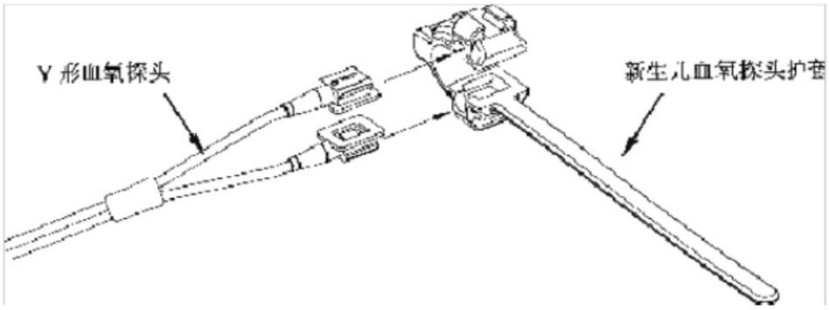


Figure 7-2 Neonatal Oxygen Probe (1)

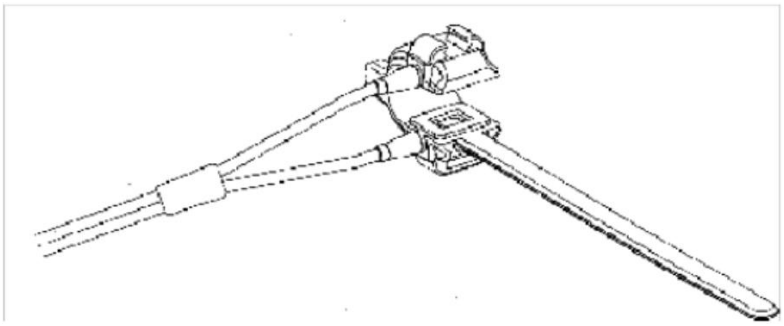


Figure 7-3 Neonatal Oxygen Probe (2)

2. placement of neonatal oxygen probe

Clip the oxygen probe to the hands or feet of the newborn (as shown in figure 7-4).

Hold the oxygen probe, pull the tape and place the V'side of the tape into the V' groove on the corresponding side of the sheath,

properly elongate the strap (about 20 mm) and place the' v', side of the strap into the' V' groove' on the other side of the sheath, then relax the strap and penetrate into the strap where the' V'side' of the strap is chimeric with the' V' groove' on both sides of the sheath

Lock the tape in the first latch, see figure. If the strap is too long, it can be penetrated into the second latch. It's necessary to locate the blood Oxygen probe so that the photoelectric element can be in the correct position. At the same time, be careful not to pull the tape too long, because this will lead to inaccurate measurements and will seriously block blood circulation.

Figure 7-4 Placement of neonatal blood oxygen probe

⚠Attention⚠

If the test site and probe can not be accurately located, it may lead to inaccurate blood oxygen saturation reading, or even unable to search for pulse wave and can not be monitored for blood oxygen, so it should be repositioned at this time.

Excessive movement of the measuring site may cause inaccurate measurement, and the patient should be quiet or replaced at this time to reduce the impact of excessive movement on the measurement.

⚠Warning⚠

In the process of continuous monitoring for a long time, the peripheral circulation and skin condition of the measuring site are checked every 2 hours or so. If adverse changes are found, the measuring site should be changed in time.

In the process of continuous monitoring for a long time, the position of the probe should be checked periodically to avoid the change of the position of the probe

caused by moving and other factors, which will affect the accuracy of the measurement.

7.3 Measurement limits for oxygen saturation monitoring

During operation, the following factors can affect the accuracy of oxygen saturation measurement:

■ high frequency electrical interference, such as interference from the host system itself or from electrical and external scientific instruments such as connections to the system.

■ do not use photo-oxygen meter and oxygen sensor during magnetic resonance imaging scan (MRI), inductive current may cause burns.

■ intravenously dye.

■ patients move too frequently.

■ external light radiation.

Improper installation of ■ sensors or improper contact with objects.

■ sensor temperature (the optimum temperature should be in the range of 28℃~42℃).

■ place the sensor on a limb with a blood pressure cuff, ductus arteriosus, or intraluminal line.

■ the concentration of non-functional hemoglobin such as carboxyhemoglobin (COHb) and n-iron hemoglobin (MetHb), etc.

■ oxygen saturation is too low.

■ circulatory perfusion of the tested site was poor.

■ shock, anemia, hypothermia and the use of vasoconstrictor drugs may reduce arterial blood flow to an unmeasured level.

■ measurements also depend on the absorption of oxygenated hemoglobin and reduced hemoglobin to special wavelength light. If other substances that absorb the

same wavelength exist, they can lead to false or low SP02 values. Such as: hemoglobin carbide, iron hemoglobin, methylene blue, rouge indigo.

■ suggest to use the Sp02 sensor introduced in the attachment.

7.4 Blood oxygen saturation alarm information

Sp02 Alarm Information

Sp02 part of the physiological alarm, technical alarm and prompt information that may occur in the measurement of the module are listed in the following table.

Physiological alarm:

Prompt information	Reasons
Sp02 too high	Sp02 measurement is higher than alarm limit
Sp02 low	Sp02 measured below alarm limit
PR too high	PR measurement is higher than alarm limit
PR too high	PR measured below alarm limit

Technical alarm:

Prompt information	Reasons	Countermeasures
SysErr3 system error	Self-test failure of blood oxygen module	Contact seller or manufacturer
SysErr4 system error	Blood oxygen module communication error	Contact seller or manufacturer
probe not connected/ no Sensor	probe not connected	Make sure the sensor is placed on the patient's fingers or other parts, and the monitor is properly connected to the cable.
Probe shedding/ Sensor off	Probe shedding	

Prompt information (including general warnings):

Prompt information	Reasons
No pulse/ no pulse detected	No pulse
Search for pulse/ Searching	Search for pulse

7.5 Maintenance and cleaning

Attention and cleanliness

⚠Warning⚠

Turn off the power and disconnect the AC power before cleaning the monitor or sensor.

⚠Be careful⚠

Do not sterilize the sensor with high pressure.

Don't soak the sensor in liquid,

Reuse is prohibited if the sensor or cable has signs of damage or deterioration.

Cleaning:

The appearance of the sensor can be wiped with a cotton ball or soft cloth stained with medical alcohol, and then dried with a dry cloth. the light emitting tubes and receiving devices of the sensor can also be cleaned in the same way.

The cable can be cleaned and disinfected with 3% hydrogen peroxide or 70% isopropanol. The active reagent is also effective. The joint can not be immersed in the above solution.

八、Body temperature (TEMP)

8.1 Temperature monitoring instructions

Portable monitor can use temperature probe to measure body temperature data.

Temperature measurement setting

If ■ are using a disposable temperature probe, insert the temperature cable into the socket and connect the probe to the cable

Get up. For reusable temperature probes, you can insert them directly into the socket.

■ attach the temperature probe firmly to the patient.

■ power on the system.

⚠Warning⚠

The probe cable should be detected before starting monitoring.

⚠Attention⚠

The disposable temperature probe can only be used once.

⚠Warning⚠

Carefully hold the temperature probe and cable, when not used, the probe and cable should be pulled into a loose ring. If the wires are too tight, will cause mechanical damage.

⚠Warning⚠

Calibration of the temperature meter must be carried out every two years (or according to the time indicated by the hospital regulations).

8.2 Temperature Alarm Information

physiological alarm, technical alarm and prompt information that may occur in TEMP measurement are listed in the following table.

Physiological alarm:

Prompt information	Reasons

Hyperthermia	The temperature measurement is higher than the set alarm limit.
Hypothermia	The temperature measurement is higher than the set alarm limit.

Technical alarm:

Prompt information	Reasons
SysErr5 system error	Temperature module self-detection error/communication error

Warning:

Prompt information	Reasons
Measuring Exceeding Range/ Overrange	Beyond Scope

8.3 Maintenance and cleaning

⚠Warning⚠

Turn off the power and disconnect the AC power before cleaning the monitor or the sensor connected to it.

Reusable temperature probes:

1) temperature probe heating shall not exceed 100℃(212℉). which can only withstand temperatures of 80℃(176℉)~100℃(212℉) for a short time.

Do not sterilize the 2) probe with steam.

3) can only be sterilized with alcohol-containing detergents.

4) in the use of straight probe, should be possible with protective glue cover.

5) cleaning the probe, hold the head in one hand and scrub the probe in the direction of the connector with a wet velvet cloth in the other.

⚠Attention⚠

If you are using a disposable temperature probe, repeated disinfection or reuse is not allowed.

⚠Attention⚠

In order to protect the environment, the disposable temperature probe should be recovered or properly treated.

九、Non-invasive blood pressure measurement (NIBP)

9.1 Non-invasive blood pressure monitoring instructions

Non-invasive blood pressure (NIBP) was measured by oscillatory method;

Available for adults, children and newborns;

Measurement mode: Manual(manual), Auto(automatic) and Stat(continuous measurement). Systolic pressure, mean pressure and diastolic pressure were shown in each mode.

Manual″ mode: only one measurement.

″Auto″ mode: measurement repeat. The interval can be set to 1/2/3/5/10/15/30/60/90 minutes.

Stat″ mode: continuous measurement for 5 min.

⚠Warning⚠

Non-invasive blood pressure measurements should not be performed in patients with sickle cell disease and any patients with skin damage or expected damage.

For patients with severe coagulation disorders, automatic blood pressure measurements should be determined according to clinical evaluation, because there is a risk of hematoma at the friction between the limb and the cuff.

When measuring in children and newborn patients, you must ensure that the correct mode settings have been selected (see patient Information menu Settings). The use of the wrong patient model has the potential to endanger patient safety, as higher adult blood pressure levels are not suitable for children and newborns.

9.2 Operation method of noninvasive blood pressure monitoring

9.2.1 Non-invasive Blood Pressure Measurement

The inflatable tube connecting the blood pressure sleeve and the monitor should be smooth and not entangled.

1. insert the inflatable tube into the monitor blood pressure sleeve interface, connect the instrument power supply.

2. tie the blood pressure cuff on the patient's upper arm or thigh as shown in figure 7-1.

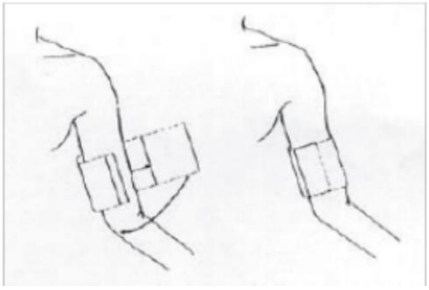


Figure 9-1 Sleeve Use

◆ confirm that the cuff is fully deflated.

◆ use the appropriate size cuff to ensure that the scarf is located on the appropriate artery. Make sure the cuff wound is not too tight, otherwise it may cause distal discoloration or even ischemia.

⚠Attention⚠

The cuff width should be 40% of the circumference of the limb. (50% of newborns), or 2/3 of the length of the upper arm. An inflatable part of the cuff should be 50~80% long enough to surround the limb. Improper size cuff will produce wrong reading. If there is a problem with the cuff size, use a larger cuff to reduce errors.

Adult/neonatal/infant reusable cuff:

Type of patient	Limb circumference	Sleeve width	Length of inflatable tube
Babies	10~19 cm	cm 8	1.5 m ~3 m
Children	18~26 cm	cm 10.6	
Adult 1	25~35 cm	14 cm	
Adult 2	33~47 cm	17 cm	
Leg leg	46~66 cm	cm 21	

Neonatal/infant disposable cuff:

Size	Limb circumference	Sleeve width	Length of inflatable

			tube
1	3.1~5.7 cm	2.5 cm	1.5 m ~3 m
2	4.3~8.0 cm	cm 3.2	
3	5.8~10.9 cm	cm 4.3	
4	7.1~13.1 cm	5.1 cm	

◆ check that the edge of the cuff falls within the range marked <->. If not, change a more suitable cuff.

3. Connect the cuff and the inflatable tube. Limbs used for pressure measurement should be placed at the same level as the patient's heart. If this is not possible, the measurement results are corrected by the following correction methods:

◆ if the cuff is above the heart level position, the gap per cm should be added 0.75 mmHg to the display value (0.10 kPa).

◆ if the cuff is below the heart level position, the gap per cm should be reduced by 0.75 mmHg on the display value (0.10 kPa).

4. Verify that the measurement mode is correct (the measurement mode is displayed in the boot interface information area).

5. Press the corresponding function button 2 on the front panel to start inflatable pressure measurement.

9.3 Operations Tips

1. an automatic measurement

The user can select the time interval value for automatic measurement. After that, the system automatically inflate the measurement according to the setting interval.

⚠Warning⚠

The non-invasive pressure measurement in automatic mode is drawn too long, and limb friction with cuff may be accompanied by purpura, ischemia and nerve injury. When monitoring patients, check the color, warmth and sensitivity of the distal limb.

Once any abnormalities are observed, place the cuff in another place or immediately stop the blood pressure measurement.

2. Stop automatic measurement

Press the stop button at any time during the automatic measurement process to stop the automatic measurement, the interval time is retimed, waiting for the next measurement time to arrive before starting the measurement.

3. Perform a manual measurement

◆ press the start button, start a manual measurement.

◆ in the free time of automatic measurement, press the start measurement button, you will start a manual measurement. If you press the stop button again, you will stop the manual measurement and continue to perform the automatic measurement.

⚠Attention⚠

If there is doubt about the accuracy of the reading, check the patient's vital signs in a possible way before checking the function of the blood pressure monitor.

⚠Warning⚠

If liquid splashes on equipment or accessories, especially when liquid is likely to enter the pipe or monitor, stop using contact with maintenance department.

Limitations of measurements

According to the patient's condition, there is some limitation in oscillatory measurement. This measurement looks for regular pulse waves generated by arterial pressure. When the patient's condition makes this detection difficult, the measurement becomes unreliable and the measurement time increases. The user should recognize that the following conditions interfere with the measurement method, making the measurement unreliable or lengthening the measurement time. In such cases, the patient's condition will render the measurement impossible:

■ Patient movement

If the patient is moving, shivering or spasmodic, the measurement will be unreliable or even impossible because these conditions may interfere The detection of arterial pressure pulsation will prolong the measurement time.

■ Arrhythmia

If the patient shows irregular cardiac beats caused by arrhythmia, the measurement will be unreliable or even impossible, and the measurement time will be will be extended.

■ Cardiopulmonary bypass

If the patient is connected with an artificial cardiopulmonary machine, it will not be measured.

■ Pressure change

If, at some point, the arterial pressure pulsation is being analyzed to obtain the measured value, when the patient's blood pressure changes rapidly, measurements will not be reliable or even possible.

■ Severe shock

If the patient is in severe shock or hypothermia, the measurement will be unreliable. Because a decrease in blood flow to the periphery decrease in arterial pulsation.

■ Extreme heart rate

Blood pressure can not be measured when heart rate is below 40 bpm and above 240 bpm.

■ Obese patients

The thick layer of fat under the limb reduces the accuracy of measurement because fat causes the shock from the artery to be blocked Nepal can not reach the cuff.

9.4 NIBP Alarm messages

NIBP measurement may occur part of the physiological alarm, technical alarm listed in the following table:

Physiological alarm:

Prompt information	Reasons
SYS too high	The systolic pressure measurement value is higher than the set alarm

	upper limit.
SYS low	The systolic pressure measurement value is higher than the set alarm limit.
DIA too high	The diastolic blood pressure measurement value is higher than the set alarm upper limit.
DIA too high	The diastolic blood pressure measurement value is higher than the set alarm limit.

Technical alarm:

Display Information Notes	Causes
System error/ SysErr	Self-examination failure
SysErr2 system error 2/	Blood pressure module system error
cuff strap loose/ CuffLoose	It may be that the cuff is wound loosely or not
sleeve type wrong / CuffErr	Neonatal cuffing in adult mode
Air leakage/ Leakage cuff	Could be a leak in a valve or gas path
Bad pressure/ PressErr	Maybe the valve can't open properly
Weak signal/ Weak	The pulse is too weak or the cuff is too loose
Exceed pressure/ OverRange	Maybe the blood pressure of the subjects exceeded the range
Arm movement/ Motion	It may be measured when the signal contains false motion errors or too much interference
overvoltage protection/ Protect	Sleeve pressure over range, adult :300 mmHg, newborn :150 mmHg
Signal saturation/ Saturate	The signal amplitude is too large for movement or other reasons

Measurement timeout/ TimeOut	Adult: cuff pressure above 2 kPa (15 mmHg) for more than 3 min (180 s) Neonatal: cuff pressure above 0.67 kPa (5 mmHg) more than 90 s time
Reset/ Reset	Hardware Reset of Blood Pressure Module

9.5 Maintenance and cleaning

⚠Warning⚠

Do not squeeze the rubber tube on the cuff.

Do not let water or cleaning fluid flow into the connector socket at the front end of the monitor to prevent damage to the instrument.

When cleaning the monitor, only wipe the periphery of the connector socket, not its interior.

Reused blood pressure cuff

The cuff can be sterilized by conventional high pressure sterilization, gas or radiation disinfection in a hot air oven, or by immersion in a decontamination solution. But remember to remove the rubber bag when using this method. The cuff can not be dry-cleaned. Sleeve can be machine wash or hand wash, hand wash can prolong the service life. Before cleaning, remove the latex rubber bag. After washing, wait for the cuff to dry thoroughly, and then re-pack the rubber bag.

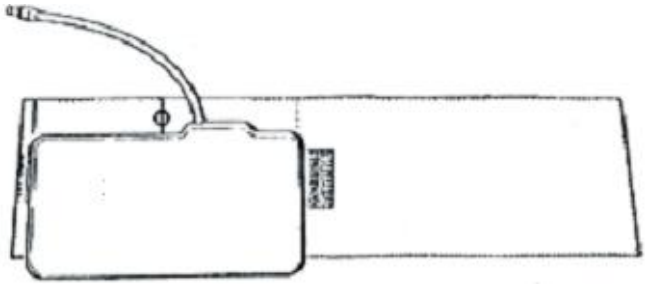


Figure 9-2 Replacement of plastic bags in cufflinks (1)

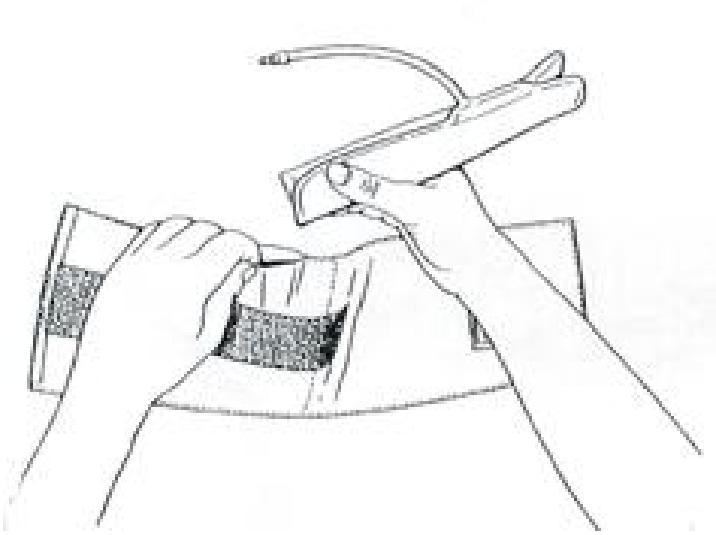


Figure 9-2 Replacement of plastic bags in cufflinks (2)

To reload the rubber bag into the cuff, first place the rubber bag at the head end of the cuff, so that the rubber tube is in line with the large opening at the long end of the cuff. Now roll up the rubber bag longitudinally and insert it into the cuff opening, holding the hose and cuff. Shake the entire cuff until the rubber bag is in place. Introduce the leather tube into the cuff and penetrate through the small hole lining.

Disposable blood pressure cuff

Disposable blood pressure cuff is specified for only one patient. Do not use the same cuff for different patients. Do not sterilize disposable cuff or high pressure steam. The disposable cuff can be washed with soap to control infection.

⚠Attention⚠

In order to protect the environment, disposable blood pressure cuff must be recycled or properly treated.

Appendix I Annex Specifications

⚠Warning⚠

The following list of accessories specified by the manufacturer. The use of other models of accessories may damage this monitor.

1. ECG annex

Name of name	Specifications	Model
Integrated five-lead line (US Standard)	Plug: AMP 6 PIN plug Patient cable: five-core shielded wire Patient lead: single core double shield Electrode connector :4.0 button	98ME01AA039
Adult ECG electrodes	Liquid glue, Ag/AgCL sensors, Press button, foam backing , Φ55MM	YA55
Children ECG electrodes	Liquid glue, Ag/AgCL sensors, Press button, foam backing , Φ30MM	YD30-5

2. SpO2 annex

Name of name	Specifications	Model
Finger clip oxygen probe	Adopt imported special Nellcor sensor. Two common specifications. Probe: Adults and Children	L6077/L6141
Soft finger sleeve oxygen probe	Adopt imported special Nellcor sensor and none Class TPU Medical Cable, Four Common	L6078/L6142

	Specifications	
	Probe: Adult/Child/Baby/Newborn	
Multifunctional oxygen probe	Pediatric bundling Press button, foam backing , Φ30MM	L6143

3. TEMP(body temperature) Annex

Name of name	Specifications	Model
YSI-401 cavity probe	Plug :6.3 mono plug Conductor :3.0 26AWG/1C shield 2.5 M Probe :4 mm Resistance :2252 Ohm B at 25℃:3935 Precision :0.1℃±30~45 Probe: Adult/Child/Baby/Newborn	ZX -F0002
YSI-409B skin temperature probe	Plug :6.3 mono plug Conductor :3.0 26AWG/1C shield 2.5 M Probe :12 MM stainless steel disc Resistance :2252 Ohm B at 25℃:3935 Precision :0.1℃±30~45	ZX -F0001

4. NIBP(blood pressure) annex

Adult/neonatal/infant reusable cuff:

Type of patient	Limb circumference	Sleeve width	Length of inflatable tube
Babies	10~19 cm	8 cm	1.5 m ~3 m
Children	18~26 cm	10.6 cm	
Adult 1	25~35 cm	14 cm	
Adult 2	33~47 cm	17 cm	

Leg leg	46~66 cm	21 cm	

Neonatal/infant disposable cuff:

Size	Limb circumference	Sleeve width	Length of inflatable tube
1	3.1~5.7 cm	2.5 cm	1.5 m ~3 m
2	4.3~8.0 cm	3.2 cm	
3	5.8~10.9 cm	4.3 cm	
4	7.1~13.1 cm	5.1 cm	

Appendix II Product Specifications

1. Classification

Standard Electrical Protection	Class I electrical equipment
EMC category	A level
Standard electrical resistance	ECG (RESP) is CF; TEMP,SpO2、NIBP is BF;
Anti-liquid level	General sealing instrument, no function to prevent liquid from entering
Disinfection/sterilization methods	See chapter VI for details.
Working methods	Continuous work

2. Specifications

2.1 Size and Weight

Size	146 mm x 67mm x 30mm
Weight	250 g

2.2 Environment

Temperature

Working	0~40 ℃
Transport and storage	-20~60 ℃

Humidity

Working	≤85 %
Transport and storage	93%≤(no condensation)

Altitude

Working	-500 to 4,600 m (-1,600 to 15,000 ft)
Transport and storage	-500 to 13,100 m (-1,600 to 43,000 ft)

2.3 Power Supply

Input :100~240 V exchanges ,50/60 Hz,

Output: DC ： 5V ,2A

2.4 Display

3 waveforms Maximum

1 alarm indicator (red)

1 battery charging LED (red/green)

2.5 Battery

3.7 V -2000m Ah Lithium rechargeable batteries

3. ECG specifications

3.1 Lead configuration

Standard 3 or 5 Leads

Three leads RA、LA、LL, lead mode: I ,II ,III

Five leads RA、LA、LL、RL、V, lead mode: I ,II ,III ,aVR,aVL,aVF,V

3.2 Gain

×0.25mm/mV, ×0.5mm/mV, ×1mm/mV, ×2mm/mV

3.3 Heart rate

Heart rate range

Adult	15~300 bpm (beats/min)
PED/NEO	15~350 bpm(beats/min)
Accuracy	±1% or bpm,1
Resolution	1 bpm(beats/min)

3.4 Sensitivity

>200 uV (peak)

3.5 Differential Input Impedance

>5MΩ

3.6 Bandwidth

Diagnostic	0.05~100 Hz
Monitoring	0.5~40 Hz
Surgery	1~20 Hz
Strong	5~20 Hz

3.8 Lectrode offset potential

±300 mV

3.9 ECG Signal range

8 mV(Peak)

3.10 Calibration signal

1 mV(Peak),5% accuracy

4. SpO2 specifications

4.1 Measurement Range:

SpO2: 0-100 %

PR: 0-254 bpm

Perfusion index: 0.05%-20%

4.2 Accuracy range

SpO2: 70%-100%

PR: 30-254 bpm

Perfusion index: 0.05%-20%

4.3 Accuracy

SpO2:

Adult/Pedia: ±2digits(70%-100%)

Neonate: ±3digits (70%-100%)

On motion conditions: ±3 digits

PR:

Adult/Pedia: ±3 bpm

Neonate: ±3 bpm

On motion conditions: ±5 bpm

5.TEMP

5.1 Temperature sensors

YSI series

5.2 Measurement

Range 25 ～ 45 ℃

Resolution 0.1 ℃

Accuracy ±0.1℃

6.NIBP specifications

6.1 Measuring Technology:

Automatic oscillometry technology

6.2 Mode

Manual/Auto/Stat

6.3 Measurement interval in Auto Mode:

1,2,3,5,10,15,30,60,90

6.4 Pulse rate range

40-240 bpm

6.5 Range and accuracy of measurement

Pressure range 0-300 mmHg

Pressure Accuracy 1 mmHg

Blood pressure Range

	Adult	Pediatric	Neonatal
SYS	40-270 mmHg	40-200 mmHg	40-135mmHg
DIA	10-210 mmHg	10-150 mmHg	10-95 mmHg
MEAN	20-230 mmHg	20-165 mmHg	20-105 mmHg

Blood pressure accuracy:

Maximum Mean error ±5 mmHg

Maximum standard deviation 8 mmHg

6.6 Overpressure protection

ADU 290 mmHg

PED 240 mmHg

NEO 145 mmHg